

**PRIVATIZATION AND DECENTRALIZATION IN DRINKING  
WATER SUPPLY CHAIN MANAGEMENT**  
Lessons Learned from the Netherlands for Indonesia

**THESIS**

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

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**AND**

**ENVIRONMENTAL AND INFRASTRUCTURE PLANNING  
FACULTY OF SPATIAL SCIENCE  
UNIVERSITY OF GRONINGEN**

**2008**

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**(Ir. Tubagus Furqon S, MA, Ph.D)**

*Abstract*

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The understanding the innate characteristic of goods and service in drinking water supply provision leads to the implementation of drinking water supply chain management for water supply provision. This chain covers all activities related to the cycle of water which starting from securing raw water sources, water abstraction from natural environment (surface and/or groundwater), the production of drinking water and the distribution drinking water to the customer. Furthermore, the chain continues with the collection and transportation of wastewater, treatment and discharge back it into the natural environment (surface and/or groundwater).

This research provides a comparative study and analysis of the Netherlands and Indonesia related to the implementation of drinking water supply chain management and the influence of privatization and decentralization to its institutional arrangements. The elements that analyzed are the adoption of drinking water chain and the influence of privatization and decentralization on the institutional arrangements of drinking water supply chain, i.e: separation of owner and provider, autonomy of utilities, adoption of competitive discipline, and adoption of cost recovery for the service.

The two countries have differently adopted the concept of drinking water supply chain and respond to the influence of privatization and decentralization. The Netherlands have implemented the drinking water supply chain for the provision of drinking water since around 1930 while Indonesia since 2004. As the result, the performance of drinking water supply provision in the Netherlands is categorized as good. The response for privatization and decentralization also are different. The Netherlands sees privatization just as an idea for increasing efficiency of the activities along the chain rather than delegating the monopoly to the private sector. Indonesia sees that privatization more as the opportunities to increase investment for extending coverage of the service. In the context of decentralization, the two countries adopted decentralization in managing the drinking water supply chain.

From similarities and differences in adopting the concept of drinking water supply chain management, privatization and decentralization, some lesson learnt are withdrawn for Indonesia in order to improve the performance of the drinking water supply provision. Some lessons learnt that taken from the Netherlands are: 1. Specific and integrated legislation for drinking water supply chain, 2. Privatization as adoption of commercial principles, 3. Managerial autonomy of drinking water supply company and 4. The multi-institution coordination in drinking water supply chain.

Based on lessons learnt and the contextual condition of Indonesia, there are some recommendation to improving the management of drinking water supply chain in Indonesia, they are: 1. Creating specific legislation for drinking water supply chain management, 2. Strengthen public sector for managing drinking water supply chain and the adoption of commercial principle, 3. Increasing local government cooperation for increasing managerial autonomy of water supply company, 4. Increasing awareness of communities on drinking water supply chain management and building mechanism for coordination in managing drinking water supply chain.

**Keywords:** Privatization, Decentralization, Drinking water supply chain management.

## **GUIDELINE FOR USING THESIS**

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## **PREFACE**

The idea of this thesis basically emerged from the experience satisfied with the water supply provision in the Netherlands during my study. This gives me curiosity to obtain more understanding on how the Netherlands provide this service to its all citizen. The institutional arrangement in drinking water supply chain management was chosen as the main object of analysis in this thesis. From this discussion there will be some lessons learnt for improving drinking water supply provision in Indonesia.

This master thesis is a final part of my study in Double Master Degree Programme of Environmental and Infrastructure Planning (Faculty of Spatial Science, RuG, the Netherlands) and Development Planning and Infrastructure Management (School of Architecture, Planning and Policy Development, ITB, Indonesia).

I realize that there is much support for me to finish my thesis. Let me give my greatest thanks to Allah SWT for blessing me during my studies in the Netherlands. Then I would like to address my special thanks to my supervisor, Prof. EJMM Arts (RuG) and Pradono, SE. M.Ec. Dev. Dr.-Eng (ITB) for gives me encouragements and enlightenments during writing my thesis.

Moreover, I would like to express my gratitude to all the lectures and faculty and staff in ITB and RuG, and also for teachers in ITB Language Center. I would like to express my gratitude for the Bappenas and Badan Perencanaan Daerah Kota Tangerang for giving me a chance to study in ITB and RUG, and also for the Netherlands Education Support Office (NESO) through StuNed program for giving me financial support. I would also like to thank to my classmates, both in ITB and the University of Groningen. Finally, many thanks to my family in Tangerang-Indonesia, especially for my parents, my wife Erni, and my sons Rayhan & Kamil for their support, love and patience during my study in Groningen.

Groningen, August 2008

Mochamad Fatwadi

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## LIST OF ABBREVIATIONS

ADB	Asian Development Bank
BPP-SPAM	Badan Pendukung Pengembangan Sistem Penyediaan Air Minum (Supporting Board for Drinking Water Supply Provision)
BOOT	Build, Operate, Owned, Transfer
IFI	International Financial Institution
MDG	Millenium Development Goal
PDAM	Perusahaan Daerah Air Minum
PDAM	Perusahaan Daerah Air Minum
Perpamsi	Persatuan Perusahaan Air Minum Seluruh Indonesia (Indonesian Association of Drinking Water Supply Company)
PLC	Public Limited Company
SPAM	Sistem Penyediaan Air Minum (Drinking Water Supply System)
UFW	Unaccounted for Water
UK	United Kingdom
UN	United Nations
UNHCS	United Nations Center for Human Settlements
UNICEF	United Nation Children Fund
USA	United States of America
UvW	Unie van Waterschappen
VEWIN	Vereniging van Exploitanten van Waterleidingbedrijven in Netherlands (Netherlands Waterworks Association)
VNG	Vereniging van Nederlandse Gemeenten
VROM	Netherlands Ministry of Housing, Spatial Planning and Environment
WFD	Water Framework Directive
WHO	World Health Organization

# CHAPTER I

## INTRODUCTION

### I.1 Background

Drinking water supply service is one of important infrastructure. This is vital for the sustained existence of human beings. The availability of quality drinking water supply will determine our quality of life now and in the future. Related to sustainable development, the adequate of water availability, including drinking water, in the terms of quality and quantity becomes important requirement for achieving sustainable development (Kundzewicz, 1997).

The importance of drinking water supply in the context of sustainable development puts the access to this resource as a kind of human right. This is based on the statement from UN Water Conference in 1977 that *"all peoples, whatever their stage of development and their social and economic conditions, have the right to have access to drinking water in quantities and of a quality equal to their basic needs"* (United Nations Children's Fund, 1995 in Finger M. , 2005). Despite many activities had been undertaken for increasing this access since that time, nowadays the number of people without access to safe drinking water supply is still increasing (Kundzewicz, 1997). Over 1.1 billion world population mostly in developing countries still do not have access to safe drinking water (World Bank, 2003). This condition more or less gives contribution to the fact that around 2 million people die each year due to the disease directly related to low quality drinking water. This measurement places diarrhoeal diseases as the 6<sup>th</sup> highest burden of disease on global scale (World Health Organization, 2003).

This low access to safe drinking water leads to a vicious cycle of poverty and diseases (World Health Organization, 2005) since access to drinking water is closely related to income distribution whereas most of population that have low

access to safe water supply service is poor (Brisco, 1992). The mechanism of this vicious cycle simply can be explained as poverty leads to deprivation, which leads to consuming unsafe drinking water, which leads to the diseases and inability to work, and finally leading to increase poverty (World Health Organization, 2005). Indeed, access to safe drinking water can be seen as one of important aspect in reducing poverty (Calderon & Serven, 2004) and as important aspect in achieving sustainable development. Moreover, the issue related to water and poverty nowadays is recognized as something important by international community. The launching of Millennium Development Goals (MDG) that mention better access to safe and drinking water as one of the goals is clearly stated that by the 2015 the proportion of the people without sustainable access to safe drinking water and basic sanitation must be decreased by 50% (Furukawa, 2005). As a consequence, sustainable drinking water supply is required for achieving this target.

Drinking water supply provision can be seen from a logistical chain perspective (Kuks, 2006). In this context, terms of logistical chain means that there is a process needed to meet the demand for drinking water as product. In order to fulfill the demand, various and sequential activities is needed in the supply chain of drinking water which is starting with securing raw water sources, water abstraction from natural environment (surface and/or groundwater), the production of drinking water by water treatment and its distribution to customer. Furthermore, the chain continues with the collection and transportation of wastewater, treatment and discharge back it into the natural environment (surface and/or groundwater).

The concept to see drinking water supply provision based on water supply chain is related to the concept of water cycle management. The importance of water cycle management is increasingly recognized for developing sustainable drinking water supply provision<sup>1</sup>. National Committee of Water Engineering Australia defines

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<sup>1</sup> Water Cycle Management: A position Paper prepared by National Committee of Water Engineering ([www.arq.org.au](http://www.arq.org.au)) accessed 07/08/2008. 12.35 p.m.

water cycle management<sup>2</sup> as “ *a broadly based interactive approach that addresses competing community demands placed on a region's water resources so as to meet defined water quantity and quality objectives*”. This cycle involves drinkable water supply; sewage collection, treatment and effluent disposal; storm water collection, treatment and disposal; and reclaimed (recycled) water collection, storage, treatment and re-use or disposal<sup>3</sup>.

The successful of infrastructure service delivery, including drinking water supply provision, depends on designing and implementing its institutional arrangements. According to Kessides (1993), institutional arrangements are perceived as “*all factors influencing the environment in which a project and organizational entity operate*”. Furthermore, this environment involves structure of ownership, horizontal relationship among entities (e.g. competition), hierarchical relationship (e.g. regulatory controls), financing responsibility, and participation by various groups in decision making. Appropriate institutional arrangements of infrastructure provision can eliminate potential inefficiency and effectiveness in fulfilling the demand (Kessides, 1993) and it can be argued that appropriate institutional arrangements finally can ensure sustainability of infrastructure service. This is based on the discourse that institutional aspect of infrastructure is connected to the goal of promoting efficiency, fairness and accountability of supply of infrastructure service (Kessides, 1993). The important of institutional arrangements are recognized in giving fundamental rules for resources use, such as water. Good institutional arrangements will facilitate achievement of economic and social goals. In contrast, bad institutional arrangements will create impediments to efficient resources use (Livingstone, 1995). Related to drinking water supply service sector, institutional arrangement is one of external factor that influence the performance of drinking water utility. This is due to the fact that the utility must be operated in a specific institutional arrangement. Schwartz (2006)

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<sup>2</sup> Water Cycle Management: A position Paper prepared by National Committee of Water Engineering ([www.arq.org.au](http://www.arq.org.au)) accessed 07/08/2008. 12.35 p.m.

<sup>3</sup> Water Cycle Management: A position Paper prepared by National Committee of Water Engineering ([www.arq.org.au](http://www.arq.org.au)) accessed 07/08/2008. 12.35 p.m.

argues that this institutional arrangement involves the nature of enabling legislation, clarity of rules and regulations, enforcement mechanism and means of redress, predictable and stable legal environments, administrative culture, ethics and attitude towards accountability and openness. Related to sustainable development, institutional issues are seen as important aspect for achieving sustainable development in general (Kundzewicz, 1997).

Two ideas related to the change in institutional arrangement of drinking water supply chain management are private sector participation or privatization and decentralization. These are becoming main consideration in undertaking drinking water supply service reform, mainly in developing countries (Memon, Imura, & Shirakawa, 2006). The poor performance, inefficiency of public water utilities management and lack of public financial and management expertise are seen as public sector failure and have become basic reason for involving private sector through something called privatization (Houdret & Shabafrouz, 2006). This is based on the assumption that private sector can solve those condition by using market principles due to the existence of government failure (Prasad, 2006). In this situation, Public Private Partnership or complete privatization in drinking water supply sector has been endorsed as important kit for improving this sector even though in many cases privatization has failed to bring the expected result in improving water supply sector performance mostly in developing countries (World Bank, 2005; Hall, 2004).

Adopting privatization will change the institutional arrangements that rule the role and the relation between public and private sector in the provision of infrastructure. The privatization or involving the private sector to infrastructure provision gives a need to a reconsideration and readjustment of the role of the state/public sector. There will be some changes in the relation among state, private sector and community due to privatization. Bakker argue that, privatization implied to the process that the state has to re-configure its role through re-regulation (Bakker, 2003) whereas some regulations need to be re-adjusted.



On the other side, reforms related to decentralization in water supply service are based on the idea for improving level of service through increasing responsiveness and accountability of the service and bringing this service more appropriate to local demands and preferences (Fuhr, 2000). The relation of level of government basically becomes main attention on decentralization. In this context, decentralization involves fundamental changes to the structure of intergovernmental relation or relation among level of government in providing infrastructure service through shift away from vertical hierarchies to a differentiation of roles and the reallocation of function among actors operating in the same sector on territory (Serageldin, Kim, & Wahba, 2000).

In this study, private sector participation and decentralization are seen as two important ideas in designing institutional arrangements of drinking water supply chain management. The adoption of these two concepts in developing institutional arrangements for water supply sector will give consequences to the performance and the way drinking water supply sector operates.

Comparing different institutional arrangements for drinking water supply provision related to privatization and decentralization and its performance between two different countries is the main focus of this study. This can reveal better understanding on institutional arrangements and its relation with the adoption of privatization and decentralization in giving influences to the performance of drinking water supply service. Moreover, lessons learnt are possible to be withdrawn from the comparison and can be used as source of inspiration for improving drinking water supply sector performance in those countries. Indonesia and the Netherlands are chosen as two cases for the comparison in this study.

The Netherlands is chosen as case study due to the evident that this country have been successfully managing drinking water supply provision based on water supply chain management, called as Water Chain, for providing sustainable

drinking water supply. To date, the performance of drinking water supply provision in The Netherlands can be categorized excellent based on the survey on the satisfaction of the user for the taste and the hygienic quality of the drinking water (VROM, 1999). Moreover, for the category of the quality of the infrastructure, technical expertise, density, environmental performance, guaranteed delivery and drinking water quality, the drinking water supply provision in the Netherlands is categorized as good and very good (Wubben & Hulsink, 2003). In the Netherlands, WHO and UNICEF also reported that all population (100% both in urban and rural area) has access to safe drinking water through piped water supply system<sup>4</sup>. Lobina & Hall (1999) say that the level of the service of water supply provision in the Netherlands is good with affordable price of high quality water. Moreover, nearly all household is also connected to the sewerage system (for the year of 2004, 100% in urban area and 89% in rural area)<sup>5</sup>. Beside that, the Dutch Water Utilities also play a pro active role in protecting their water sources (ground water and surface water) from pollution in the context of water supply chain management. Thus, it can be argued that the successful of the Netherlands in delivering drinking water supply service for their citizen is laying on the appropriate institutional arrangements of drinking water supply chain management.

On the other hand, the performance of drinking water supply and sanitation provision in Indonesia is still in poor condition and can be categorized as one of the weakest infrastructure sectors in Indonesia (World Bank, 2004). In this poor situation, according to Bank (World Bank, 2004), the current drinking water supply sector structure in Indonesia shows that there are three main modes of provision. First, formal provision held by public water utilities (Perusahaan Daerah Air Minum (PDAM)/Local Government Owned Drinking Water Supply Utilities) which responsible to produce and sell water mainly through piped water

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<sup>4</sup> Data is taken from [www.wssinfo.org](http://www.wssinfo.org). A website organized by Joint Monitoring Program of WHO and UNICEF on Water Supply and Sanitation. This website is accessed 07202008, 21.35 p.m.

<sup>5</sup> *Ibid.*

supply system. This mode of provision only covers 17% of total population nationally in general and 50% of population in urban areas.

The second mode of provision is alternative small-scale water provision. This mode of provision covers 13% of total population and about 8% in urban areas. This alternative small scale provision includes independent and intermediate providers selling water supply service to household and communities. The third mode is self provision whereas the coverage of this mode in water supply sector is remarkable high. In general, 70% of total population (in urban are 42% of total urban population) use this mode for fulfilling their demand for drinking water supply. This self provision covers activities such as extracting groundwater and using poor quality of surface water. Even for piped drinking water supply system managed by public water utilities, the drinking water distributed can not be categorized as potable drinking water. It should be boiled before used due to the existence of faecal coliform contamination (Bakker K. , 2007).

This structure of water supply provision still gives consequences to the significant high incidents of water borne disease (World Bank, 2004). Moreover, this condition of poor performance of drinking water supply provision is deteriorated by the poor performance of sanitation sector due to the lack of formal networks and management of sanitation infrastructure which leads to widespread contamination of surface and ground water (World Bank, 2004). Based on this fact, it can be argued that the unsuccessful of Indonesia in delivering drinking water supply service for their citizen is laying on the inappropriate institutional arrangements of drinking water supply chain management.

Learning from other countries experience in water supply provision is something that is possible to do. This is in line with the possibilities for lesson learnt to be withdrawn from comparative study as Rose stated in article written by Dollowitz and Marsh (Dolowitz & Marsh, 1996) that *“every country has problem, and each think that its problem are unique...However,..policy makers in cities, regional*

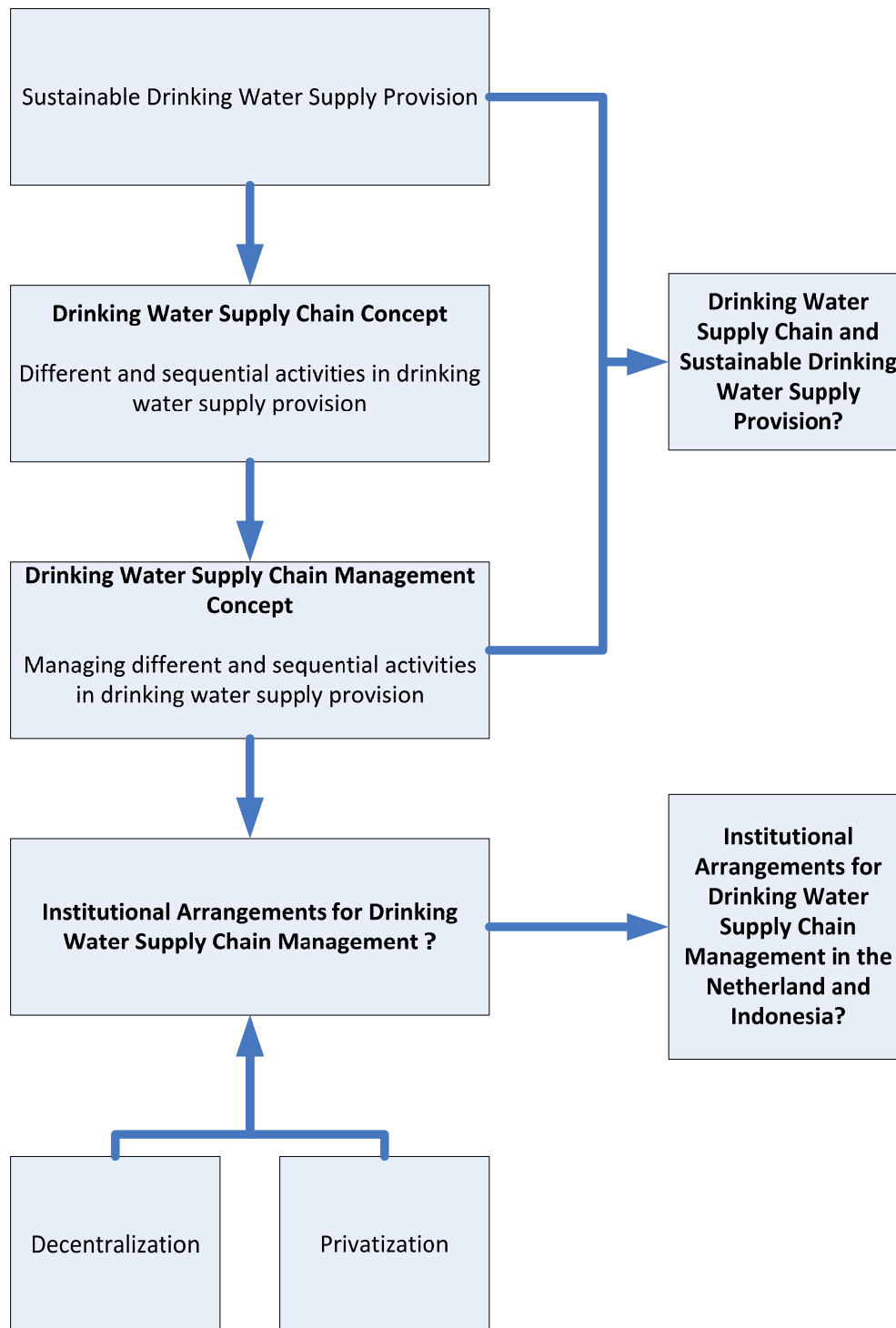
*governments and nations can learn from how their counterparts elsewhere responded”.*

## **I.2 Research Problem**

Based on the background mentioned above, the research problem of this study mostly in efforts to find the adoption of privatization, decentralization to the institutional arrangements of drinking water supply chain management.

As stated above, the drinking water supply chain involves different and sequential activities starting with securing raw water sources, water abstraction from natural environment (surface and/or groundwater), production of drinking water using water treatment and its distribution to customer. The chain continues with the collection and transportation of wastewater, treatment and discharge back it into the natural environment (surface and/or groundwater) (Kuks, 2001). These various activities that are possibly involving various different actors should be managed properly in order to provide sustainable drinking water supply service. Moreover, these activities in the chain can be viewed as business activities that probably appropriate for divestment, commercialization and privatization (Kuks, 2001).

The management of drinking water supply chain will be based on the design of institutional arrangements. In this research, the drinking water supply chain concept and its relation with sustainable drinking water supply provision will be analyzed. Furthermore, institutional arrangement for drinking water supply chain will be analyzed from privatization and decentralization perspective. For more detail, the research problem formulation can be seen in the Figure I.1.



**Figure I.1**  
**Research Problem Formulation**

### **I.3 Research Objective and Research Question**

The objective of this research is to get insight on the concept of drinking water supply chain and its relation to sustainable drinking water supply provision and its institutional arrangements in the Netherlands and Indonesia related to the concept of privatization and decentralization for making recommendation to improve performance of drinking water supply provision in Indonesia based on lesson learnt. To achieve that objective, the study will be focus on:

1. Understanding the concept of sustainable drinking water supply provision and its relation to the concept of drinking water supply chain management.
2. Understanding the concept of institutional arrangements on drinking water supply service. The exploration will be focused on understanding the importance of institutional arrangements in the context of achieving sustainable drinking water supply provision.
3. Understanding privatization and decentralization as concepts that can be implemented for institutional arrangements of drinking water supply chain management.
4. Understanding the adoption of privatization and decentralization for institutional arrangements of drinking water supply service in the Netherlands and Indonesia.
5. Obtaining recommendation based on lesson learnt for improving performance of Indonesia's drinking water supply service mainly for improving the public drinking water utilities in Indonesia.

Based on that objective, the main questions of this research are:

1. What are the similarities and differences on drinking water supply chain management and its institutional arrangements in Netherlands and Indonesia?

2. What are lesson learnt from the experiences of drinking water supply chain management in the Netherlands and recommendation for improving water supply chain management in Indonesia?

To answer those main questions, there are several sub questions. They are:

1. What is the concept of drinking water supply chain management and its institutional arrangements in the context of sustainable drinking water supply provision?
2. What are privatization and decentralization concept and how are they adopted in institutional arrangement for drinking water supply chain management?
3. How is the implementation of drinking water supply chain management and its institutional arrangement for sustainable drinking water supply provision in the Netherlands and Indonesia from privatization and decentralization perspectives?

#### **I.4 Methodology**

The methodology of this research will be organized into several steps that consist of literature review, data collection and analysis. In general, literature review will be undertaken both for building theoretical framework and collecting empirical data. The general methodology of this research can be seen as follows:

##### **Literature Review**

This step is undertaken for building theoretical framework that will be used as basis for analysis of the case studies. Theoretical framework that will be developed in this stage will be based on the nature of drinking water supply service, sustainable drinking water supply provision, the concept of drinking water supply chain management, privatization and decentralization in drinking water supply provision and institutional arrangements of drinking water supply

chain. This literature review will be based on scientific journals, books, research report and other relevant publications.

### **Empirical Data Collection**

In this stage, the research will explore empirical data from the case studies, i.e.: Netherlands and Indonesia. The data that will be collected is about practice of drinking water supply chain management mainly focused on its institutional arrangement. Empirical data for this research totally is obtained from secondary data acquired from some literature including scientific journals, research papers and relevant publications.

### **Empirical Data Analysis**

The analysis will be focused on institutional arrangement of drinking water supply chain from the perspective of privatization and decentralization. The analysis will be done by using qualitative descriptive analysis.

### **Comparative Analysis and Lessons Learnt**

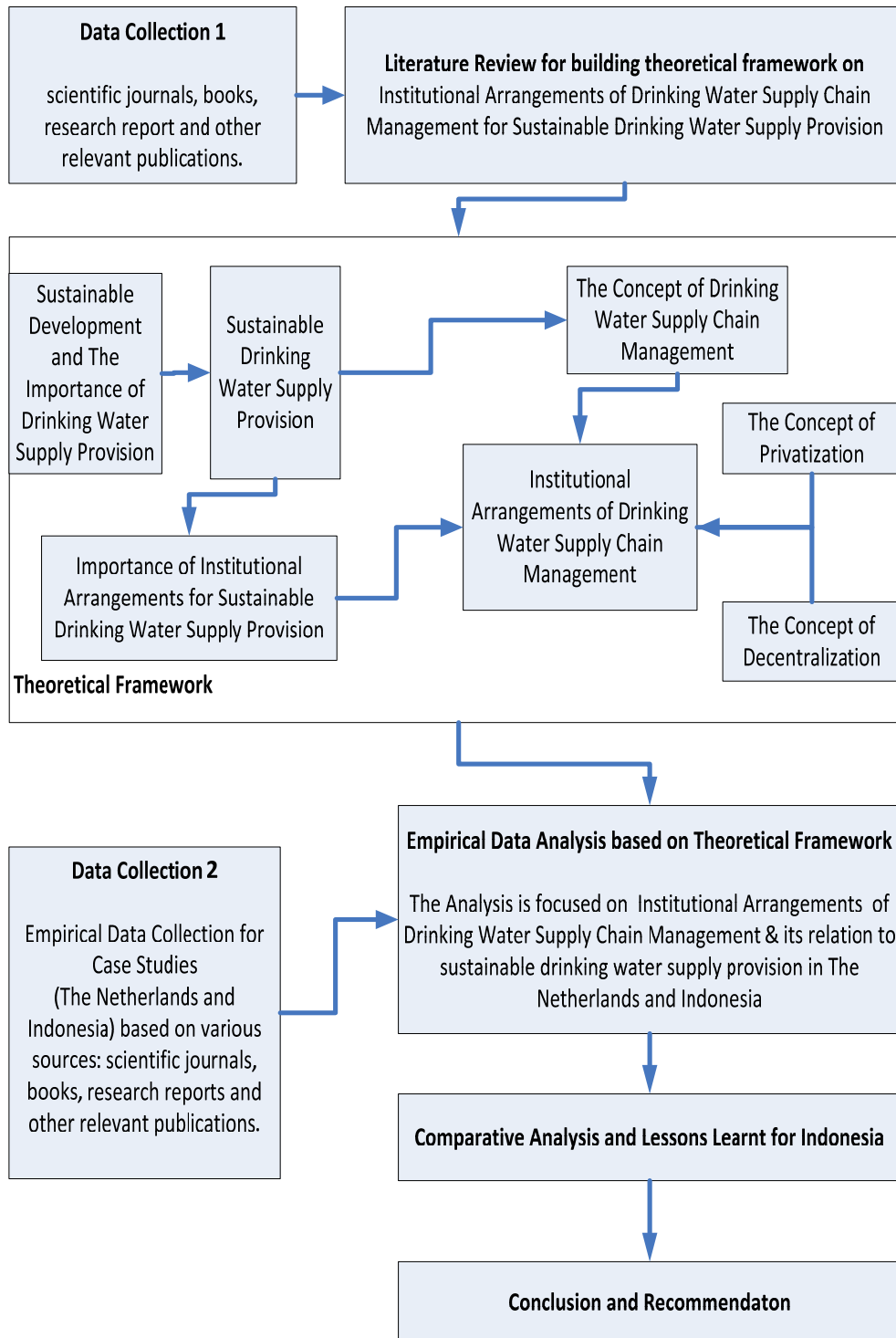
This analysis is done to answer the research question on the similarities and differences of institutional arrangement for drinking water supply chain management between two countries (the Netherlands and Indonesia). The analysis will be done by using descriptive comparative analysis method. Furthermore, the result of comparative analysis will be used as basis for obtaining lessons learnt.

### **Formulating Conclusion and Recommendation**

The result of comparative analysis will be used as basis for formulating conclusion. Moreover, this lesson learnt analysis. This lesson learnt will be used as recommendation for improving institutional arrangements of water supply chain management in Indonesia.

For more detail, research methodology is shown in Figure I.2:





**Figure I.2**  
**Research Methodology**

## **I.5 Report Structure**

The result of this research will be reported in a structured way consist of six chapters. The description of the chapters is shown as follow:

**Chapter I Introduction:** This part consists of background, research problem definition, objectives of the research, research questions, research methodology, and report structure.

**Chapter II Theoretical Framework:** This part consist of the exploration on the concept of sustainable water supply provision, the nature of water supply service, the concept of water supply chain management and its institutional arrangements which is based on the concept of privatization and decentralization.

**Chapter III Institutional Arrangements of Drinking Water Supply Chain Management in the Netherlands:** This part will explain the empirical part of this study in the Netherlands based on theoretical framework in Chapter 2.

**Chapter IV Institutional Arrangements of Drinking Water Supply Chain Management in Indonesia:** This part will explain the empirical part of this study in Indonesia based on theoretical framework in Chapter 2.

**Chapter V Comparative Analysis on Institutional Arrangements of Drinking Water Supply Chain Management in the Netherlands and Indonesia & Lesson Learnt:** This chapter will explain the comparative analysis between two case studies based on analysis discussed in chapter 3 and 4. Furthermore, the discussion on lesson learnt also will be explored.

**Chapter VI Conclusion, Lessons Learnt and Recommendation:** This part consists of conclusion of the study, lessons learnt and recommendation.

## **CHAPTER II**

### **THEORETICAL FRAMEWORK**

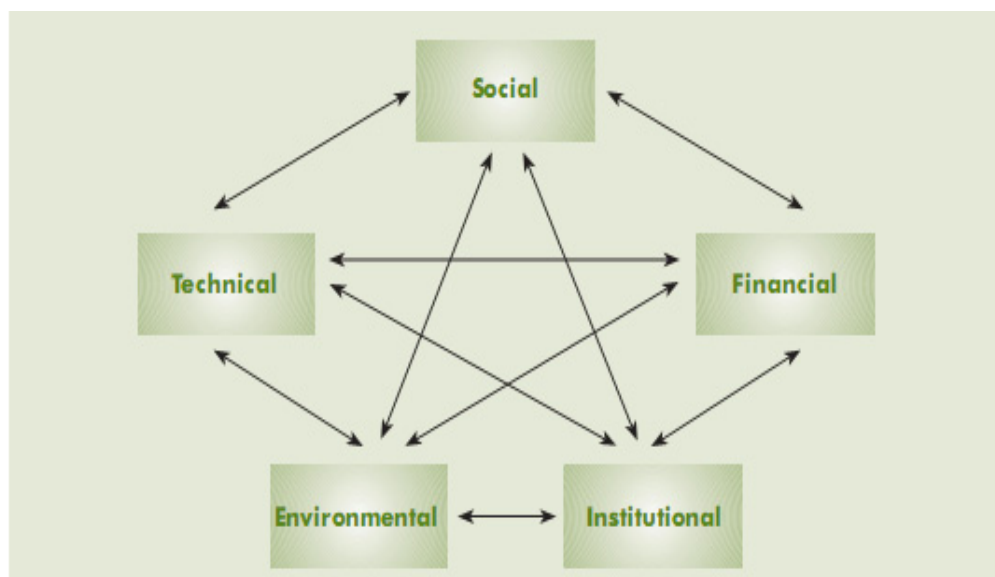
This chapter consists of elaboration of theoretical framework for this study. This covers the discussion on the concept of sustainable water supply provision mainly from institutional point of view, the nature of water supply service, the concept of privatization and decentralization and the influences of those concepts to institutional arrangement in drinking water supply chain. This theoretical framework will be used as eyeglasses to analyze and compare institutional arrangements in the Netherlands' and Indonesia's drinking water supply chain management.

#### **II.1 Institutional Arrangement, Sustainable Water Supply Provision and Sustainable Development**

According to Finger (2005), increasing water needs caused by increasing population, industrial development and practice of water-intensive agriculture has led to the water scarcity. Decreasing water quality by pollution and contamination from human activity give more severe impact on the condition of water scarcity. These two situations led to the condition of water crisis (Finger M., 2005). Furthermore, poor urban water management which is mostly undertaken by public sector and bad habits of supplying water due to under pricing water are giving more pushes to water crisis (Winpenny,1994). Without appropriate anticipation, this water crisis will give consequences to the public health and economic development and sustainable development in general after that. This is based on the concluding remark from the Dublin Conferences on Water in 1992 that the scarcity and misuse of fresh water give a serious and growing threat to sustainable development and environmental protection (Finger M., 2005). In this context, sustainable water supply provision is considered as an important aspect for achieving sustainable development.

Mukherjee & Wijk (2000) defines sustainability in drinking water supply and sanitation service as “*continuous, satisfactory functions and effective use of water supply and sanitation service*”. Moreover, effectiveness in this context is defined as “*use by the majority in health-promoting and environmentally sound manner*”. Moreover, Gleick (1998) defines sustainable water use as “*the use of water that supports the ability of human society to endure and flourish into the indefinite future without undermining the integrity of hydrological cycle or the ecological system that depend on it*”.

Sustainability of water management/water use/drinking water supply provision can be seen from several dimensions/criteria, such as, technical sustainability, financial/economic sustainability, social sustainability, ecological/environmental sustainability and institutional/political sustainability (Mukherjee & Wijk, 2000, Klostermann, 2003). All of these criteria are inter-related in building the concept of sustainable water use/drinking water supply provision as shown in Figure II.1.



**Figure II.1**  
**Key Aspects of Sustainability of Drinking**  
**Water Supply and Sanitation Services**  
Source: Mukherjee & Wijk, 2000

Technical sustainability refers to the reliability and properly functioning of technology in delivering water supply (Mukherjee & Wijk, 2000), drinking water supply system is durable and require little maintenance (Klostermann, 2003). This technical sustainability will ensure the delivery of adequate drinking water in acceptable quality (Mukherjee & Wijk, 2000) and lead to efficient use of the water due to the durability of the system (Klostermann, 2003). This criterion requires technically good design in drinking water supply system.

Financial sustainability refers to the adequate of financial resources for operation and maintenance of the system (Mukherjee & Wijk, 2000). This financial sustainability can be achieved by pushing the user to pay the cost for the service (Klostermann, 2003).

Institutional sustainability refers to way for keeping the drinking water supply provision system operational, accessible and widely used. This institution is related to cultural characteristic, agreed and valued procedures and rules for operation and varying capacities for management and accountability (Mukherjee & Wijk, 2000) and also can be seen as water policy (Klostermann, 2003).

Social sustainability refers to the condition that the drinking water service can be accessed by all users (Klostermann, 2003) according to their socio-culture preference and service that they obtain is worth to the cost they deserve (Mukherjee & Wijk, 2000).

Environmental sustainability refers to the condition that the extraction of water should be at or below water recharge rate that will not give negative consequences to the water itself and environment, such as salinization, dessication or reduction of biodiversity (Klostermann, 2003). Moreover, prevention for water resources pollution is seen as part of efforts of environmental sustainability (Mukherjee & Wijk, 2000). From the description above, institutional dimension gives important

role in achieving sustainable drinking water supply provision as response to the water crises.

Based on the description of sustainability dimension of drinking water supply provision, it can be argued that institutional dimension can be seen as essential part in determining other dimension of sustainability, such as the functioning of technology of water supply provision (technical sustainability), ensuring adequate financial resources for operation and maintenance of the system (financial sustainability), ensuring the accessibility of water supply provision for all users (social sustainability) and ensuring that producing and using of water supply will give no negative impact to the environment (environmental sustainability). This is mostly related to keep the drinking water supply provision system operational, accessible and widely used through rules and policies.

Moreover, according to Saleth & Dinar (2004), the limitation of recent institution of water can be seen as cause for the crises of water sector. This is related to the failure of institutional aspects in dealing effectively with resource allocation, resources management and resource development. Furthermore, Williamson (1994) argues that for natural resources management, including water, getting institutional right as policy is now become focus rather than getting prices right or getting property rights right. In this context, institutional aspect can be seen as essential aspect that should be focused in delivering sustainable drinking water provision for sustainable development.

## **II.2 the Nature of Drinking Water Supply Chain**

In this part, the nature of drinking water supply chain and its characteristic will be explored. The first exploration will be done for seeing drinking water supply provision as a supply chain and its management. This exploration will give basic understanding on the needs to see drinking water supply service provision in the context of water chain and the integration of related activities in the chain.

## 2.2.1 Water Supply Chain and Water Supply Chain Management

In Merriam-Webster dictionary, water supply provision is defined as

*“a source, means, or process of supplying water (as for a community) usually including reservoirs, tunnels, and pipelines”<sup>6</sup>.*

European Union defines water supply provision with the term of water service. In EU Water Framework Directive (WFD), water service as defined as

*“all services, which provide, for households, public institutions or any economic activity: (a) abstraction, impoundment, storage, treatment and distribution of surface water or groundwater, (b) waste-water collection and treatment facilities, which subsequently discharge into, surface water”*(Water Framework Directive 2000; article 2 point 38 in Schwartz, 2006)

From the first definition, the water supply service activities only cover the process to supply treated water to the community usually through a means such as reservoir, tunnels and pipelines. The EU Water framework directive sees that the water supply is part of water service and can not be separated from waste water collection and treatment activities. In this context, the water supply provision is seen as an integrated activity with wastewater collection and treatment.

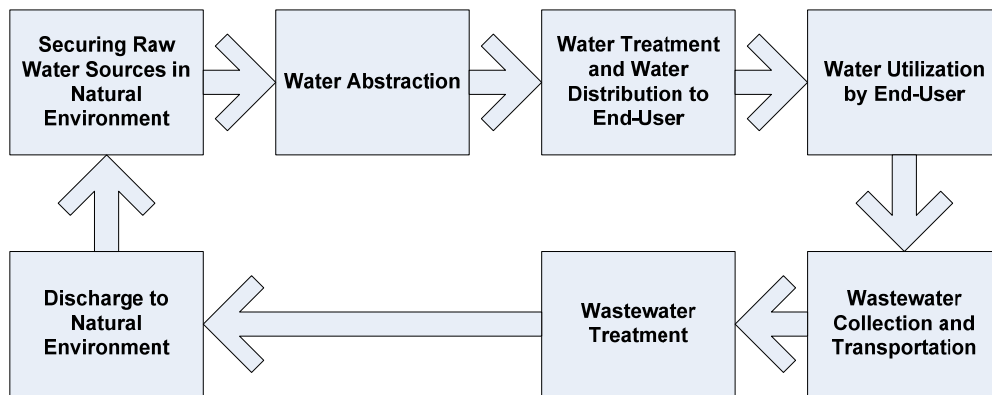
Moreover, according to that definition, the water supply activities give emphasizing in delivering treated water for community and their economic activities through several series activities covers abstraction of raw water from a source, water treatment and water distribution. The definition of water service as

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<sup>6</sup> Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary>. Accessed May 2, 2008.

determined by the EU Water Framework Directive covers broad type of activities and consumers. The focus of this research will be put at the drinking water supply.

Drinking water supply service can be broadly categorized as a supply chain. In this context, it is described as a serial activity that is required for fulfilling demand of drinking water as product. This chain is starting with securing raw water resources, water abstraction from natural environment (surface and/or groundwater), the production of drinking water in water treatment facilities and its distribution to customer. Furthermore, the chain continues with collection and transportation of waste water, treatment and discharge back it into natural environment (surface and/or groundwater) (Kuks, 2006). Due to this view, water supply provision planning process is a complex task since interaction across the various activities and its related actors in an interdependent system is essential along the chain. For more detail, following is the diagram of water supply chain.

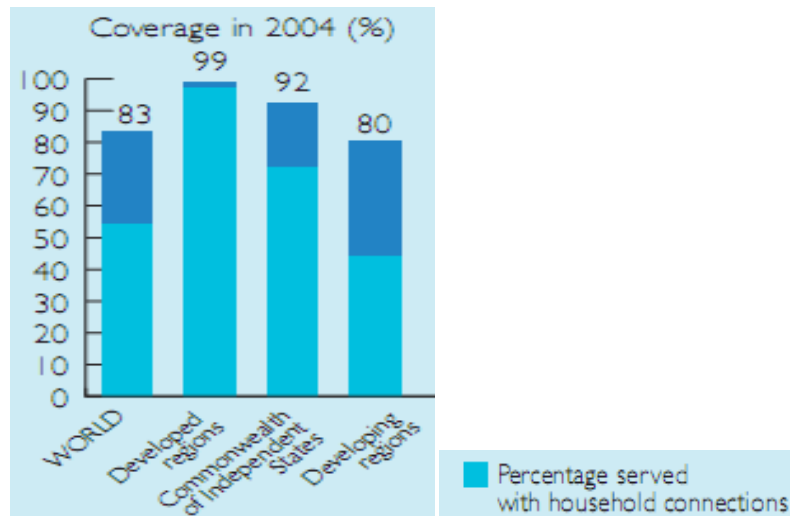


**Figure II.2**  
**Drinking Water Supply Chain**  
(adapted from Kuks, 2001)

Actually, there are several modes of water supply provision nowadays, i.e.: piped water supply system, self provision, and relying on small scale water vendor. It can be seen from the evidence of water supply provision in developed and developing countries. In developed countries, the water supply provision is



provided through piped infrastructure. It can be seen from Figure II.3 that more than 90% of household is connected to piped water supply system through household connections. In developing countries, due to the lack of piped water supply service (only served less than 50% of total household, see Figure II.3), the community provide water themselves through self provision or relying on small scale water vendor. For instance in Indonesia 70% of population uses self provision mode and 13% of population uses small scale water vendor (World Bank, 2004).



**Figure II.3**  
**Coverage of Improved Drinking Water Supply in**  
**Developed and Developing Countries**  
**Source: WHO & UNICEF, 2006**

Improved drinking water source is the basic means in achieving MDG in water supply provision (WHO & UNICEF, 2006). From the Figure II.4, it can be seen several types of improved and unimproved drinking water sources and also improved and unimproved sanitation facilities. The difference between improved and unimproved water sources and sanitation facilities is protection of the water sources from pollution contaminant and preventing direct discharge of wastewater to the environment. In this context, drinking water supply chain is implemented in achieving improved drinking water sources and improved sanitation facilities.

<p><b>IMPROVED DRINKING WATER SOURCES</b></p>	<p><b>IMPROVED SANITATION FACILITIES<sup>b</sup></b></p>
<ul style="list-style-type: none"> <li>&gt; Piped water into dwelling, plot or yard</li> <li>&gt; Public tap/standpipe</li> <li>&gt; Tubewell/borehole</li> <li>&gt; Protected dug well</li> <li>&gt; Protected spring</li> <li>&gt; Rainwater collection</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Flush or pour-flush to:               <ul style="list-style-type: none"> <li>- piped sewer system</li> <li>- septic tank</li> <li>- pit latrine</li> </ul> </li> <li>&gt; Ventilated improved pit latrine</li> <li>&gt; Pit latrine with slab</li> <li>&gt; Composting toilet</li> </ul>
<p><b>UNIMPROVED DRINKING WATER SOURCES</b></p>	<p><b>UNIMPROVED SANITATION FACILITIES</b></p>
<ul style="list-style-type: none"> <li>&gt; Unprotected dug well</li> <li>&gt; Unprotected spring</li> <li>&gt; Cart with small tank/drum</li> <li>&gt; Bottled water<sup>a</sup></li> <li>&gt; Tanker-truck</li> <li>&gt; Surface water (river, dam, lake, pond, stream, canal, irrigation channels)</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Flush or pour-flush to elsewhere<sup>c</sup></li> <li>&gt; Pit latrine without slab or open pit</li> <li>&gt; Bucket</li> <li>&gt; Hanging toilet or hanging latrine</li> <li>&gt; No facilities or bush or field</li> </ul>

<sup>a</sup> Bottled water is considered improved only when the household uses water from an improved source for cooking and personal hygiene.

<sup>b</sup> Only facilities which are not shared or are not public are considered improved.

<sup>c</sup> Excreta are flushed to the street, yard or plot, open sewer, a ditch, a drainage way or other location.

**Figure II.4**  
**Improved and Unimproved of Modes of Water Supply Provision**  
**Source: (WHO & UNICEF, 2006)**

Based on the Figure II.4, It can be argued that the improved drinking water sources and sanitation facilities basically can be carried out through two modes of provision (piped system and self provision). Piped system involves piped water into dwelling plot or yard and public taps/standpipes. The self provision covers tube well/borehole, protected dug well, protected spring and rainwater collection. The provision from the water vendor (cart with small tank/drum and tanker truck) is categorized as unimproved due to the significant possibilities of contamination

during the distribution process and more expensive price of water than from piped system (WHO & UNICEF, 2006).

In the list of options of improved drinking water sources and sanitation facilities (see Figure II.4), the piped system is put at the first option. Regarding to this, it can be argued that the piped water supply and piped sewerage system through household connections gives more reliable drinking water supply and sanitation provision. This is based on the probability to significant increased for water safety and quality (by decreasing the possibilities for contamination due to the separation and well treatment of wastewater), continuity (no interruption in water service and sanitation service), quantity (accessibility to water source and sanitation facilities) and affordability (the facts that the price of water from piped system is lower than the prices from another provision, mainly from water vendor)<sup>7</sup>.

The adoption of drinking water supply chain concept in piped water supply provision can be seen from the process involved in producing and distributing water supply through piped system. According to VEWIN, 2001 in Schwartz, 2006, the process of drinking water supply provision through piped water supply system can be decomposed into several steps. This several steps are in line with the concept of drinking water supply chain. They are:

1. Production process: This process relates to all activities concerned with groundwater abstraction, surface water collection, storage, pre-purification, transport and infiltration in the production company and the purification and processing of this water into drinking water (including operation and maintenance of these facilities).

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<sup>7</sup> The criteria of water safety, quality, continuity, quantity and affordability is taken from the list of criteria needed in designing and building drinking water service in WHO & UNICEF, 2006.

2. Distribution process: This process consists of all activities concerning the distribution of drinking water to end-users including maintenance of pipes, connections, and replacement and maintenance of water meters.
3. Sales process for water supply: Consists of all service activities in which the relationship with end-users (customers) is central. It includes obtaining and processing meter-readings, invoicing, management of debtors and payments received, management of customer contacts and provision of water-related services such as advice, information and inspection.
4. Collection process: The collection process consists of all activities concerned with the removal of wastewater from the user and the transport of that wastewater to a treatment facility (or to the water source to which it is discharged).
5. Treatment process: The treatment process consists of all activities related to the treatment of collected wastewater and the subsequent discharge of the treated wastewater to a water source.
6. Sales process for wastewater: The sales process for wastewater is similar to that of water supply and essentially concerns all service activities in which the relationship with users from whom wastewater collected is central. It includes invoicing, management of debtors and payments received, managements of customer contacts and provision of wastewater-related services such as advice, information and inspection.

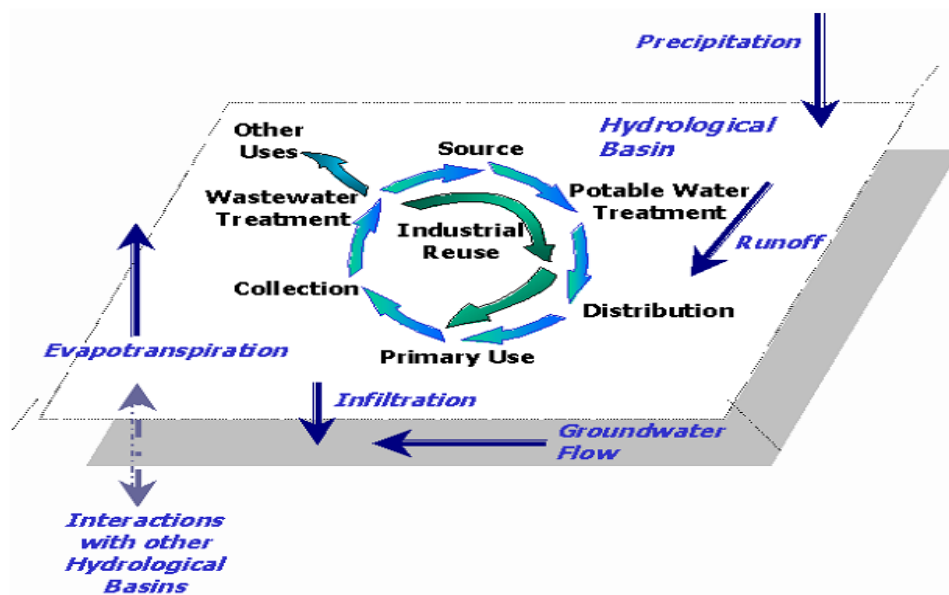
The concept to see water supply provision based on water supply chain is related to the concept of water cycle management. The importance of water cycle management is increasingly recognized for developing sustainable water supply provision<sup>8</sup>. National Committee of Water Engineering Australia (2004)<sup>9</sup> defines water cycle management as “ *a broadly based interactive approach that addresses competing community demands placed on a region's water*

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<sup>8</sup> Water Cycle Management: A position Paper prepared by National Committee of Water Engineering ([www.arq.org.au](http://www.arq.org.au)) accessed 07/08/2008. 12.35 p.m.

<sup>9</sup> Water Cycle Management: A position Paper prepared by National Committee of Water Engineering ([www.arq.org.au](http://www.arq.org.au)) accessed 07/08/2008. 12.35 p.m.

resources so as to meet defined water quantity and quality objectives. This cycle involves drinkable water supply; sewage collection, treatment and effluent disposal; storm water collection, treatment and disposal; and reclaimed (recycled) water collection, storage, treatment and re-use or disposal. According to this concept, integration of all water system (drinking water supply provision, sewerage and storm water) should be considered in drinking water supply provision<sup>10</sup>. Moreover, considering water cycle for drinking water supply provision is seen as an effort for achieving drinking water sustainability. This is based on the concept of four pillars in urban water cycle which consists of (1) source, (2) water treatment and distribution, (3) use and reuse, and (4) wastewater treatment and disposition, as well as the connection of the cycle to surrounding and adjacent hydrological basins (Coenen & Lulofs, 2006). These four pillars consider the water cycle. For more detail, the diagram of these four pillars can be seen as follows.



**Figure II.5**

**The Four Pillars Approach to Water Sustainability**

Source: United Nation University, International Network on Water, Environment and Health in Coenen & Lulofs, 2006

<sup>10</sup> Integrated Water Cycle Management Guidelines for NSW Local Water Utilities, Oct 2004. Department of Energy Utilities and Sustainability, New South Wales Government, Australia.

Integrated water management is an option for increasing the efficiency in the provision of scarcer water resources for water supply provision. This is based on the definition of integrated water management which is defined as “*IWRM is a process which promotes the co-ordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems*” (Global Water Partnership, 2000). In this context, considering entire water supply chain is important in the context of integrated water management for water supply provision (Dalhuisen & Nijkamp, 2004). Moreover, understanding water supply provision as a chain that cover natural environment as important part of the chain will increase the possibilities to achieved cost effective, equitable and sustainable access to water resources and services for all (Emerton & Bos, 2004).

Moreover, water supply chain is closely related to the concept of integration between water and wastewater management. In this context, water is seen as a renewable and reusable resource and this integration is seen as part of integrated water resources management (Global Water Partnership, 2000). Based on this integration, wastewater flow can be used as useful additional resources for water supply through kinds of mechanisms. Wastewater is not only seen as something that impairing water quality and increasing future cost of water supply but also as potential sources for water supply. In this context, natural environment is important resources that can determine the quantity and quality of water.

From the discussion above, it can be said that conceptually sustainable water supply provision can not be separated from wastewater service provision. These two activities is closely related and establishing a close-loop chain. The absence of sewerage system results in the direct discharge of untreated wastewater into surface or ground water sources that will contaminate those sources for water supply provision. Furthermore, it can be argued that conceptually the challenge in developing appropriate institutional arrangements in water supply provision is

lying on the need to see water supply provision as a supply chain with many different actors being involved along the chain and involving natural environment as important consideration. This is done in order to response to the problem of water shortages, water resources pollution and unprotected watershed. In this context, water supply chain management and its institutional arrangement are needed to ensure sustainable water supply provision.

### **2.2.2 Characteristic of Drinking Water Supply Chain**

In this part, the discussion on the characteristic of drinking water supply chain infrastructure will be done. Furthermore, this discussion will be related to the rationale for determining the extent of public and private sector involvement in the activities along the chain.

#### **Nature of Goods/Service: cost recovery potential**

The good produced in the drinking water supply chain is drinking water. In producing this good, several steps are required and relates to the cost of production. Because of that, water produced and distributed in piped water supply infrastructure is considered as scarce and valuable commodity and has price (Kessides, 1993). In this context, customers should pay for drinking water they use. This activity is potential for cost recovery.

On the other side, the service produced in the drinking water supply chain is sewerage service and sewage treatment. These two services also have potential for cost recovery due to the adoption of polluter pays principle. In this context, customers of drinking water should pay for the wastewater they produced. This is done in order to ensure the discharge of sewage to the natural environment will not give pollution to raw water and to the environment itself.

Due to this potential cost recovery, the market and private sector involvement are potential to be done to deliver the goods and services in the chain.

### **Natural Monopoly**

The piped water supply, piped wastewater and wastewater treatment are categorized as natural monopoly activities where the monopolistic character is intrinsic in the sector (Johnstone & Wood, 2001). This is due to the high investment, degree of capital sunkness and high economic of scale required for the investment and average cost turned down constantly over the relevant increasing range of output. The larger the production of the goods/services, the lower its average costs to produce a unit of good/service as product (Kessides, 1993). Moreover, this natural monopoly characteristic of piped water supply and sewerage only allows one network provider for serving the whole market. The provision by more than one operator for the same market will not be efficient (ADB, 2000). Due to that, conventionally, the provision of this infrastructure in the drinking water supply chain is undertaken by the state/public sector (Johnstone & Wood, 2001).

Since this natural monopoly characteristic, piped drinking water supply and sewerage & sewage treatment infrastructure require high coordination in its delivery. This coordination is needed for planning and investment, pricing, technical operation and setting of minimum standards of equipment and operation and this requires public sector involvement (Kessides, 1993).

### **Externalities, Environmental and Social Objectives Involved**

Drinking water supply provision and sewerage & sewage treatment have externalities in inter-sectoral allocation of water resources and public health (Kessides, 1993). In inter-sectoral allocation of water, water supply activity will influence the supply of water needed for other activities, such as agriculture, natural ecosystem, etc. In this context, the planning of water supply should consider the needs for appropriate allocation for all sectors that need water and preventing impact of excessive water abstraction from surface or groundwater, such as land subsidence, salt water intrusion, etc. For instance, better access to



water supply infrastructure for the community possibly reduces the excessive groundwater abstraction individually by community.

Securing water for people as human right, securing water for food production and securing water for protecting vital ecosystem are several aspects that related to the need for appropriate water supply and demand management to avoid the externalities of this water allocation among the sector and conflict of allocation (Global Water Partnership, 2000).

Extreme water used by urban population as part of securing water for people (residential, commercial and industrial) will have influences to the non-urban water uses (Johnstone & Wood, 2001), such as for agriculture and freshwater ecosystem. Integrated water management is seen as appropriate approach in this case (Global Water Partnership, 2000). Securing water for people is aimed to improve access to safe and adequate sanitation for the existing population and future increasing population. Securing water for food production is related with the increasing population that needs increasing food supply. Moreover, protecting vital ecosystems is another need of water. In this context, aquatic ecosystems also need water to produce a range of economic benefits, such as fish, recreation value and wildlife habitats (Global Water Partnership, 2000).

The provision of drinking water supply system and sewerage & sewage treatment also has externalities on public health. Adequate provision of this service will give fulfillment of water demand qualitatively and quantitatively while giving improvements to the degree of community health. This is related to the function of this infrastructure that can give protection for community from many infectious water-borne diseases, like Cholera, Diarrhoeal Diseases, skin diseases, typhoid etc. (Johnstone & Wood, 2001)

Regarding social objective of water supply infrastructure, this infrastructure should be provided for all at affordable price for a standard minimum service.

This is related to the concept of water right. United Nations issued a general declaration that water is a human right.

*“The human right to water entitles everyone to sufficient, affordable, physically accessible, safe and acceptable water for personal and domestic uses.”* (United Nation Economic and Social Council, 2002).

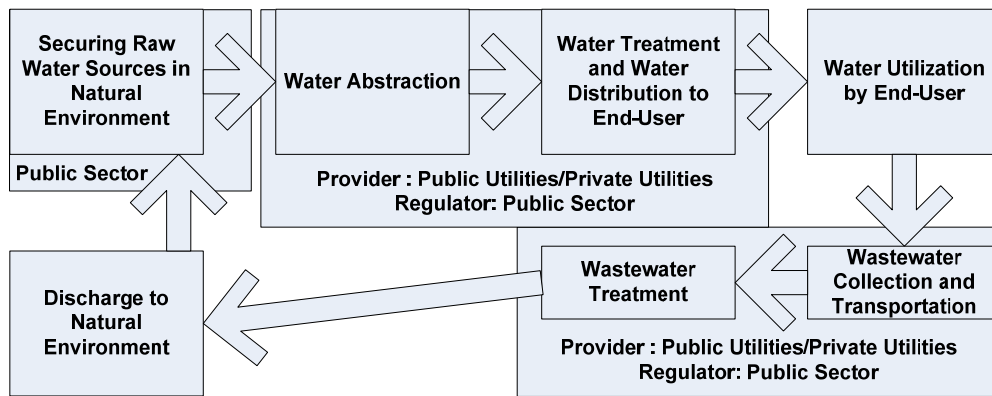
There are some interdependent consequences for the existence of the lack of access to sufficient drinking water supply infrastructure service, such as increased monetary cost for those who lack access, increased time and physical effort needed in collecting water, reduced water consumption levels, increased health burden, economic cost in terms of lost productivity (Johnstone & Wood, 2001).

The characteristic of drinking water supply chain explained above is crucial in the context to determine the role of public sector and private sector in delivering the service. This characteristic will give consideration to what extent the public sector should be involved and also to what extent the private sector should be involved in delivering the services. For private sector involvement, this characteristic will give indication for marketability of the services (Kessides, 1993). For public sector, this gives public some indications to regulate the sector effectively (Johnstone & Wood, 2001) .

The potential of cost recovery due to the characteristic of drinking water supply service and sewerage & sewage service gives the possibilities for the market/private sector to be involved. The characteristic of natural monopoly of this infrastructure will give consequences to the public sector to consider the failure of market in delivering this infrastructure. In the case of private sector involvement, the public sector needs to regulate the market in order to avoid the abuse of monopoly power by single provider (Budds & McGranaham, 2003), such as over priced and under-provided service (Johnstone & Wood, 2001). Moreover, due to the externalities in drinking water supply and wastewater service provision,

the public sector also should ensure the achievement of social (ensuring access to all people at affordable price) and environmental objectives (environmental sustainability, such as securing quality and quantity of raw water (through integration with spatial planning) for drinking water supply provision.

Based on the discussion on the characteristic of drinking water supply chain above. It can be concluded that the involvement of public sector and private sector along the chain can be seen in Figure II.6.



**Figure. II.6**  
**Possible Role Sharing between Public and Private Sector**  
**in Drinking Water Supply Chain**  
 Source: Analysis, 2008

### II.3 Privatization in Drinking Water Supply Chain

The concept of privatization in water supply provision actually inspired from the Dublin Principles (Finger M. , 2005) mostly the 4<sup>th</sup> statement:

*“Water has an economic value in all its competing uses and should be recognized as an economic good”.*

The Dublin statements was reiterated by the UN as *“integrated water resources management is based on the perception of water as integral part of the ecosystem,*

*a natural resources and a social and economic good whose quantity and quality determines the nature of utilization” (United Nations, 1992)*

Based on this principles, according to Finger (2005) water has been transformed from a basic human right that is threatened by development to an economic good that is essential for development. In short, this principle signifies a fundamental new way of thinking about water: the allocation, protection, and conservation of freshwater supply can be optimized through market mechanism and effective management (Finger & Allouche, 2002). The market mechanism assumes perfect competition and is regulated by demand and supply equilibrium is when the two axis cross. Basically, the new way of thinking on seeing water resources defined above does not automatically emphasize the role of private sector for managing water (Finger M. , 2005). These principles gave more emphasizes on economic approach with participation of all concerned actors (public sector, private sector and community) is the most appropriate means of addressing the problem of water scarcity (Finger M. , 2005). In particular, it is presumed that the internalization of all cost especially environmental costs would encourage water conservation and thus solve environmental problems (Finger & Allouche, 2002).

According to Finger (2005), privatization or private sector participation in water has been linked to aim for improving management of water resources since management of water resources is seen as important aspect that capable of improving the condition of water scarcity. This was emphasized during Habitat II Conference for the case of urban management:

*“The urban environmental crisis will continue to be one of the most pressing problems facing humanity in the twenty-first century. Most of the world’s gravest environmental threats to air quality, water quality and availability, waste disposal, and energy consumption are exacerbated by the high density and activity of urban life. Governments acting alone cannot successfully address these*

*challenges- what is needed are partnerships between local government, the private sector and citizen's groups working together to find solutions. (Habitat II, 1996)*

Privatization is seen as a way to respond to the sense of urgent condition of water scarcity and poor water management which is mostly managed by public sector. This is due to the assumption of privatization that introduces commercial principles, professional management and competition (Finger M. , 2005). Moreover, Kuks argues that privatization, commercialization and divestment can be possibly implemented in water supply chain activities since it can be viewed as business activities (Kuks, 2001). Moreover, related to the involvement of private sector into water supply and sanitation management, there are a number of basic reasons, i.e.: (Johnstone & Wood, 2001)

1. Gamekeeper-poacher problems: This related to the inefficiency of public water utilities due to conflicting interest in public sector as a result of functioning as both owner and provider. In this situation the manager of the utility is facing to a number of conflicting influences, which it may not be able to balance if clear priorities are not established. From this basic reason, it can be concluded that the privatization will tend to separate the owner and the provider/operator of water supply and sanitation. This separation can be seen as a typical of privatization adoption.
2. Flexibilities and autonomy: bureaucratic requirements often constraint the operation of public utilities that lead to the condition of inefficiencies due to inflexibilities and un-autonomy utilities in achieving the goal. This is unlikely to be happened in private sector. For example, in the public utilities there is often inflexibilities and autonomous in human resources management. From this basic reason, it can be concluded that privatization will tend to increase the autonomy of water supply and sanitation utilities in managing their task. This giving autonomy to the water supply utilities can be seen as a typical of privatization adoption.

3. Absence of competitive discipline. This related to the absence of public utilities in adopting market discipline. This leads to the inefficiency condition due to fewer incentives in minimizing costs and maximizing tariff collection rates and provide services based on costumers demand. From this basic reason, it can be concluded that privatization will create competitive environment for the water supply service provider in order to increase efficiency trough reducing cost and provide service based on customer demand.
4. Access to capital. Due to the lack of budget in public sector, it is argued that most public utilities have not enough financial capital to carry out the necessary investment for expanding and maintaining service. On the contrary, it is also argued that private companies are better in accessing capital, both domestically and internationally. They may also be better in accessing technical skills as human capital. This access to capital mostly becomes main reason for increasing private sector participation/privatization in water supply service in many cities. In this case, public sources of finance are no longer able to bear the cost of system rehabilitation and expansion. From this basic reason, the privatization will open more opportunities to access capital from the market. This capital can be used as additional investment for improving service performance and responding the increasing demand.

It can be concluded that the reason for privatization/private sector involvement in water supply provision is mostly related to the inefficiencies of public water management and the lack of public financial capital for expanding the service. In the neo-liberal thinking, it is convinced that there is a clear relationship between performance and ownership (Schupen & Gibbon, 2001). Relate to such thinking, private ownership will perform better than public ownership due to the condition that the private sector establishes a market for management, leading to higher quality management; better access to capital market; politicians interfere less in the affairs of private enterprises than they do for public enterprises; and private

firms are run by self-interested board members and shareholders, rather than by disinterested bureaucrats (Nellis, 1994). However, in the water sector some studies have proved the contrary to this assumption (Renzetti & Dupont, 2003).

Related with Renzetti & Dupont (2003) argument, Lobina & Hall (1999) argues that the privatization of water and sewerage service show problems and distortion, they are:

- Management inefficiencies: Private sector management is not always be efficient.
- Restricted competition and corruption: Due to characteristic of natural monopoly of water supply and sanitation service, private sector takes a collusive action with the government to exploit their monopoly position.
- Excess pricing and restricted access: privatization in water supply leads to increasing water tariff. Restricted access for customer who can not pay the increasing tariff is happened in privatized water supply service.
- Excess profits and low water quality: Due to more profit motive, reduction expenditure on maintenance and operating cost is happened that leads to decreasing service quality.
- Problems in delivering development objectives: There are problems in extending access for poor community in privatized water supply service.

In the context of efficiency comparison between private and public water utilities, there are some studies that reveals on the differences in efficiencies between private and public ownership in water supply. According to Byrnes, Grosskopf, & Hayes (1986), based on the study taken in USA, there is no differences in efficiency between public and private ownership in the USA. Bhattacharya (1997) also argued the similar conclusion that there is no differences in overall efficiencies between public and private ownership in USA. Furthermore, Lambert, Dichev & Raffiiee (1993), also based on the study in USA found that publicly owned water utilities to be more efficient. For the case of UK, Saal (Saal &

Parker, 2001) found that privatization only increased profit but not productivity. From these studies, it can be seen that in developed country that characterised with strong government and publicly water service, the shift of ownership of water service to private sector through privatization/private sector participation is not guaranteed improving the performance of water service. The same condition also exists in developing countries where many privatizations in water supply have failed in achieving its expected gains for improving the services. According to Prasad (2006), there is emerging trend of failure in private sector participation in developing countries which includes Buenos Aires (Argentina), Manila (Philippines), Cochabamba (Bolivia), Jakarta (Indonesia), Neilsprut (South Africa), Kelantan (Malaysia), Mozambique, Nkokebde (South Africa), Conakry (Guinea), Gambia, Parana (Brazil), Trinidad and Tobago Belize, La Paz (Bolivia), and Dar es Salam (Tanzania).

**Table II.1**  
**Comparison for Argument on Privatization in Water Supply**

<b>Reason for Why Privatization?<sup>1</sup></b>	<b>Reason for Why not privatization?<sup>2</sup></b>
<b>Private ownership will perform better than public ownership</b>	Excess pricing and restricted access
<b>Higher quality management</b>	Management Inefficiencies
<b>Better access to capital market</b>	Excess profit and low water quality
<b>Less interfere from politicians</b>	Restricted competition and corruption
<b>More qualified personnel</b>	Problem in delivering development objective
<b>Enhance the efficiency of operations<sup>3</sup></b>	

Source: 1. Nelis,1994. 2. Lobina & Hall, 1999, 3. Boorsma, 1994

Private sector participation in water supply in many literatures is defined as a wide range of arrangements between government and private institution mainly trough a contractual agreement involving a public agency and formal private company (Budds & McGranaham, 2003). On the other hand, the term of privatization is



defined as a generic term not only to refer to increase private sector involvement, but also specifically to the model of divestiture (selling public assets to private parties) (Budds & McGranaham, 2003). The model of divestiture is known as British Model. The British Model is characterised as transferring assets and rights of water to the private sector. This is also called as large-scale full divestiture (Blokland, Braadbaart, & Schwartz, 1999).

“Public-private partnership” is defined as a term refers to contractual arrangements in which imply that the parties involved have mutually shared objectives and working arrangements that go beyond the fulfilment of any contractual agreement (Budds & McGranaham, 2003). This public private partnership is known as The French Model. In this model, private sector involvement is only for water utility management and not extended to the ownership of assets. This French model is the model that widely used now in global private sector involvement due to various modes, such as Long-term concession agreements, build-operate-transfer schemes, service contracts and management contracts.

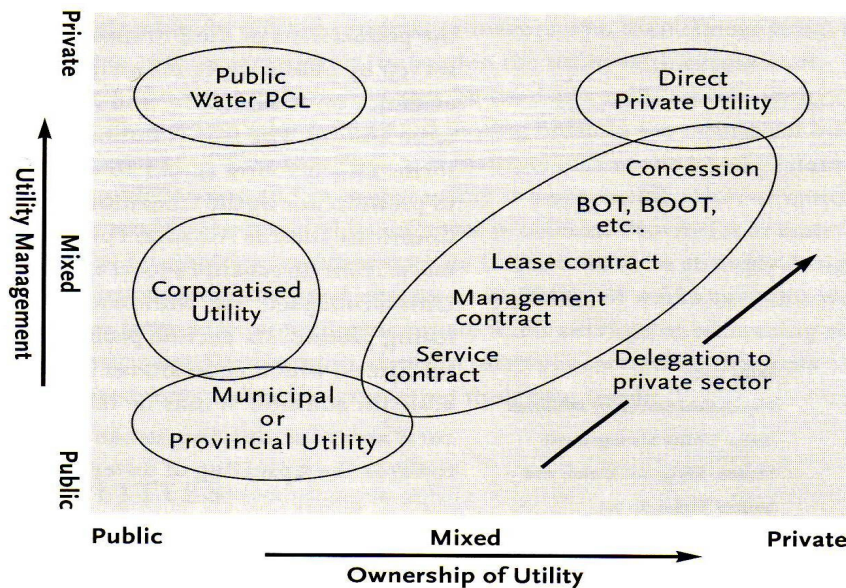
Besides, two model of privatization (British and France), there is another model called as Dutch Model. This model is introduced by the Netherlands to distinguish the privatization model implemented in Dutch water supply utilities from other model of privatization (British and France). This model is about public water PLCs where the utility is running as a profit-oriented company while the stocks are owned by local, provincial or national government. In this context, the privatization is perceived as concept for increase efficiency of the service while the control of government is still exist to ensure the social goals of water provision is maintained to achieve. In this model, the water supply service in Netherland is developed by combining the best from the idea of privatization and the best from the idea of public sector involvement (Blokland, Braadbaart, & Schwartz, 1999).

Moreover, Jaglin (Jaglin, 2002) has defined commercialization as a form of privatization. This type of privatization is common in East Africa for the water sector in this region (UNHCS, 1998). Commercialization can be implemented in the operation of public utilities for enhancing better efficiency and profitability through adoption of business like principles. This commercialization is usually done through the establishment of corporatized utility called as parastatal that can be categorized as quasi-corporation (Blokland, Braadbaart, & Schwartz, 1999).

According to Rakodi (Rakodi, 2000), creating quasi market condition for competition in public service delivery through increased cost recovery and introduction of performance measurement system can be said as commercialization. Furthermore, Bakker (Bakker K. , 2003) consider commercialization to refer to *“a networking of the management institutions (rules, norms and customs) and entails the introduction of markets as allocation mechanism, market stimulating decision-making techniques and the displacement of Keynesian-welfarist by neo-liberal principles in policymaking”*. Indeed, commercialization is seen a culture of or discipline in transacting business. This culture may be implemented both under public or private enterprise (K'Akumu, 2006). In this context of public utilities, the strategy is to keep management of the utility within the public realm, but implement management practices associated with the private sector in the public utility (Schwartz, 2006). The introduction of business principles and management techniques (commercialization) into the public sector is known as the new public management paradigm (Drechsler, 2004). This is one of ‘managerial’ approach to improving service provision besides delegation to the private sector through concession contracts or other contractual arrangements. Corporatized utility can be said as public owned utilities that adopts commercialization principles. For more detail on the model of privatization, it can be seen at Figure II.7.

COMMERCIALIZATION

DUTCH  
MODEL



© IHE SECTOR AND UTILITY MANAGEMENT GROUP

**Figure II.7**  
**Model of Privatization**

Source: Adapted from Blokland, Braadbaart, & Schwartz, 1999

Based on that figure, there are several modes of organization in water supply service (Blokland, Braadbaart, & Schwartz, 1999). Adoption of privatization concepts creates a wide range of modes of organization. Table II.2 summarized the modes of privatization and organization in water supply service from pure public sector provision to pure private sector provision based on the aspects of ownership of infrastructure, the identity of the system operator, the legal status of the system operator, the legal framework and ownership of the shares of the operating company.

**Table II.2**  
**Modes Privatization and Organization in Water Service**  
**(Water Supply and Sanitation)**

<b>Modes of Privatization</b>	<b>Modes of Organization</b>		<b>Who owns the Infrastructure?</b>	<b>Who operates the infrastructure?</b>	<b>Legal status of operator</b>	<b>Legal Framework</b>	<b>Who owns the shares?</b>
<b>No Commercialization</b>	Public Utility	Local	Local (municipal) government	Municipal administration	Municipal department	Public Law	Not Applicable
<b>No Commercialization</b>		Supra-local	National/state/provincial government	National/State government administration	National or state government department	Public Law	Not Applicable
<b>Commercialization</b>	Corporatized Utility	Corporation, Board or Authority	Government utility	The Corporatized utility	Parastatal, usually defined by special law	Public Law	Not Applicable
<b>Commercialization (Dutch Model)</b>	Public-Owned Public Limited Company		Government or PLC	A PLC as permanent concessionaire	Public limited company	Company Law	Local/provincial government
<b>Public Private Partnership (French Model)</b>	Delegated Private Utility		Any combination of government agencies	Government and temporary private concessionaire	Public Limited Company	Company Law	Private shareholder
<b>Divestiture (British Model)</b>	Direct Private Utility		Private agents	Private company	Public Limited Company	Company Law	Private shareholder

Source: Adapted by author from EUREAU (1992) and IHE Sector and Utility Management Group data Bank in Blokland, Braadbaart, & Schwartz, 1999.

Moreover, the public private partnership mode of privatization involves many options for allocation of responsibilities between public sector and private sector. These options give broad allocation of responsibilities that can be adjusted to fit to the characteristic of the project. For more detail, it can be seen at Table II.3.

**Table II.3**  
**Options for Public-Private Partnership in Water Supply and Sanitation Provision**

Options	Asset Ownership	Operation & Maintenance	Capital Investment	Commercial Risk	Usual Duration
<b>Service Contract:</b> the simplest form of Public Private Partnership, short term contract, private sector carrying out specific duties	Public	Public & Private	Public	Public	1-2 years
<b>Management Contract:</b> private sector is involved in operation and maintenance of the service in day to day basis, require no private investment	Public	Private	Public	Public	3-5 years
<b>Lease:</b> Private sector rents facilities from the public sector for a certain period. The Public sector has responsibility in investment for the system.	Public	Private	Public	Shared	8-15 years
<b>BOOT:</b> Private sector is allowed to build, own, and operate certain capital. After a specified time, private sector transfers the capital to the public sector.	Private	Private	Private	Private	20 – 30 years
<b>Concession:</b> Long term contract, private sector is allowed to invest for development the system. Private sector has responsibility for operation, maintenance, investment and expansion of the system for specified time.	Public	Private	Private	Private	25-30 years
<b>Shared Ownership:</b> Shared public sector and private sector responsibility for service provision, a separate and new company is established for the share of ownership.	Joint Corporate	Joint Corporate	Joint Corporate	Joint Corporate	Indefinite

Source: Adapted from Brook-Cowen 1997 in Johnstone & Wood, 2001

Related to public sector role in privatization, government involvement in privatized water supply provision is still important. Privatization can not be seen as a substitution for government involvement in water business (Houdret & Shabafrouz, 2006). There are some factor related to the success of private sector participation, such as the quality of contract design but even more so on how the public-private relationship develops subsequently with contract enforcements, the quality of regulatory interventions, risk management and conflict management as key factors (Blokland, Braadbaart, & Schwartz, 1999). Furthermore, there is a fact called as paradox of privatization that shows how the role of government is really important in ensuring the successfulness of privatization as noted by Gleick “ *the greatest need for water services often exist in those countries with the weakest public sector, yet the greatest risk of failed privatization also exist where government are weak*” (Gleick, Garry, Elizabeth, & Rachel, 2002)

The increasing private sector participation in the delivery of water supply requires effective public sector involvement in the sector. The public sector has to regulate the sector effectively to ensure that services are not high-priced or poorly performed (Johnstone & Wood, 2001). Public authorities should ensure social and environmental objectives of provision of water supply to be fulfilled (Johnstone & Wood, 2001).

Privatization usually is understood linked to deregulation and thus to a reduction of state intervention on the market, but it is in practice frequently accompanied by re-regulation (Bakker K. , 2003). Furthermore, public authorities do, theoretically, still have role in providing regulatory instruments in order to ensure the achievement of the goal of social equity and ecological sustainability (Houdret & Shabafrouz, 2006). In this context, a regulatory body will be created in the context of water utilities privatization. This regulatory body has main function to ensure competitive situation will run in a socially responsible and in line with the public interest (Wubben & Hulsink, 2003). This regulatory body have rules in regulating the economic actor in the sector in the context of determining the market structure

(number of player and nature of the competition), pricing of the service, level of investment and profit player in the market. The establishment of this regulatory body is as response to prevent market failure/market imperfection (natural monopoly, externalities, excessive competition and information asymetry) that will lead to sub optimal outcomes (Wubben & Hulsink, 2003).

#### **II.4 Decentralization in Drinking Water Supply Chain**

Nowadays, many development-related issues, such as social, economic, environmental, legal and political factors, at local, regional, national levels and international level influence the complexity of water management (Biswas, 2004). Regarding to this condition, water management should be responsive to the needs and demands of a growing diversity of central, state and municipal institution, user groups, private sector, NGO and other appropriate bodies. In this context, increasing stakeholder participation, decentralization and decision making at the lowest possible level become important (Biswas, 2004).

The term of decentralization referred to the three modes of decentralization. They are deconcentration, delegation and devolution (Klugman, 1994). Decision making is becoming one of attentions in decentralization. According to Uphoff (Uphoff, 1986), the concept of decentralization is related to the actor who make decision, the location where decision made and to whom the decision were accountable. In this context, He tries to elaborate such three modes of decentralization and make the differences between them. Devolution is the case where the decision making was made non-centrally and accountable to the local population. Deconcentration takes place if the decision making is done locally without making the decision maker accountable for local people. Delegation is the transfer of specific decision making and management authority to semi independent units. Furthermore, Klugman (Klugman, 1994) argues that decentralization can be improved by bringing decision makers closer to the people and developing mechanism of local accountability.

Related to basic utilities service, decentralization tends to change the relation of central, local government and service operator. This concept aims to strengthen local authorities by transferring greater responsibilities for the implementation of basic utilities, such as urban service from a central level to lower levels of government administration. According to Fuhr (Fuhr, 2000), decentralization offers the chance to match public service more close to local demand and preferences and to build more responsive and accountable government from below. Moreover, some of basic ideas relating to the decentralization of basic utilities is elaborated by Moore (Moore, 1993), Murray (Murray, 1983). They are :

1. Decentralization would lead to a more efficient and effective allocation of scarce resources (optimization) since local authorities know the needs and capabilities of their own to providing utilities service.
2. Decentralization would stimulate necessary local resources mobilization more effectively. Nevertheless, it is needed institutional development for strengthening of the capabilities of local government agencies in allocating resources for utilities service.

Allocation is one of three fundamental economic functions of the state besides stabilization and distribution (Finot, 2002). This is the function that can be decentralized due to its relation with the provision of public goods. This covers type of goods, quantity and quality of the goods, and the means of producing goods (Finot, 2002). This is in line with the term of political decisions on allocation which refers to two types of allocation: one on provision, where it is decided what is to be provided and with what resources, and another on production, in which it is decided how to produce the goods that are to be provided (Finot, 2002).

Furthermore, Simpson argues that in the context of public service reforms, decentralization is regarded as an important means to achieve improved efficiency and quality of services (Simpson, 2001). In the case water supply and sanitation

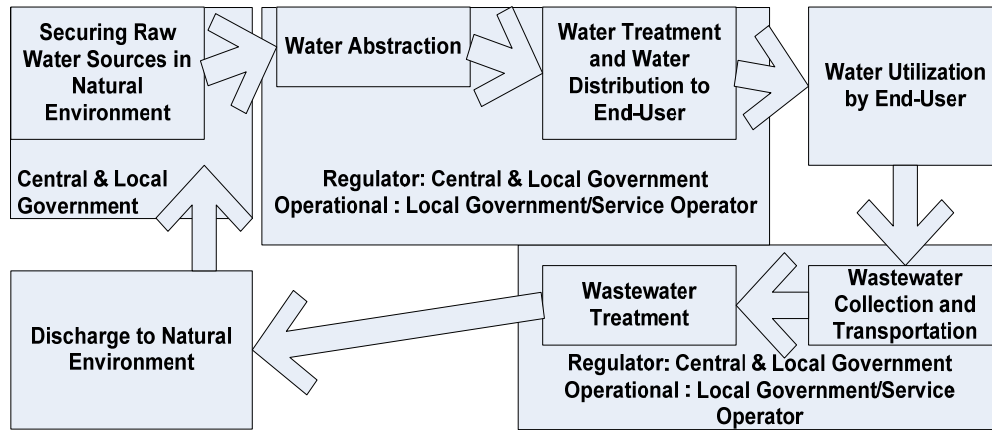


service, decentralization of water supply service mostly has been done in many parts of the world. This can be seen as the existence of enterprise/utilities in local government level that have been given the responsibilities to manage water supply provision and/or sewerage & sewage treatment. This water utilities establishment is happened in developing and developed country regarding to the improvement of public service in water supply provision. Moreover, there will be an increasing the role of local government in the broader field, such as securing raw water for drinking water.

As illustration, decentralization is related to the failure of provision public service by central government (World Bank, 2003). For example, the centralised corporatized water supply utilities operating in a national scale in Ghana and Srilanka trapped in a vicious circle of poor service provision. This is related to the problem of cross-subsidy from surplus (metropolitan) to deficit (rural) regions. In this case, consumer are unwilling to pay their bills, which leads to poor collection performance and hence inadequate funds for maintenance and repairs, causing inadequate funds for maintenance and repairs, causing inadequate service provision and so on (Blokland, Braadbaart, & Schwartz, 1999).

Decentralization also happened in lower level government/local government. This is related to the transfer of management of public service to institution which has main task in managing the service (service operators), such as parastatal agency or enterprise through corporatization or privatization (Aliani, 2002). In this context, local government should be able to improve the situation of local infrastructure and service through generation of their own resources by providing autonomy to service operators and making them accountable for their efficiency.

Based on the discussion on the decentralization in drinking water supply chain above. It can be concluded that the roles sharing between central, local government and service operator along the chain can be seen in Figure II.8.



**Figure II.8**  
**Role Sharing between Central, Local Government and Utilities Company in Drinking Water Supply Chain**  
 Source: Analysis, 2008

## 2.5 Concluding Remarks

Based on the discussion above, in this part, the construction of theoretical framework for this study will be given. The concluding remark for developing theoretical framework is shown as follows:

1. Due to the characteristic of water as important substance for the life, sustainable water supply provision is required to achieve sustainable development. Moreover, institutional arrangements aspect is seen as one of important aspects for achieving sustainable development.
2. Sustainable drinking water supply provision should be based on the system perspective that the provision involves different sector and activities. In this context, water supply chain management is seen as appropriate approach for achieving sustainable water supply provision.
3. Drinking water supply provision service can be broadly categorized as a supply chain. It is described as a serial activity that is required for fulfil demand of drinking water as product. This chain is starting with securing

raw water resources, water abstraction from natural environment (surface and/or groundwater), the production of drinking water in water treatment facilities and its distribution to customer. Furthermore, the chain continues with collection and transportation of waste water, treatment and discharge back it into natural environment (surface and/or groundwater) (Kuks, 2006).

4. Water supply chain management and its successfulness in achieving sustainable water supply provision depends on the design of institutional arrangements that covers the actors and the rule for cooperate in the chain.
5. The adoption of privatization and decentralization for drinking water supply chain institutional arrangements basically give a basic framework for a wide range of institutional option for drinking water supply chain management. In a broad term, privatization and decentralization give influences in the context of assigning public sector role and the private sector role for various function in drinking water supply infrastructure service including planning, policy making, ownership, regulation, financing, execution of investment, operation and maintenance infrastructure of the chain.
6. Based on the characteristic of drinking water supply chain, the adoption of privatization and decentralization for drinking water supply chain give possible role sharing between public and private sector for the activities in the chain. This characteristic is in the context of nature of goods and service produced in the chain, natural monopoly of the activities in the chain, externalities, environmental & social objectives involved. The possibilities of role sharing between public and private sector for the activities in the chain is discussed as follows:

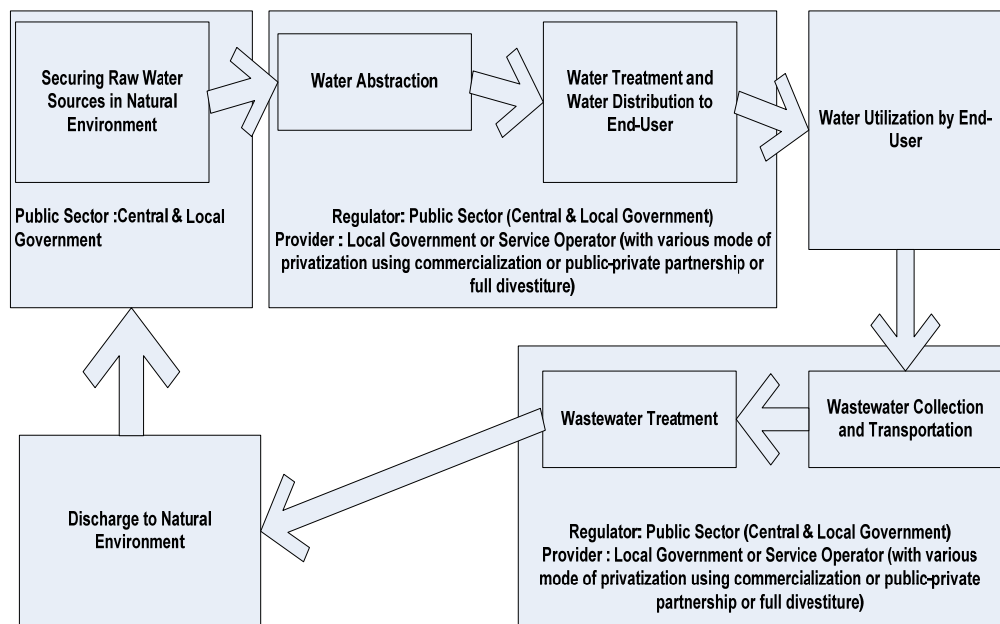
- **Securing Raw Water Resources:** This activity is mostly in the hand of public sector. This is due to the existence of externalities in water allocation among various needs, such as for drinking water, agriculture, and natural ecosystem. Moreover, the activity of securing

raw water is closely related to spatial planning in which this responsibility is fully on public sector. Central government and local government can share this responsibility through decentralization.

- **Water Abstraction, Water Treatment and Water Distribution to End-user:** This activity is related to drinking water production and distribution. Potential cost recovery exists in this activity from the collection of revenue from water tariff. Based on this situation, market or private sector is potential to be involved. This involvement can be carried out by using various privatization modes from commercialization, public-private partnership or full divestiture. The existence of natural monopoly in this activity requires public sector involvement to regulate the market in order to avoiding the abuse of monopoly power by a single provider (Budds & McGranaham, 2003) in the case of private sector involvement. In this context, the public sector should ensure that the water supply service is not over priced and under-provided (Johnstone & Wood, 2001). Moreover, the social objectives and environmental of drinking water abstraction, treatment and distribution becomes basis for the involvement of public sector in this activity.
- **Wastewater Collection, transportation and Wastewater Treatment:** This activity is related to wastewater collection, transportation and treatment for minimizing the potential of contamination to the drinking raw water source. Potential cost recovery is exist in this activity from the adoption of polluter pays principle. Due to this situation, market or private sector is potential to be involved. This involvement can be carried out by using various privatization modes from commercialization, public-private partnership or full divestiture. The existence of natural monopoly in this activity requires public sector involvement to regulate the market

in order to avoiding the abuse of monopoly power by a single provider (Budds & McGranaham, 2003) in the case of private sector involvement. In this context, the public sector should ensure that the wastewater service is not over-priced and under-provided (Johnstone & Wood, 2001). Moreover, the social objectives and environmental objectives of wastewater collection and treatment becomes basis for the involvement of public sector in this activity.

For more detail, the possibilities for role sharing of public and private sector along the drinking water supply chain that influenced by the adoption of privatization and decentralization can be seen in Figure II.9.



**Figure II.9**  
**The Possibilities of Role Sharing between Public Sector and Private Sector in Drinking Water Supply Chain based on the Adoption of Privatization and Decentralization**

Source: Analysis, 2008

Based on the discussion on water supply chain management, privatization and decentralization, this theoretical framework of this research will focus on two

main aspects that will be used as basis for comparison between the Netherlands and Indonesia, they are:

1. The adoption of drinking water supply chain concept.
2. The influences of privatization and decentralization on water supply chain management.

The adoption of water supply chain concept will be seen from the aspect of:

1. Water supply provision as government focus: This aspect is about the position of water supply provision in the government policy. This will give understanding how water supply provision is perceived in a system view.
2. Period of water supply chain concept adoption: This aspect will give understanding on the initial period of the awareness for the adoption of water supply chain concept in water supply provision.
3. Actors involved in drinking water supply chain: Due to the characteristic of water supply chain as a chain of various activities related to water supply provision will be determine the number and type of actor involved.

The influence of adoption of privatization and decentralization in water supply chain institutional arrangement in this research as defined as:

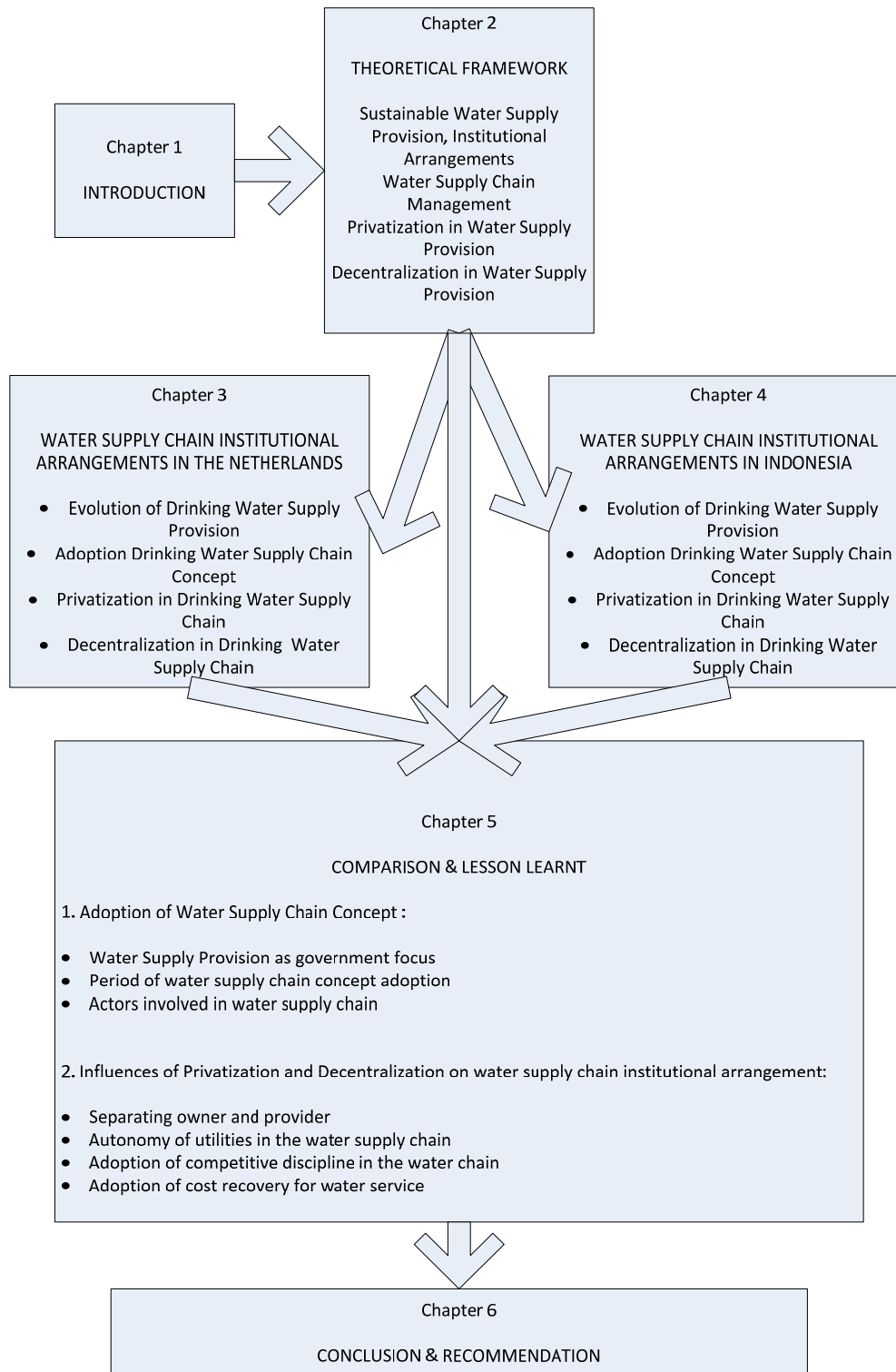
1. Separation of owner and operator of the water service in the water supply chain
2. Autonomy of Utilities in water supply chain
3. Competitive discipline in water supply chain
4. Cost recovery for service in water supply chain

For more detail, the influence of privatization and decentralization that will be discussed later in the next chapter is summarized in the following table (Table II.4)

**Table II-4**  
**Influences of Privatization and Decentralization for Water Supply Chain**  
**Institutional Arrangements**

		<b>Privatization</b>	
		<b>Yes</b>	<b>No</b>
<b>Decentralization</b>	<b>Yes</b>	<ul style="list-style-type: none"> <li>○ Separating owner and provider</li> <li>○ Autonomy of utilities in the water supply chain</li> <li>○ Adoption of competitive discipline in the water chain</li> <li>○ Adoption of cost recovery for water service</li> </ul>	<ul style="list-style-type: none"> <li>○ Increasing local government responsibilities in the water supply chain.</li> <li>○ Increasing autonomy of local service provider.</li> <li>○ Water supply chain management is fully under public authorities (no separation between owner and provider, no adoption of competitive discipline, no adoption of cost recovery for water service)</li> </ul>
	<b>No</b>	<ul style="list-style-type: none"> <li>○ Adoption modes of privatization in water chain</li> <li>○ Increasing efficiency of the chain through increasing competition.</li> <li>○ Central government/national government is fully responsible for managing water supply chain.</li> </ul>	<ul style="list-style-type: none"> <li>○ Water supply chain management is fully under public authorities.</li> <li>○ There is no implementation of commercial principle in managing water supply chain.</li> <li>○ Central government/national government is fully responsible for managing water supply chain.</li> </ul>

Based on the discussion on the theories, the framework of analysis can be seen in Figure II.10 as follows.



**Figure II.10**  
**Framework of Analysis**



## **CHAPTER III**

### **INSTITUTIONAL ARRANGEMENTS OF DRINKING WATER SUPPLY CHAIN IN THE NETHERLANDS**

In this part, the case study will be discussed. The discussion will be focused on institutional arrangement of drinking water supply chain. As general description for obtaining the whole story of the development of drinking water supply provision, the history of this development will be given. The discussion continued with the adoption of water supply chain management, the adoption of privatization and decentralization.

#### **III.1 Evolution of Drinking Water Supply Provision**

The efforts for providing sustainable water supply provision in the Netherlands basically started more than a century ago. The awareness for the needs of good and sufficient and sustainable water supply service can be seen from the evolution of provision of drinking water and its institutional arrangement. In this part, it will be discussed on the evolution of water supply provision in the Netherlands.

##### **The emerging awareness of public health**

In the earlier developments (1400-1850) of water supply provision, the fulfillment of water supply needs was undertaken by the citizen directly from surface water and groundwater (Klostermann, 2003). Initially in 1400s, the small amount of population in this period and the nonexistence of industry had given no difficulty to obtaining good and sufficient water supply (Wijmer, 1992 in Klosterman, 2003). Furthermore, the growing population and its activities (domestic and industrial) gave severe impacts to the quality of water. This led to the condition of decreasing public health. In the 1850, it was recognized the concept that there is a close relation between the quality of water supply and the quality of public health

(Klostermann, 2003). The awareness of that concept gave starting point for the development of public water supply system (Klostermann, 2003). In this period, local initiative was dominance in initiating the development of public drinking water supply in the Netherlands while central government paid little attention on this aspect (Blokland, Braadbaart, & Schwartz, 1999).

### **Corporatization of Drinking Water Supply Provision**

The period of 1850-1890 was seen as the beginning period of the drinking water sector (Klostermann, 2003). In this period, water supply system had started to be developed and the first drinking water company was developed in the year 1851 in Amsterdam (Klostermann, 2003). The company was a private company due to the investment come from the private sector, such as British investment capital and Amsterdam's wealthy residents (Wijmer, 1992 in Klostermann, 2003). Local government and private entrepreneur developed piped water supply infrastructure. This development was only undertaken in urban area. Furthermore, the enactment of Municipality Law of 1851 give more awareness for achieving more successful water supply provision due to the statement that public health was a task of the municipalities (Klostermann, 2003) . In the period of 1900s, the private water company experienced difficulties to be profitable. It took ten years for Amsterdam Water Company to become profitable (Wijmer, 1992 in Klostermann, 2003). This was as a result of the culture of the citizen that did not want to pay water from water supply system as long as they could obtain water from the canal or well. This condition led to the importance of public sector involvement in water supply sector, thus the period between 1890-1910 was called as "switching to governmental ownership period" (Klostermann, 2003).

### **Water Supply as Government Business: public ownership**

The role of central government initially began in 1910 which can be seen from the allocation national funds to this sector (Blokland, Braadbaart, & Schwartz, 1999). Moreover, the central government involvement can be seen from the enactment of National Housing Law of 1901 that gave municipalities the task to launch

regulation for water supply company to ensure that all residential/housing have water supply connections (Leeflang, 1974 in Klostermann, 2003). Another important law in this period was the Health Law of 1901 used as base for audit drinking water quality (Klostermann, 2003). Due to these two laws, the public sector involvement was increased. In this time, period of private sector participation (PSP) in water supply was ended due to acquisition of private water company by municipalities. According to Blokland, Braadbaart, & Schwartz (1999), this period is the initial step for public ownership in the Dutch water supply sector.

During the period of 1910-1950, due to the enactment of National Housing Law of 1901 and the growing involvement of public sector in the provision of water supply, the distribution network was developed not only in urban areas but also in rural areas. This was indicated by the establishment of the first regional company in part of Zeeland and the introduction of national subsidy for the development of water supply system in sparsely populated areas (Klostermann, 2003). Moreover, the development of advisory committee to the government and a national bureau in 1913 was taken place for supporting the development of drinking water in the context of a regional system which covered urban and rural areas (Blokland, Braadbaart, & Schwartz, 1999).

### **Regionalization Water Supply Company: Decentralization**

The province held important role in the period of 1910-1950 due to the creation of supra municipal level water supply service to further extension to the municipal and rural area as one integrated region (Blokland, Braadbaart, & Schwartz, 1999). The development of regional water supply companies was happened in this time. In 1938, the number of water supply company reached 231 companies with the composition 155 companies under municipality management, 41 under direct private management and 32 companies as regional companies that used public limited companies (PLC) with multiple municipal shareholders as management mode (Blokland, Braadbaart, & Schwartz, 1999). In this period, the focus of water

supply provision was more on the extension of water supply service coverage and developing technology for coping with pollution and corrosion than on prevention of water supply resources depletion (Klostermann, 2003). The efforts to increase coverage area for water supply service were success in which 96% of the population in urban and rural area had access to the water distribution system in 1963. Moreover, with the subsidy scheme launched for increasing service coverage, in 1968, the number of population that had access to the distribution system reached 99% of total population (Leeflang, 1974 in Klostermann, 2003).

Due to the increasing concern on coping with pollution, the development of sewerage network system was also undertaken in this period (1910-1950) (NHV, 1998). Actually, the development of widespread sewerage system and wastewater treatment system was started in around 1930. The development of sewerage and wastewater treatment plant was undertaken by the municipality and province. Based on Surface Water Act (1969), the responsibility of managing wastewater treatment plant was given to Water Boards. The development of sewerage and wastewater treatment system was influenced by the enactment of Surface Water Act of 1969 whereas the capacity grew dramatically from 1 mpe (million population equivalent) in 1960 to 8 mpe in 1970 and steadily growing to 27 mpe in 2004 (Nederland Leeft Met Water 2004, 51 in Juuti & Katko, 2005). As a result after some decades, nearly all houses is connected to the sewerage system (for 2004, 100% in urban area and 89% in rural area<sup>11</sup>). This sewerage network transports wastewater from household to 400 unit central wastewater treatment plants (Nederland Leeft Met Water 2004, 51 in Juuti & Katko, 2005).

### **Legislation on Water Supply Provision**

Due to the complexity in water supply provision related to increasing demand, water pollution and the needs for more sophisticated system, in the 1957 the first drinking water act was enacted (Klostermann, 2003). This law arranged the performance requirements, monitoring of drinking water quality, checking by

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<sup>11</sup> Data is taken from [www.wssinfo.org](http://www.wssinfo.org) accessed 07202008, 21.35 p.m.

health inspection on water company performance (Klostermann, 2003). The act also gave influences in the establishment larger water supply company for increasing its economic of scale, and facing commercial challenges (Blokland, Braadbaart, & Schwartz, 1999). In this law, the role of water supply company was important in which the water companies should ensure that the distribution of reliable drinking water should be done in sufficient quality based on public interest (Wubben & Hulsink, 2003).

Following the successfulness in increasing the access, much legislation was enacted to ensure the successfulness of the system development could be sustained. The enactment of Groundwater Law for Water Companies of 1955 was seen as the first step in controlling the drinking water supply company in utilizing water resources in a more sustainable way (Leeflang, 1974 in Klostermann, 2003). This law proposed the transfer of groundwater licensing task from the municipalities to central government (Ministry of Health and Environment) and also covers the regulation on financial compensation for dessication damage (Klostermann, 2003). This law was amended in 1981 and the responsibility for groundwater licenses went to provincial government (Klostermann, 2003).

The awareness to provide more sustainable water supply provision was increasing in the period of 1970-1990. In this period, environmental pollution became serious problems (Klostermann, 2003). Due to this problem, several water supply companies established an organization that concern to maintain quality of raw water. RIWA, Rhine Committee River Companies, was established in 1951 (Leeflang, 1974 in Klostermann, 2003). The attention of the government to the problem of water pollution was marked by the enactment several regulations regarding water, air, soil (Klostermann, 2003). In 1970, The Law of Surface Water Pollution was completed. This law encourages people to treat wastewater before flowed to surface water. Another issue during this period was the problem of dessication due to extraction of groundwater intensively by water supply companies in order to fulfill increasing demand. As a result of this condition, the

government enacted a new groundwater law in 1981 (Klostermann, 2003). According to this act, provincial government has responsibility to regulate groundwater. The licensing responsibility was decentralized from national government to provincial government (Klostermann, 2003).

Moreover, in the period of 1980-1990, the public limited companies were become main choice as mode of management for water supply companies. This is aimed to make more efficient the decision making. The shareholders of this PLC are municipalities and provincial government (Blokland, Braadbaart, & Schwartz, 1999). Regarding the Drinking Water Act of 1957, the provincial government took important role in this era in reorganizing water supply companies with the minimum standard of 100.000 connections or supplies 5 million m<sup>3</sup> of drinking water. As a result of this reorganization, according to Blokland, Braadbart & Schwartz (1999), the number of company was reduced from the peak 231 in 1938 to 210 in 1950, 185 in 1965 to 195 in 1980 and only 40 companies in 1980 where there was 32 of water companies as PLC with the coverage areas several municipalities, 8 as direct public management and 2 as direct private management. As a result, the period of public limited companies (PLCs) had started and the end of municipal companies (Blokland, Braadbaart, & Schwartz, 1999).

### **Exclude Free Market and Increasing Efficiency: Benchmarking**

Liberalization/privatization influences the Dutch water sector. In 1999, it was determined that water supply sector (including water chain activities) was exclude from free market and decided to be still under public ownership. Kuks (2001) argues that this decision is based to the perception that many threats to the overall performance of water supply service, such as a decreasing of quality management and decrease security and continuity of supply and reduce prospect for the better management of water resources potentially will be emerged if water supply sector is devolve to private sector. Moreover, it is convinced that the Dutch Model of public limited company (PLC) management modes of water supply utilities has proved to give good performance in water supply service (Kuks, 2001). The

influence of liberalization/privatization in water sector is the development of benchmarking system for water chain (Bots, 2008). This benchmarking system is aimed for increasing the transparency and encourage learning across institution involved, including drinking water company (water supply provision), municipalities (wastewater collection), and surface water quality (waterboard).

### **The Result**

As a result of the continuous development from the very beginning of the development period until now, the performance of water supply service in the Netherlands is remarkable categorized as good and very good (Wubben & Hulsink, 2003). This is based on the representative pooling done by the Association of Water Supply Companies (VEWIN) in the mid of 90s for the category of the quality of the infrastructure, technical expertise, density, environmental performance, guaranteed delivery and water quality (Wubben & Hulsink, 2003). Moreover, several data from VEWIN and WHO gives more description on the performance of water supply provision in the Netherlands. The indicator of good performance of water supply and sanitation in the Netherlands can be seen as follows:

- **Access to Water Supply and Sanitation<sup>12</sup>**

All population (100% both in urban and rural area) is connected to piped water supply system through household connection. Nearly all household is connected to the sewerage system (for 2004, 100% in urban area and 89% in rural area).

- **Water Quality (VEWIN, 2006)**

The water quality is good and categorized as better than the standard that required in Water Supply Act. This water quality is measured by using index called water quality index (WQI). The range of score is between 0-1, with 0 means that water

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<sup>12</sup> Data is taken from [www.wssinfo.org](http://www.wssinfo.org). A website organized by Joint Monitoring Program between WHO and Unicef on Water Supply and Sanitation. This website is accessed 07202008, 21.35 p.m.

quality fulfils the legal standard and 1 means that water just comply the standard. The index for 2006 is 0.03. From the customer perspective, 89% of the customers are satisfied with the price-quality ratio of drinking water. Moreover, customers give high enough mark 8.0 out of 10 for water quality.

- **Service Quality (VEWIN, 2006)**

In 2006, the company get good appreciation from the customer due to the service they gave with an average mark of 7.6. This mark is higher than the appreciation of customer to other service sector, such as energy company and supermarkets.

- **Environment (VEWIN, 2006)**

Regarding to environmental issue, the water supply company take some initiatives to managing energy consumption, recycling residues and fighting dehydration. Energy consumption per m<sup>3</sup> of producing drinking water is increased 4% in the period of 1997-2006. The utilization of sustainable energy, such as solar energy for pumping was increased from 5% to 34% during 1997-2003. The utilization of residues of the drinking water production reached 94% of total residues. Moreover, the industry proactively involved in activities related to preventing dehydration and impact of excessive groundwater extraction. In order to ensure sustainability of raw water availability, water supply companies manage around 20,100 hectares of nature area in the Netherlands that related to the water abstraction area.

- **Finance & Efficiency (VEWIN, 2006)**

There is a decline in cost per connection by 16.9% in the period of 1997-2006. Moreover, cost per m<sup>3</sup> also declined by 5.4%. In this context, water supply company can maintain the cost to not increase, even though it is stated that the declining cost can not be seen directly as increasing efficiency.

Based on the discussion in this sub chapter, it can be argued that, the successful of increasing service coverage and performance of water supply service to all



population was supporting by the increasing attention in minimizing surface water pollution and groundwater pollution through development of adequate sanitation service and supporting regulation that directly relate to qualitative and quantitative aspects of water. Moreover, the political will on increasing public health and the large involvement of public sector (government) were important in the development of infrastructure.

### **III.2 Adoption of Drinking Water Supply Chain Concept**

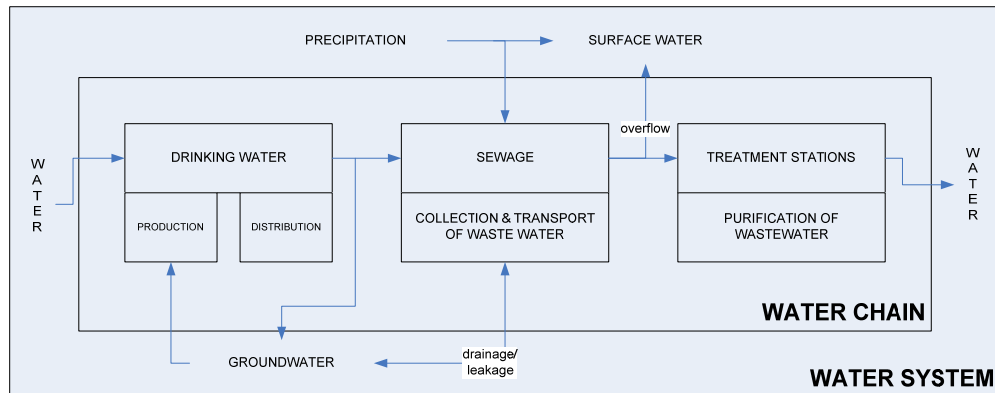
Drinking water supply provision in the Netherlands is based on the concept of water chain (Jong, 2007; Wubben & Hulsink, 2003). This based on the system view of the drinking water supply that is related to other activities. The water chain concept for water supply service provision actually is based on the efforts to achieve sustainable water supply provision. This is related to the Fourth White Paper on Water Management that released in 1998. In this document, sustainability became main issue in which it is used in the document to express the term of sustainable economic growth, sustainable water system and sustainable protection against floods (Klostermann, 2003). The integrated approach of quality and quantity problem, harmonizing water supply provision with natural water system and considering larger system in water supply provision such as catchment's area are the important principles of this document (Klostermann, 2003).

The water chain in Dutch drinking water supply provision involves the sequential process of producing drinking water supply and wastewater treatment. For more detail, water chain diagram is shown as follows.



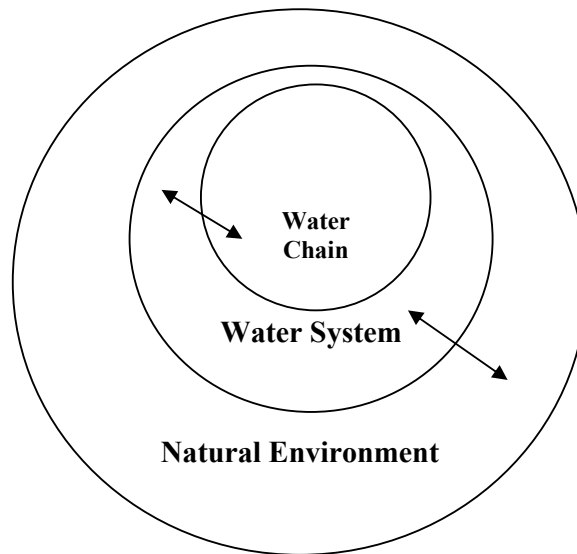
**Figure III.1**  
**Water Chain in Dutch's Drinking Water Supply Provision**  
Source: (Wubben & Hulsink, 2003)

Actually, the approach of water chain in water supply service is rooted on the idea of integration. This is related to the concept of sustainability in water supply provision in the Netherlands through implementation integrated water management (NHV, 1998). The water chain has the relationship to the water system and the environment (Jong, 2007). For more detail, it is showed in following figure III-2



**Figure III.2**  
**The Relationship among Water Chain, Water System in**  
**Dutch's Integrated Water Management**  
 Source: Jong, 2007

From the figure III-2, the water chain relates to the water system in the inflow and outflow ends. The Water System provides raw water for drinking water supply as well as for natural environment from surface water and/or groundwater. The Water Chain produced treated wastewater and discharges it to water system (groundwater/surface water). On the other hand, precipitation can supply water to the water system and water chain. In the context of water chain, the rain water runs to the sewage system. In the context of water system, rain water goes to surface water and groundwater. In the context of rain water, the separation of these two systems becomes target to be realized by the Dutch Government by the 2020 (Jong, 2007). This seems to ensure the sustainability of water management by avoiding contact between clean rainwater and groundwater with wastewater. Moreover, one important principle of Dutch government policy regarding water chain is that water system and the environment (including the soil and the air) should become important consideration for the water chain management (Jong, 2007). For more simple illustration of the interaction among water chain, water system and environment, it can be seen at Figure III.3.



**Figure III-3**  
**Interaction of Water Chain, Water System and Natural Environment**  
 Source: Author, adapted from Jong, 2007

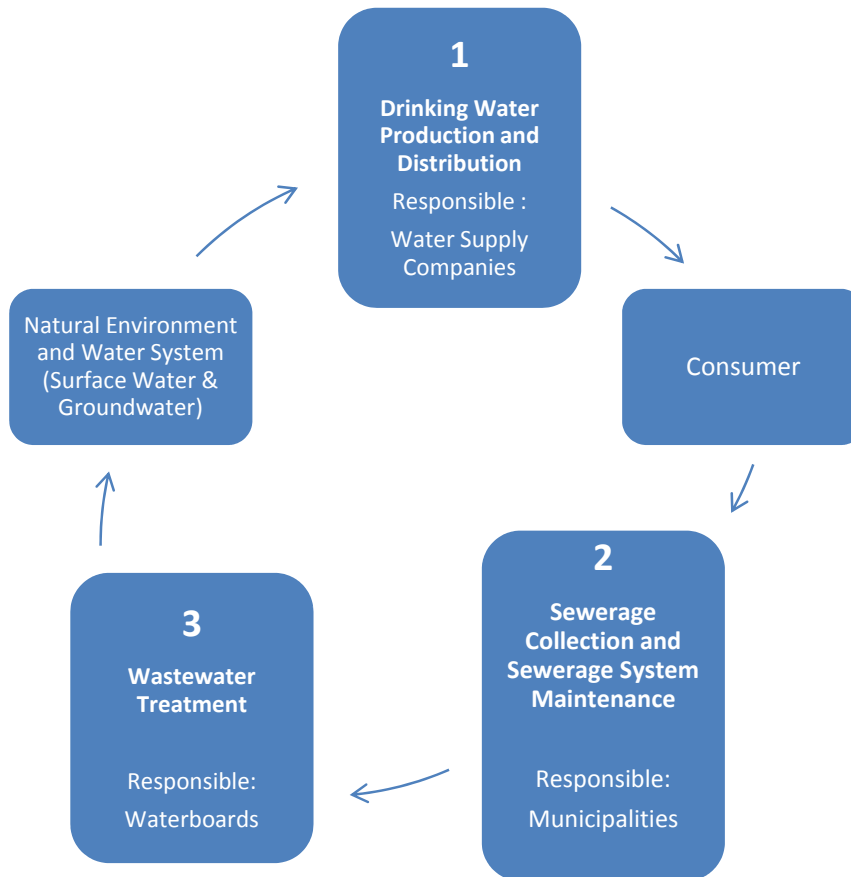
The integration of water chain has been proposed by the Dutch Ministry of Housing, Environment and Spatial Planning in order to make a coherent management of all elements in the water chain that leads to increasing efficiency (Dalhuisen & Nijkamp, 2004). The integration is about the establishment of one authority to manage the whole related activities along the chain and one water bill for all services. This will lead to lower transaction cost than multiple organizations getting involved in the chain. On the other side, the integration also will give users aware on the water chain and realize that there are interconnection among elements in water chain (Dalhuisen & Nijkamp, 2004).

Based on the practical implementation of this integration in Amsterdam (Rodenburg, H. L. F., Dalhuisen, & Nijkamp, 2000), some lessons learnt tell that the integration is difficult due to the characteristic that sewerage and drinking water system are completely separated and very different in cultures and organization modes of related institution along the chain. Indeed, the concept of integrated chain management under one authority is still not implemented yet. The

concept of voluntary cooperation among related actors in the chain is preferred (Dalhuisen & Nijkamp, 2004).

In fact, several different actors are linked in the water supply chain with different responsibilities (Blokland, Braadbaart, & Schwartz, 1999). Various organizations are involved in Dutch water chain. It can be seen from two levels perspective; regulatory level and executive level (Argento & Helden, 2008). In regulatory level, the national government, two minister are involved (water affairs and environmental affairs) and also the provinces. In the executive level, water company that has responsibility for producing water supply, the municipalities that has responsibilities in collection sewerage and water board that has responsibility in wastewater treatment (Argento & Helden, 2008). In the Dutch water chain, the role of association of each actor is also crucial. This organization has role as liaison between the members with the national government. Moreover this association also has function to promote the common interest of the members. These associations are VEWIN (for water supply company), VNG (for municipalities), UvW (for waterboards) (Wubben & Hulsink, 2003). For instance, VEWIN has responsibility in developing 10 years drinking water supply plan (Blokland, Braadbaart, & Schwartz, 1999) that used as basis for 1 year drinking water supply planning by water supply company.

The related actors in the water chain include water supply company, municipalities, water boards, and Rijkswaterstaat. Graphical illustration of water supply chain and its actors can be seen in figure III.4.



**Figure III.4.**  
**The Actors in The Netherlands' Drinking Water Supply Chain**  
 Source: Adapted from Blokland, Braadbaart, & Schwartz, 1999

Following is the detail explanation on the role of each actor in the chain:

**Water supply company:** this institution has responsibilities in abstracting raw water from surface water and/or groundwater. Moreover, the treatment of raw water (mostly purification) and distribution treated water to consumer is also another responsibility. The cost of abstracting, producing and distributing drinking water is included in the price the customer pays per m<sup>3</sup> (Kuks, 2001). Due to the increasing dependence of water supply company to surface water as source of raw water, surface water pollution become important issue. In this context, water supply companies pay more attention and responsibilities to preventing surface

water pollution. There are several activities that undertaken by water supply company in this issue, such as: detecting pollution substances, undertaking the action to minimise pollution and preventing future pollution (Blokland, Braadbaart, & Schwartz, 1999). According to VEWIN, most of Dutch water supply company (over 96%) are increasing their actions in order to minimise pollution. These actions are done by making cooperation or either against with identified polluters (VEWIN, 1996 in Blokland, Braadbart & Schwartz, 1999)

**Municipalities:** this institution has responsibilities in maintaining and managing the sewer network. This is related to the responsibilities of municipalities for providing public health. The management of sewerage network is part of integrated infrastructure since most of sewer network is laid under road networks. Municipalities have rights to charge everyone that connected to the sewerage network for recovering the cost of maintaining the sewers. However, most of municipalities don not use this right and as an alternative they put these costs as part of the property tax which is general sources of income for municipalities in the Netherlands (Kuks, 2001).

**Water Boards:** this institution has responsibilities in determining the availability of surface water in sufficient quantity and good quality. Managing wastewater conveyance, treatment and discharge, combating water pollution and improving the quality of surface water are some of responsibilities of water boards (Blokland, Braadbaart, & Schwartz, 1999). Furthermore, the water boards have two modes of water quality management, i.e.: active and passive treatment (Kuks, 2001). Active treatment involves activities of sewage treatment, such as build and operates wastewater treatment plant, pipes and pumping station. Passive treatment involves setting water quality standard, issuing the discharge permit, monitoring and inspection of discharge & raising levies based on criteria equivalent pollution units. The pollution levy was not only determined by the number of pollution unit to be treated but also by the required water quality standard (Kuks, 2001). This pollution levy is used to finance water board management tasks, such as build and

run wastewater treatment plant. The levy is in line with the principle of 'cost recovery' stated in the European Water Framework Directive (EC 2000/64). This principle is stated that the obligation to recover costs that are related to 'water services' in the river (and sub) basin districts where these costs exist (Lazaroms & Poos, 2004). In undertaking its role in water chain, the water boards have coordination with Rijkswaterstaat. Rijkswaterstaat is the national government organization which has responsibilities in the operational management plans for the large water bodies, such as River Rhine and Lake IJssel (Blokland, Braadbaart, & Schwartz, 1999).

The interaction among the actors is arranged by several acts that used as regulatory framework on water chain. These acts cover the quality and quantity aspect of water, the relation between water and environment (natural environment and spatial planning) and right of people on water. They are: (NHV, 1998)

1. Water Management Act (1989): This act regulates the integration of water management which include water system (surface and groundwater) and water chain (water supply and sanitation). This act gives rules for quantitative management of surface water. The integration between water, environment and spatial planning is also main consideration in this act that the water management should relate to environment and spatial aspects.
2. Groundwater Act (1981): This act focus on groundwater quantity management. This act relates to the instrument, such as: groundwater abstraction permission, abstraction registration, duty report, and levies for abstraction more than 10 m<sup>3</sup>/hour. The authority that is responsible for the instrument of the acts is province.
3. Pollution of Surface Water Act (1970): This act mainly focuses on pollution control of surface water. The quality of surface water is main focus in this act through the reduction of emission and improvement of surface water quality. The instruments of the act are: the issue of discharge permission, standard setting, and levy. The levy is on discharge, especially for heavy metal and



organic waste. This levy is used for recover the cost for wastewater purification (earmarked). Primary authorities are the national and provincial government which delegate their responsibility to the waterboard. Discharge into surface water without a licence is forbidden. Precautionary principle: pollution should be minimized, irrespectively of the type of substances concerned. No-deterioration principle: harmful substances should not increase in the environment. Every polluter pays for: Operation sewage treatment plants. Costs of restoration of the water system. Costs of administration.

4. Soil Protection Act: This act mostly focuses on general duty to prevent groundwater pollution and clean up the soil. The act is for protection soil and groundwater. This act distinguishes two level of protection, i.e.: general level and specific level. The general level protection is based on the standard set by national government. This rules focus on the activities that may lead to pollution of soil and groundwater. This activities cover : application and spreading manure on soil, discharge of liquids into soil and groundwater, application and spreading sewerage sludge and organic household waste (compost) on soil, dumping of solid waste material, storage of petrochemical products in underground tanks, artificial recharge of aquifers, eaching standar for building materials produced from recycled waste. Moreover, the specific protection level is implemented in the areas used for water supply abstraction. The responsibilities for soil protection based on this act are divided in national and regional level. In national level, the Ministry of Housing, Environment and Spatial Planning responsible for determining General Administrative Orders of the act, soil quality objectives and procedures for estimating site-specific risks. In local level, provinces and municipalities are responsible for applying the Act and associated instruments. In 1994, this act is part of Environmental Protection Acts.
5. Drinking Water Act: This act regulates the provision of water supply quality and supervision of water producing and distributing companies in the interest of public health. This act contains on supply conditions, quality standard, organization and planning of water supply provision in national to local level.

Provincial government has responsibility for re-organization of water supply company in their respective region to increase economic of scale of water supply company. Water supply company has important responsibility to deliver sufficient reliable drinking water.

Legislation concerning sewerage collection and treatment is not regulated by formal legislation by national government. These tasks are regulated by the province and municipality through province and municipality ordinances. The regulation that regulates the tasks is Environment Protection Act which gives obligation to municipalities to prepare sewerage plans (NHV, 1998).

From the discussion above, the concept of water chain and its integration with water system supported with clear legislation related to quality and quantity of water as well as clear role of actors involved gives the achievement of sustainable water supply provision in the Netherlands. Moreover, due to the centralized system of water supply and wastewater treatment, the management of water chain can be done easier than if the system is decentralized or fragmented.

### **III.3 Privatization in Drinking Water Supply Chain**

Privatization, commercialization and divestment can be possibly implemented in water supply chain activities since the activities in the chain can be viewed as business activities (Kuks, 2001) due to the potential of cost recovery. Privatization in Dutch's water supply chain basically focuses on liberalization and privatization the drinking water supply company, but the effect influence all other actors in water chain, i.e. municipalities and waterboard. This is based on argument from Wubben & Hulsink (2003) that the focus of privatization and liberalization of Dutch's water industry is in the drinking water industry. The liberalization and privatization of The Dutch water industry was part of liberalization and privatization program of three major utility which involves the

telecommunication, energy and water supply sectors. This program was launched in 1990s and particularly for water supply in 1997 (Wubben & Hulsink, 2003).

The adoption of privatization/private sector participation in Dutch water supply industry basically is not a new mode. Actually, this mode was the initial modes implemented in the early period of water supply system development. According to Blokland, Braadbart & Schwartz (1999), in the periode of 1854-1920 the mode of direct private management was dominant. The company was a private company due to the investment comes from the private sector, such as British investment capital and Amsterdam's wealthy residents (Wijmer, 1992 in Klostermann, 2003). In this initial period, piped water supply infrastructure was developed by local government and private entrepreneur.

Basically, the liberalization and privatization in the Netherlands water supply sector in the 1990s was driven by the trend in European countries<sup>13</sup>. This trend is based on the policy of European Commission to liberalize the telecommunication and energy market in part of establishing internal network and utility market (Wubben & Hulsink, 2003).

The basic reason for proposing privatization in Dutch water chain in the mid of 1990 is for increasing efficiency of the water chain mainly drinking water supply company through increasing competition that will lead to significant cost reduction<sup>14</sup>. This argument was supported by the Ministry of Economics. On the other hand, the objection for increasing privatization is mostly on argument that water supply provision should be provided for every person sufficiently and as the core business of government<sup>15</sup>. Moreover, privatization was considered as barrier for achieving sustainability of water supply provision (Tweede Kamer, 1998 in Klostermann, 2003). In this context, water supply company is viewed as utility

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<sup>13</sup> Aqualibrium – Country Report The Netherlands, [www.oieau.fr/aqualibrium-12.pdf](http://www.oieau.fr/aqualibrium-12.pdf), accessed June 15,2008

<sup>14</sup> *Ibid.*

<sup>15</sup> *Ibid.*

that has many functions related to the effort for ensuring the sustainable of water supply provision, such as protection of resources and societal function (ensuring every people have access to the service). Based on this function, the role of government is necessary to protect customer, maintain the societal function of water utilities and resources management. By devolving the ownership and management of water supply provision to private sector, the achievement of these goals will not be achieved due to increasing tariff (Feenstra, 1998 in Klostermann, 2003). Moreover, by introducing market force in water supply, loss of quality management and a reduced security and continuity supply and reduce prospect for the wise management of water resources possibly will be happened (Kuks, 2001). From the view of characteristic of piped water supply, the existence of natural monopoly characteristic makes new entry of third party (private sector) for increasing competition become not feasible (Wubben & Hulsink, 2003).

After the debate in adopting privatization, finally in 1999, it was decided to reject the involvement of private sector in the drinking water supply as owner. Moreover, it was also decided to maintain the monopoly in the water supply sector for the existing water supply companies (Kuks, 2001). However, the idea of privatization, i.e. idea for increasing competition for efficiency is still adopted even tough the shares of the water supply companies are still owned by local and provincial government. As a consequence of this adoption, a system of benchmarking is introduced for water supply companies to increase the competition for increasing efficiency and customer friendliness (Klostermann, 2003). In this benchmarking the performance of water companies is compared, using performance-indicators on product quality, customer satisfaction, environmental performance and cost (Klostermann, 2003). There are three objectives of introducing benchmark mechanism for Dutch's water supply company, they are 1) increase transparency, 2) give account to the public, shareholders and the Board of Directors and 3) generate information to improve performance (Geel, 2004). This benchmarking is seen as a type of competition (administrative competition) besides market competition which can pressure the

low performance water supply company to increase its performance (Wubben & Hulsink, 2003). This benchmarking system has given impact on performance improvement of drinking water supply ( (Wubben & Hulsink, 2003).

Moreover, the adoption of privatization idea in water supply sector in the Netherlands can be seen from the dominance of type of Public Owned-Public Limited Company (PLC) for water supply company. With this mode of organization, company law is used as legal framework. In this context, the Dutch water supply company can be seen private companies that run based on commercial principles while the shareholders are local government and provinces (Geel, 2004).

Based on the discussion above, it can be argued that water management, including water supply provision and its related activities in the water chain is put in the shoulder of government as public responsibilities due to the needs to ensure protection of resources and societal function (ensuring every people have access to the service). Furthermore, in order to increase the efficiency and performance of the sector, competition is encouraged through benchmarking. This benchmarking system is aimed for increasing the transparency and encourage learning across institution involved, including drinking water company (water supply provision), municipalities (wastewater collection), and surface water quality (waterboard) (Bots, 2008).

#### **III.4 Decentralization in Drinking Water Supply Chain**

The discussion on decentralization is closely related to the discussion on level of government. The Netherlands has three levels of government. The first level covers the national government. National interests are the responsibility of the national government. The second level includes the 12 provinces of the Netherlands. The provincial government has responsibilities in the field of environment, spatial planning, energy, social work, sports and cultural matters.

The third level of the government includes both the municipalities and the waterboards. The Dutch municipalities have responsibilities in the areas of sanitation, traffic, housing, management of public authority schools, social services, health care, sports, recreation and culture. The waterboards have functional responsibility for water management in the Netherlands (Blokland, Braadbaart, & Schwartz, 1999).

In the initial period of water supply provision, the initiative to develop and managing the water supply system mostly come from local government (municipality). In this time, the role of local government was very important. The role of local government in this sector basically is initiated by the awareness that there was a relation between the quality of water supply and the quality of public health in their respective municipality area (Klostermann, 2003).

In the present time, the role of local government in water supply chain management in Dutch water supply sector is still important. This is based on the adoption of concept of subsidiarity (Blokland, Braadbaart, & Schwartz, 1999). This main idea of this principle is about the devolution of responsibility from higher level of government to the lowest possible level that has sufficient capacity to carry out that responsibility efficiently and effectively (Blokland, Braadbaart, & Schwartz, 1999). Due to this principle, the management of water supply chain becomes more complex since it involves many actors/institution from different level of government. This influences the way strategic and operational policy of water supply chain is formulated.

Related to water chain, the national government determines public policy by means of national framework acts and policy plan (Blokland, Braadbaart, & Schwartz, 1999). This framework acts will be used by the lower government level for preparing operational policy. This is done in order to ensure that the operational policy will be match with the framework acts. In order to be able to implement this policy effectively, lower government levels are provided a certain

degree of policy freedoms. The management of water chain in the Netherlands is largely decentralized. This can be seen from the actors that have roles in water chain, i.e. drinking water supply, municipalities, water boards.

In the context of integrated water management, an integrated planning system is required to be implemented. The integration of plan from various government levels (from central to local government) is required. In the Netherlands, the integration of planning in the context of water chain is focused on quality and quantity aspect of groundwater and surface water. The national government is responsible for formulating strategic water policy in the Netherlands for water system and water chain. Moreover, in the context of water supply provision, national government has responsibility to formulate a 30-year Plan which consists of policy statement and detailed technical overview of future infrastructural requirements needed to ensure sustainable water supply provision (Blokland, Braadbaart, & Schwartz, 1999). The provincial government mostly has responsibility in groundwater quality and quantity management. They develop both strategic and operational policy to meet these responsibilities. Moreover, provincial government has big influences to the management of water supply chain in the context of determining the operational aspects of water board, reorganization plan for drinking water supply to meet feasible economic of scale (through merge some water supply companies) and supervision over municipalities in undertaking activities related to sewage collection and transportation (Blokland, Braadbaart, & Schwartz, 1999).

Beside the clear division of responsibility among government level, there is also clear involvement of non-governmental actors, such as water board and association. In line with this, the water board has role delegated from provincial government mostly on maintaining quality and quantity of surface water. Moreover, the association of water supply company has great role in determining the future plans of the water chain. This is related to the responsibility of VEWIN to prepare 10-year Plan for the development of water supply service. This 10-year

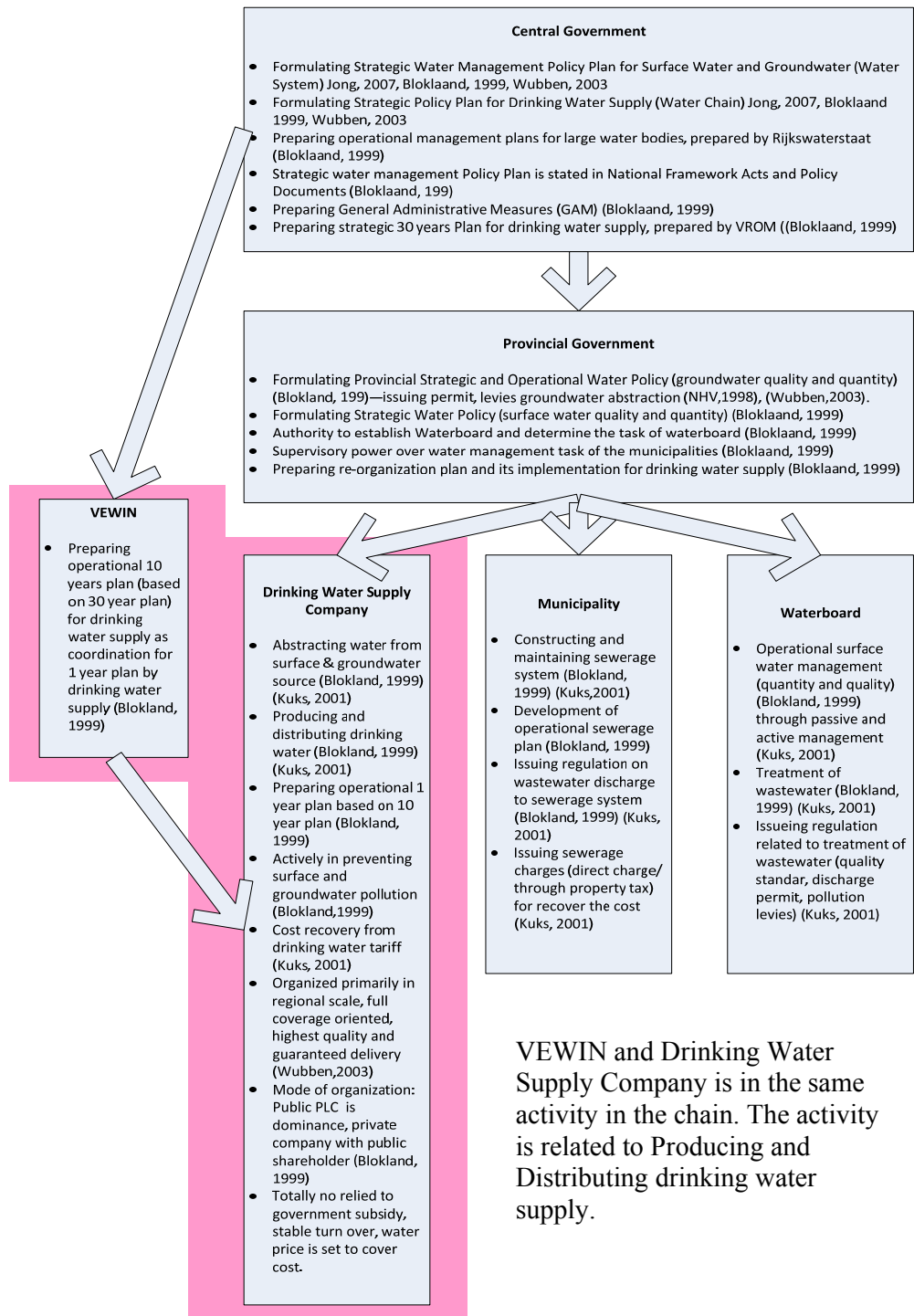
plans are prepared based on 30-year plan prepared by national government and consists of the plan of individual water supply companies in the next ten year (Blokland, Braadbaart, & Schwartz, 1999).

Based on this 10-year plan, the water supply company prepare one-year plan which consist of future development required for achieving sustainable water supply provision (Blokland, Braadbaart, & Schwartz, 1999). The determination of water tariff per m<sup>3</sup> is determined locally, by the utility management and local government (municipal and provincial as shareholder). There is no intervention from central government in this activity. This tariff covers cost of water abstraction, water production and distribution. This price is determined in the context of full cost recovery for ensuring water supply company self supporting (Blokland, Braadbaart, & Schwartz, 1999). Moreover, the calculation of tariff is transparent and understandable to customer (Blokland, Braadbaart, & Schwartz, 1999).

The waterboard has responsibilities for wastewater treatment. Waterboard can draw up regulation to support their tasks. The regulation can be related to the financing matters. In this context, waterboards can require a water-board tax and a surface water pollution levy to the population in the area where it operates (Blokland, Braadbaart, & Schwartz, 1999). On the other side, the task of municipalities is only in constructing and maintaining the sewerage system by preparing operational sewerage plan and releasing regulations regarding the discharges on the sewers (Blokland, Braadbaart, & Schwartz, 1999).

The division of responsibility in Dutch's water chain among different level of government can be seen in Figure III.5.





**Figure III.5**  
**Division of Responsibilities in Dutch's Drinking Water Supply Chain**  
 Source: compiled by author from various literatures, 2008

The decentralization can be related to the concept of the cost recovery and accountability of water service (abstraction raw water, production drinking water, treatment wastewater). In this context, it should be ensured in the local level where the water existed. The term local level can be perceived as administrative boundaries or hydrological boundaries, such as river basin area.

The central government gives enabling environment for local government and other local actors to take their appropriate roles. Moreover, the characteristic of water supply company with the Public PLC mode whereas the share of the company is owned by multiple shareholder (municipality and provincial) that leads to prevent abuse of power by single shareholder. The up-scaling process through merger of some companies still put the role of local government as shareholder for ensuring that the water is provided to the community in their respective area in a sustainable way.

### **3.5 Concluding Remarks**

From the discussion above on the implementation of drinking supply chain management and its institutional arrangement related to adoption of privatization and decentralization, it can be concluded that:

1. The development of drinking water supply provision in the Netherlands has been taken for more than a century, starting in 1850. This development basically was pushed by the awareness of improving public health. In this initial period, private sector and municipality has dominant role in developing water supply system.
2. The central government give more focus to the development of water supply after the failure of private companies in extending the service coverage to the urban & rural areas. This is started in the early of 1900 whereas the government takes many efforts to increase the coverage of water supply provision. By this effort, in 1963 the coverage of drinking

water supply service was increased considerably to 96% of population in urban and rural area. In 1968, this number reached 99%. To date, 100% of population both in urban and rural area is connected to the piped water supply system.

3. The wide spread development of sewerage system and wastewater treatment plant was initiated in around 1930. The development of this system was increased dramatically after the enactment of Surface Water Pollution Act in 1969. As a result, the coverage increased from around 1 mpe (million population equivalent) in 1960 to 8 mpe in 1970 and 27 mpe in 2004 (100% urban household connected to the system, 98% in rural area).
4. The effort to develop sufficient sewerage and waste water treatment plant in line with water supply provision can be seen as awareness in adopting the water supply chain concept for water supply provision. This is due to the characteristic of water supply chain whereas the drinking water supply provision, sewerage service and wastewater treatment are main activities in the chain.
5. Based on the discussion in Chapter 2 on the influences of decentralization and privatization to institutional arrangements of water supply chain management (see Figure II.9). The influence is mostly on the possibilities in role sharing between public and private sector. The influences of such concepts in each activity in the chain in the Netherlands will be described as follows:

### **Securing Raw Water in Natural Environment**

- The responsibility in securing raw water for drinking water supply is the hand of public sector which is shared among different level of government. In this context, decentralization is adopted in this activity.

- The task of central government is mostly on strategic level. In this context, the national government has responsibility in developing water management policy plan for surface water and groundwater nationally. On the other side, national government through Rijkswaterstaat have operational task for managing surface water in large water bodies.
- The provincial government has task for formulating strategic and operational policy for groundwater quality and quantity in their respective area. The operational task involves issuing permit, levies on groundwater abstraction within their area. For surface water, the provincial government have task in formulating strategic water policy for surface water quantity and quality. The operational task of surface water quality and quantity is in the hand of waterboards. The waterboards integrate this operational task with the task for wastewater treatment.
- Provincial and municipalities also have role in determining spatial and environmental planning that relates to the activity in securing raw water source. This is related to the protection of the area used for raw water abstraction.
- The drinking water supply company is actively involved in the activities related to securing raw water sources. This action is done by making cooperation or against with identified polluters.

### **Drinking Water Production & Distribution**

- Drinking water production and distribution activity is undertaken by adopting the concept of decentralization and privatization. In decentralization, there is role sharing among different level of government and the devolution of the operational of drinking water production and distribution to the drinking water supply company. Privatization in Dutch water supply companies is perceived as not

opening the opportunities for private sector to have monopolies in managing water supply service. The idea of privatization is seen as the idea for increasing the efficiency of water supply company. The adoption of privatization in Dutch water supply can be seen from the modes of organization of water supply company as Public PLC. This mode of organization can be seen as private companies that run based on commercial principles while the shareholders are still in public bodies (municipalities and province). The drinking water supply company operates in commercial basis with the adoption of full cost recovery principles.

- The operational task of drinking water production and distribution activity is in the authority of drinking water supply company. This company has monopoly to produce drinking water to all customer. Related to this operational task, the company has responsibility in preparing 1 year plan for drinking water supply.
- The strategic task in drinking water production and distribution is in Central Government. In this context, central government formulating strategic policy plan for drinking water supply and preparing strategic 30 years plan for drinking water supply.
- The VEWIN (association of drinking water supply company) has responsibility for preparing 10 years plan for drinking water. Moreover, the benchmarking for drinking water supply company is executed by VEWIN.
- The benchmarking activity is undertaken in this activity for increasing the transparency and encouraging learning across drinking water supply company in improving their performance. This benchmarking activity covers the indicator of product quality, customer satisfaction, environmental performance and cost.
- The multiple stakeholders in drinking water supply company is possible existed due to the reorganization of drinking water company for increasing the economic of scale and efficiency through merging

of some company. Provincial government has responsibility to reorganize the water supply company. The multiple stakeholders in Dutch water supply company possibly leads to prevent abuse of power by single dominant shareholder. This also gives the possibilities for the company to have better managerial autonomy.

### **Wastewater collection and Transportation**

- This activity is decentralized to municipalities. According to this task, municipalities have responsibility for constructing and maintaining sewerage system, formulating sewerage operational plan and regulation on wastewater discharge to the sewerage system.
- In the order to recover the cost of sewerage operation and maintenance, the municipality has task for issuing sewerage charges by direct charge or indirect charge through property tax.
- Benchmarking activity also implemented for municipality in managing wastewater collection and transportation activities.

### **Wastewater Treatment**

- This activity is decentralized to regional water boards. This task is closely related to the task of securing quality of raw water source for drinking water.
- Waterboards has task for issuing regulation related to treatment of wastewater (quality standard, discharge permit) and pollution levies for ensuring the cost recovery of waste water treatment process.
- Benchmarking activity also implemented for water boards in managing waste water treatment activity.

## **CHAPTER IV**

### **INSTITUTIONAL ARRANGEMENTS OF DRINKING WATER SUPPLY CHAIN IN INDONESIA**

In this part, the case study will be discussed. The discussion will be focused on institutional arrangement of drinking water supply chain. The history will be given as general description for obtaining the whole story of the development of drinking water supply provision. The discussion continued with the adoption of water supply chain management, the adoption of privatization and decentralization.

#### **IV.1 Evolution of Drinking Water Supply Provision**

##### **Initial Provision: before 1950**

Historically, the development of drinking water supply infrastructure (especially for urban areas) in Indonesia has been run since the Dutch colonial era. This infrastructure mainly was developed for providing settlement area of the Dutch's people. This can be seen from the establishment of drinking water supply institution in several main cities in Indonesia. This institution typically was running as part of municipalities which is operated as government body (dinas/diensts) or as water enterprise (Gemeentelijk Waterleiding Bedrijf or Provinciaal Waterleiding Bedrijf)<sup>16</sup>. For instance, The institution of water supply service was established in Jakarta in 1843 with the name of Gementestaatwaterleideng van Batavia, Bandung City in 1916 with the name of Stads gemeente Water Leiding Bandung<sup>17</sup>, in Medan in 1905 with the name of NV. Water Leiding Maatschappij Ajer Beresih<sup>18</sup>.

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<sup>16</sup> Sejarah Air Minum taken from [http://ciptakarya.pu.go.id/\\_pam/Profil/Sejarah\\_AM.htm](http://ciptakarya.pu.go.id/_pam/Profil/Sejarah_AM.htm)

<sup>17</sup> Source : [www.pambdg.co.id](http://www.pambdg.co.id)

<sup>18</sup> Source : [www.pdamtirtanadi.co.id](http://www.pdamtirtanadi.co.id)

### **Central Government Initiative**

In the period of 1950s-1960s, the role of central government was dominant in the development of water supply service. This can be seen from the extension of water supply system for Jakarta as capital city in that period whereas there was increasing water supply demand due to urbanization. Department of Public Works and Electric Power (DPUTL) and Department of Health (Departemen Kesehatan/Depkes) were becoming primary institution in developing and supervising water supply service in that time<sup>19</sup>. Due to the needs for improving water supply provision management, in the early of 1960's, Central government enacted a law (Law No. 5/1962 on Regional Enterprises) regarding the establishment of regional enterprise to improve public service at regional/local level and as source of income for the local government while for improving public service provision. Water supply service was one public service that can be provided through the establishment of regional water supply enterprises. These regional water supply enterprises were established based on regional act and until now mostly perceived as source of income for improving financial condition of local government rather than for improving water supply service for citizen (Dikun, 2003). This is perceived as one of impediments in improving and extending water supply infrastructure provision (Dikun, 2003).

### **Drinking Water Supply: not a priority in National Development**

In the period of 1970-1980, drinking water supply infrastructure was not focus of national development, even though there are some development efforts<sup>20</sup>, such as limited development of water supply provision in several cities through stimulant financing from central government to local government. In this time, the responsibility for drinking water supply provision was mostly given to every household. The household was freely to chose and maintain their water supply provision. At that time, the national policy related to water focused more to agriculture sector in the context of maintaining water availability for increasing

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<sup>19</sup> Sejarah Air Minum taken from [http://ciptakarya.pu.go.id/pam/Profil/Sejarah\\_AM.htm](http://ciptakarya.pu.go.id/pam/Profil/Sejarah_AM.htm)

<sup>20</sup> Government of Indonesia, National Policy Development of Community Based Water Supply and Environmental Sanitation, 2003.



agriculture product. The policy of water resources tended more to the activity of securing water for food production.

The water infrastructure developed at that time was mostly irrigation network and dams. Due to this policy, the investment in drinking water supply and sanitation was decreased that led to inadequate services for growing population. The water legislation in this period mostly only focused on irrigation (Law No. 11/1974 on Irrigation). This can be seen from the total asset value of water infrastructure until the end of 2002 was concentrated in irrigation and limited for water supply provision. The data from Bappenas (National Planning Agency) shows that the total asset value of water infrastructure until was Rp 346.49 trillion consisted of Rp 273.46 trillion (78.92%) for irrigation, Rp 63,48 trillion (18.32%) for dams, rubber dams, Rp 9.21 trillion (2.66%) for flood control and beach preservation and Rp 0.34 trillion (0.1%) for raw water (Sjarief, 2002 in (Dikun, 2003). Moreover, urban infrastructure development in this period mostly focused on ‘visible infrastructure’, such as highways, monuments, etc. that led the provision of urban environmental infrastructure, such as water supply and sanitation lag behind the increasing demand due to urbanization (Hendropranoto, 2000; Firman and Dharmapatni, 1994; Ford, 1993; Kusno, 1997; World Bank, 2004b in Bakker K., 2007.)

### **The increasing Role of Local Government & International Funding**

In the period of 1980 – 2000, the concepts of community empowerment and the demand responsive approach was began to be introduced<sup>21</sup>. The development of drinking water supply is concentrated to the utilisation of effective technology for self provision by community or by individual household, such as hands pump, water tanks and communal water tap. The local government was directed to have more roles in water supply provision in this period due to decentralization policy. In this case, the central government only gives technical assistance. In the period

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<sup>21</sup> Government of Indonesia, National Policy Development of Community Based Water Supply and Environmental Sanitation, 2003.

of 1990-1997, the development of water supply service in Indonesia can not separated from the involvement of International Financial Institution (IFI). Loan disbursed from this institution to the Government of Indonesia was used as important financial sources for the development this sector in line with the decreasing of subsidy from central government. Moreover, the implementation of full cost recovery water supply provision also was introduced during this period. Private sector involvement in water supply service was also initiated during this period<sup>22</sup>. The economic crises that hit Indonesia in the end of 1997 gave consequences to the decreasing of water supply service due to increasing in operation and maintenance cost<sup>23</sup>. Thus, privatization can be seen as potency to increasing investment capability of the water supply company.

Although many efforts have been took for improving the performance of water supply provision, recently water supply sector in Indonesia is still as the weakest infrastructure sector (World Bank, 2004) due to the inadequacy service delivery caused by poor management. Until year 2004, only about 17 % of total population are served by water utilities (PDAM) through 5,25 million piped connections (World Bank, 2004). In urban area, 50% of total urban population can enjoy water supply provision from PDAM (through piped connection 35%, non piped connection 15%), 8% of total urban population from alternative provider, and 42% of total urban population rely on self provision. This figure extremely different from the fact in rural area whereas 88% of total rural population rely on self provision, 4% of total rural population enjoy water from alternative provider, and the rest (only 8%) is connected to piped water supply from PDAM (World Bank, 2004). In this context, the spread of settlements and difficult terrain (hilly and mountainous area) has become constraint in increasing access of piped water supply for all population.

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<sup>22</sup> <http://digilib.ampl.or.id/data/airminum-sejarah.php> accessed on June,15 2008 12.00 p.m.

<sup>23</sup> <http://digilib.ampl.or.id/data/airminum-sejarah.php> accessed on June,15 2008 12.00 p.m.

In this situation, the failure of formal utilities in providing sufficient service have led to the existence of other two modes of water supply provision, i.e. self provision by community which consist of individual household and communal (70% of total population) and alternative small scale water provider (13% of total population) (World Bank, 2004). This self provision covers the activities such as extracting poor groundwater and using poor quality of surface water due to poor sanitation facilities (sewerage and sewage treatment) and management.

According to World Bank, Indonesia is categorized as a country that has the lowest urban sewerage coverage in Asia with only 1.3 % of urban population connected to the sewerage network due to low investment in city-wide sanitation infrastructure in the last 20 years (World Bank, 2004). Urban population that has access to sanitation at household level is higher in urban area than in rural area. In urban area 68% of total population has access to private basic sanitation (on-site facilities) while in rural population only 44% (World Bank, 2004). This condition results to uncontrolled direct wastewater discharge to surface water (river and groundwater). Moreover, the leakage from poorly functioning individual household septic tanks also give severe impact on the quality of groundwater mostly shallow groundwater. The contamination from wastewater in water body (river, canals, etc.) aggravated by the industrial pollution gives severe impact on the quality of raw water for drinking water and other activity. The constraint in difficult terrain and the spread of settlement become constraint in developing centralized piped sewerage system. Moreover, according to Dikun (Dikun, 2003) low awareness and willingness to pay of people for good sanitation service gives severe impact on the feasibility of sewerage network system development through piped infrastructure or trucking method (household – onsite septic tank- transport of sewage by truck-sewage treatment plant).

The structure of water supply provision discussed above still gives consequences to the significant and high incidents of water borne disease, mostly in poor communities. This can be seen from the high incidents of gastrointestinal illness

in poorer areas (Bakker K. , 2007)). On the other side, the quality of water supply distributed through formal provision by the water supply company still can not be categorized as drinking water. Customer should boil the water due to the existence of faecal coliform contamination (Bakker K. , 2007). Furthermore, the absence of adequate water supply from formal provision (piped system provided by water utilities) gives consequences to poor and rich community differently. This shows the unfairness condition whereas poor community should pay more and get less for clean water from water vendor while for richer people exploit the groundwater more and more that lead to many problems related to over-exploitation of groundwater, such land subsidence and salt water intrusion<sup>24</sup>.

Law No. 11 of 1974 on Irrigation has served as the main instrument for water management for about 30 years before it was replaced by Law No. 7/2004 on water resources management. This Law (No. 11 of 1974) was a very broad and simple law, which consisted of only 17 Articles. This law is implemented further by Government Regulation No. 22 of 1982 on Water Governance, Government Regulation No. 23 of 1982 on Irrigation and Drainage and is supported by Basic Agrarian Law No. 5 of 1960 (Al Afghani, 2006). During the implementation of Law No.7/1974, there were several regulations that related to water management, such as Law No.5/1990 on Natural Resources and Ecosystem Conservation, Law No. 4/1992 on Spatial Planning, Law No. 23/1997 on Environmental Management, Law No. 22/1999 on Fiscal Balance between Central and Regional Government and Law No. 41/1999 on Forestry. In fact, these all regulation was difficult to integrate. Therefore, it is aware to make new regulation on water resources that can integrate many aspects related in a holistic, sustainable and environmentally friendly way.

Based on the needs for better water resources management, The Government of Indonesia enacted new water resources law in 2004 (Law No.7/2004 on water resources management) to replace the Law No. 11/1974 on irrigation. The

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<sup>24</sup> <http://www.tni.org/water-docs/adbsantono.pdf> accessed June 16,2008 02.30 a.m.

enactment of new law in water resource basically was driven by the awareness of the needs to manage water resources more integrated in the context of social, environmental and economic functions of water. The new water resources law focuses on water conservation, water infrastructure and its management. Public participation in water management both for surface and groundwater is encouraged in this law. With the spirit of democratization, decentralization, the community have role in the management of water resources<sup>25</sup>. Drinking water supply provision is fully considered in this new law.

From the discussion above, it can be argued that the inadequacy of water supply provision and sanitation was due to the lack of political will of the government and regulation of these sectors in an integrated way during the initial period of national development. In that initial period, water supply provision and sanitation responsibility was delivered fully to community with poorly monitoring and law enforcement on public health. Water supply and sanitation was perceived as basic needs that can be fulfilled by individual. Nowadays, this leads to more complicated situation where water pollution become more severe and clean water become more difficult to get. The enactment of new law on water resources management gives hope for improvement of drinking water supply provision in the future.

#### **IV.2 Adoption of Drinking Water Supply Chain Concept**

The water supply chain concept requires at least the integration of two sectors (water supply and sanitation (sewerage and sewage treatment) besides integration with water system and natural environment. According to World Bank, 2004 due to the lack of political will and insufficient legislation on integrated water management for almost 30 years, the water supply and waste water disposal (sanitation) have functioned as two separate sectors with little integration in terms of institutional, financial and technical aspects of delivery (World Bank, 2004).

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<sup>25</sup> Indonesia Law No.7/2004 on Water Resources Management

Based on this, it can be argued that water supply chain concept was not implemented in Indonesia for drinking water supply provision. The impact of the absence of perspective to see drinking water supply provision from water supply chain concept can be seen from the increasing difficulties for community and water supply company to get good quality raw water due to pollution from sewage. For water supply company, this leads to increasing cost for water purification (Dikun, 2003).

Finally, the awareness of water supply provision from the perspective of water supply chain actually is introduced in several nation policy documents and laws. The national policy development for community based water supply and environmental sanitation of 2003, Law No.7/2004 on water resources management and Government Regulation No. 16/2005 on Water Supply System Development are some of policy documents and laws that consider that issue. It is stated that in order to ensure sustainable water supply provision, the emphasizes should be put on the enhancing natural environment quality through protection of spring water, maintenance and rehabilitation of watershed areas, reducing groundwater exploitation, and increased management of wastewater and solid wastes. Moreover, the awareness for conducting integrated water resource management is formally stated explicitly in the Law No. 7/2004 on water resources management. This can be seen from article 2 – 4 in that law, they are:

*Article 2*

*Water resources shall be managed based on the principle of conservation, balance, public benefit, integrity and harmony, justice, independence, as well as transparency and accountability.*

*Article 3*

*Water resources shall be managed in a comprehensive, integrated, and environmentally friendly manner with the aim to realize the*

*benefits of water resources in a sustainable manner for the greater welfare of the people.*

*Article 4*

*Water resources shall serve a social, environmental, and economic function that will be implemented and realized in a harmonious manner.*

This integration would allow the possibilities to the implementation of water supply chain management for water supply provision due to the position that water supply chain management is part of integrated water resource management. Moreover, in article 5 of the law, the state will ensure the access to water for every people as a basic right in order to achieve a healthy, clean and productive life<sup>26</sup>. Moreover, as following steps for operating the new law, the Government Regulation No. 16/2005 on the Development of Drinking Water Supply Provision also prioritized as the first derivative regulation from Law No.7/2004. The enactment of this government regulation was prioritized due to increasing awareness to improving water supply provision. The adoption of water supply chain concept was clear in that government regulation. It can be seen from the explicit statement that raw water for water supply provision should be protected trough integration with the development of sanitation infrastructure<sup>27</sup>. Moreover in article no. 23 Government Regulation No. 25/2005, it is stated that:

*“the implementation of the drinking water supply system development must be carried out in an integrated manner with the development of the sanitation infrastructure. This is aimed to guarantee the continuity*

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<sup>26</sup> Indonesia Law No. 7/2004 on Water Resources Management

<sup>27</sup> Article no. 14 of Government Regulation No. 16/2005 on Development of Water Supply System Provision

*and sustainability drinking water provisions by avoiding water supply from wastewater and solid waste pollution<sup>28</sup>”*

From this statement, it can be said that the concern of public health related to integrated water service provision (water supply and sanitation as water supply chain) is increased.

From the way in fulfilled the demand, the structure of water supply provision and sanitation service provision basically are similar. Water supply provision and sanitation is provided mainly by three groups, i.e.: utilities, self provision and alternative providers. The provision by utilities (formal institution) is higher in water supply than in sanitation, whereas 15-20% provided by utilities (World Bank, 2004). This was in line with the perception of the government that sanitation is primarily as individual responsibilities (World Bank, 2004). In this situation, the government only provides regulation on public health (Law No. 23 of 1992 on Health and Law No. 23 of 1997 on Environmental Management) while delivered all responsibility of construction and maintenance of sanitation infrastructure to the individual through on-site septic tanks. However, that related regulation and supervision is poorly enforced. This situation leads to inappropriate disposal of wastewater that causes water pollution and other negative consequences on public health. The collection of the wastewater and its treatment basically is considered as government responsibility (mainly by local government), but investment in this sector has been insignificant. As a consequence, 13% of sewage goes into rivers and lakes and 6% in to rice field (World Bank, 2004) that leads to increasing water pollution.

This structure of provision is still adopted in new regulation of drinking water supply provision. It is stated, in Government Regulation No. 16/2005, that:

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<sup>28</sup> Article no. 23 of Government Regulation No. 16/2005 on Development of Water Supply System Provision



*For drinking water supply:*

*“(1) Drinking Water Supply System (SPAM) could be done through the piped network system and/or non-piped network system. (2) SPAM with piped network system could cover the raw water unit (water intake), the production unit (water purification), the distribution unit (reservoir and pipe network), the service unit (household connection/water tap), and the management unit (organization for management, for instance, water company). (3) Non piped network system SPAM could cover the shallow well, hands pump, rain water tanks, the water terminal, the water truck, or spring water protection building<sup>29</sup>”*

*For wastewater disposal system:*

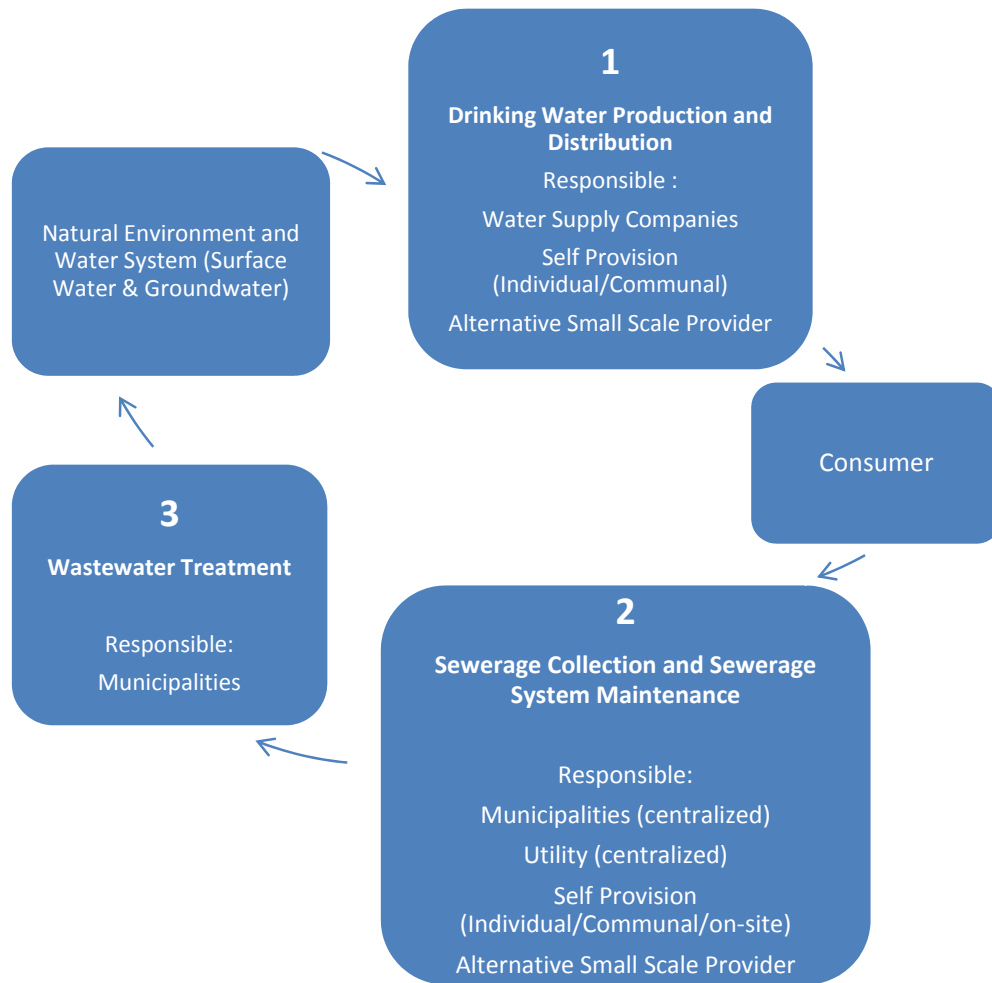
*1) Wastewater disposal system is carried out through on-site (local) and off-site (centralized) system (2) the on site disposal system is carried out individually (3) the off site disposal System of the waste water is carried out through collection and centralized treatment<sup>30</sup>.*

This provision structure gives more challenge for Indonesia in implementing water supply chain management in which integration between water supply and wastewater treatment is needed. The complex integration will be happened due to the involvement of many actors in supply chain management. For more detail on the actor in water supply chain management in Indonesia based on the structure of water supply and wastewater disposal provision can be seen in Figure IV.1.

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<sup>29</sup> Article no. 5 of Government Regulation No. 16/2005 on Development of Water Supply System Provision

<sup>30</sup> Article no. 15 of Government Regulation No. 16/2005 on Development of Water Supply System Provision



**Figure IV.1**  
**The Actors in Indonesia's Drinking Water Supply Chain**  
 Source: Analysis,2008

The structure of water supply and sanitation provision give consequences to more complicated coordination for managing the chain. The direct involvement of individual/communal household in the water supply chain gives more challenges. In this context, the awareness of individual/communal household to the concept of water chain is required and they can implement it in their individual/communal provision. They should aware that the implementation of water supply chain is needed due to the water scarcity, Unfortunately, most of individual/communal

household pay little attention on water scarcity issues<sup>31</sup> although the legislation has stated that water supply provision should be managed based on water chain concept. The challenges for Indonesia in implementation of supply chain management will be followed by the requirement for integrating multiple providers in water supply and sanitation provision (utilities, self provision and alternative small scale provider). Increasing the awareness of community for the importance of water supply chain is important.

### **IV.3 Privatization in Drinking Water Supply Chain**

The adoption of privatization in Indonesia's water supply chain is undertaken for water supply provision and not for sanitation. In this context, sanitation sector is seen as unprofitable sector due to low level of awareness and willingness to pay of household (Dikun, 2003). This privatization is aimed to improving the performance of water utilities that previously operated fully under public sector authorities. This is in line with the policy in encouraging private sector participation and privatization for most of public sector utilities, such as telecommunication, toll road, etc in which the Indonesian government had passed legislation enabling private sector participation and privatization for most public sector utilities in the mid-1990s (Bakker K. , 2007).

According to Olleta (Olleta, 2007), the role of International Financial Institution (IFI) was really important in spreading the idea of privatization of public infrastructure for developing countries. The privatization of water supply service in Indonesia can not be separated from the role of International Financial Institution (IFI), such as The World Bank Group. This is in line with the arguments from IFI on the most factor contributing to low level of water service provision in Indonesia, for instance in Jakarta is the low level of infrastructure finance and weak water governance (Bakker K. , 2007).

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<sup>31</sup> National Policy on Development of Community-Based Water Supply and Environmental Sanitation, Government of Indonesia, 2003

It is assumed that the encouraging private sector participation in water supply provision will give hopes to solve those two problems. Moreover, the lack of finance required for achieving target of MDG (minimize half numbers of people who have not received drinking water service) is seen as another pressure for encouraging private sector involvement. Big investment in water supply service is required for achieving this target in which totally reached Rp. 23 trillion. In this situation, government's ability is only Rp 400 million/year, thus by encouraging private sector involvement the investment gap will be filled and MDG target will be reached<sup>32</sup>.

In order to ease the transition from publicly-managed to privately-operated service, it is needed to modify laws, decrees and administrative resolution as regulatory reform process. This regulatory reform is aimed to create the conducive business environment for private sector to be involved while ensure the balance of equity and efficiency of the service. The regulatory reform stated above usually is put as a condition of IFI's development assistance. For Indonesia, the enactment of new water resources management Law No.7/2004 and its derivative regulation Government Regulation No. 16/2005 can be seen as the provision of enabling environment for encouraging private sector privatization in water resources management, mainly water supply provision (Al Afghani, 2006).

Private sector participation mostly is done by large-scale public water Enterprise (PDAM/Perusahaan Daerah Air Minum/Local Government Owned Water Supply Enterprise) in several cities, such as Medan, Bekasi, Semarang, Surabaya, Tangerang, Serang and Nusa Dua. These partnerships are undertaken in the modes of<sup>33</sup>:

1. Service contract: This mode is undertaken for the activity such as water loss reduction, meter reading, bill collection, water meter improvement

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<sup>32</sup> <http://www.tni.org/water-docs/adbsantono.pdf> accessed June 16,2008 02.30 a.m.

<sup>33</sup> [http://www.pu.go.id/e\\_comm/air%20bersih/air.htm](http://www.pu.go.id/e_comm/air%20bersih/air.htm) , acceced at June, 15 2008, 02.24 p.m.

and calibration. In this context, the private sector is only responsible in operation and maintenance of the system for certain contracted activities. The assets, capital investment and commercial risk of the water supply service are still in the hand of public sector.

2. Management contract: This mode is undertaken for the activities such as performance efficiency enhancement for the operation of water treatment plants (WTP) for drinking water. In this context, the private sector is responsible for managing the operation and management of water treatment in a daily basis. The assets, investment and commercial risk is still in the hand of public sector.
3. Build Own Operate Transfer: This mode is undertaken for new capacity development, such as extending water supply service coverage. In this context, the private sector take the asset ownership, the operation and maintenance, capital investment and commercial risk. The duration of the contract is done for long term (20-30 years). After the contract, the asset and management will be given to public sector.
4. Concession contract: This mode of privatization was implemented in Jakarta and Batam. In Jakarta, two private company (PT. PAM Lyonnaise Jaya and PT. Thames Water Jaya) received the full concession from PAM Jaya for 25 years starting in 1998 (World Bank, 2004) . In Batam Island, PT. Aditia Tirta Batam (private enterprise's Indonesian joint venture with Bi-water England) received the concession from the Batam authority. In this contract, private sector has responsibility in investing and managing the increasing coverage of water supply provision
5. Joint Venture: This mode of privatization is implemented in Ambon. In this context, the operational of water service was delegated to a joint venture company of PDAM Ambon and WMD Netherlands (Dikun, 2003).

Based on the modes of privatization in water supply provision in Indonesia, it can be said that the French Model with its various options of public private partnerships is dominant in water supply provision privatization.

In relation to the demand to increase performance of PDAMs, benchmarking system is implemented for PDAM. This system was undertaken by PERPAMSI (Persatuan Perusahaan Air Minum Indonesia/Indonesian Association of Drinking Water Supply Company). The aim of this benchmarking system is for evaluating and increasing performance of PDAM in delivering water supply service in a continuous way. The variable used in this benchmarking system covers 29 indicators that can be grouped into 4 aspects, i.e. financial, customer service, operational and human resources<sup>34</sup>. The environment aspect is not become focus in Indonesia water supply benchmarking. This is due to the focus of benchmarking system only for increasing operational and service performance of the PDAMs.

The result of private sector participation in water supply service in Indonesia mostly is not as expected before. The performance of PDAM was not improved even though privatization has been implemented<sup>35</sup>. Moreover, the evident from the largest privatization in Indonesia (concession in Jakarta) shows that there were limited new investment and little improvement in efficiency of water supply service performance (World Bank, 2004). This is related to incident of high Unaccounted for Water (UFW) that still lies in the range of 47%-49% (World Bank, 2004). This measurement is defined as the difference between the amount of water produced and the amount of water sold to all customers. Underground leakages, unavoidable leakage, unauthorized use, inaccurate meter for the customer are several cause of high Unaccounted for Water (Johnson, 1996). Moreover, the private sector participation in Jakarta's water supply concession shows that the initial target of performance improvement was not reached. The

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<sup>34</sup> <http://www.perpamsi.org/benchmarking.htm> accessed July 17,2008,07.30 a.m.

<sup>35</sup> <http://www.tni.org/water-docs/adbsantono.pdf> accessed June 16,2008 02.30 a.m.

access for the poor was not increased even though the contract explicitly mentioned that the access for the poor will be improved and increased. The new connections mostly developed in the area of middle-class customer, water tariff increased more than the ability to pay of the poor (Bakker K. , 2007).

The adequate quantity and quality of raw water supply for drinking water company is really important. The failure of privatization in increasing the efficiency of drinking water supply companies can be related to the availability of raw water. In this context, water supply chain management is important due to the possibilities for delivering sufficient raw water. The quality and quantity of raw water used for drinking water production will give significant effects to the water treatment cost. In this case, World Bank reported that due to extremely poor quality of raw water supplied by government, the two concessionaries in Jakarta water supply experienced high treatment cost that lead to the loss of two water concessionaries between water tariff and cost of water production (World Bank, 2004). In this context, the efficiency of water supply companies in producing drinking water will be related to the performance of water chain management since it is closely related to the provision of good quality and quantity of raw water through the activity of securing raw water resources.

The privatization of water supply in the context of private sector participation seems still become option for improving water supply service in Indonesia due to the potency for increasing investment to increasing service coverage and quality of service. The new law that has been enacted (Law No. 7/2004 on water resources management and Government Regulation No. 16/2005 on drinking water supply provision system) seems give more open door for privatization. In this context, privatization or not privatization is only the option for the way water supply provision is managed. The most important thing is water supply should be delivered to the community, including the poor, in sustainable way. The importance of water supply chain management in this context is required more

attention from all actor in delivering drinking water supply, including community because of their self provision.

#### **IV.4 Decentralization in Drinking Water Supply Chain**

Basically, water supply chain management has been devolved to local government. In this context, waste water service and water supply are part of local government responsibility. For water supply, this can be seen from the enactment of Law No. 5/1962 on Regional Enterprise. In this law, the local government can establish regional cooperation that give public service, such as water supply provision and sanitation. Moreover, according to the Law No. 7/2004 on water resources management, the municipality/regency has responsibility to fulfil the minimum daily basic needs for water of community in its area.

Due to euphoria of decentralization in Indonesia in 2001, there is the trend that every local government (municipalities and regencies) established their own local water company. This trend leads to the increasing number of drinking water supply company with limited economic of scale and too small to be profitable. Until the end of 2003, total number of PDAM reached 306 units. This situation is possible due to Law No. 5 of 1962 on Regional Enterprises. This law provides for water enterprises or PDAMs to be established trough municipalities or regency legislation. This company is wholly owned by local government. Under this legislation local government are given responsibilities for tariff setting and under specific condition a part of the profit from PDAM can be used for specified regional purposes.

Furthermore, according to the Law No. 5/1962 on Regional Enterprises, the role of local government was dominant in the management of this enterprise, especially for the head of local government and the local parliament. In this case, the manager of PDAM always need local government approval for every take they made (Blokland, e Braadbaart, & Schwartz, 1999). In short, there was limited



autonomy in the management of enterprises in which political interest was more dominant than economic interest for enhancing water supply service, for instance in determining the water tariff. In this case, the water tariff mostly was determined below the cost recovery level based on political interest (Dikun, 2003). This can be seen from the evident that 44% of PDAM has water tariff below the cost for operation and maintenance activity. This is due to the perception that water is more social goods rather than economic goods.

Based on the enactment of Law No.7/2004 and Government Regulation No. 16/2005, legally the development of water supply provision is task of PDAM (Local Government Owned Water Utilities). The involvement of other actors from non-government institution, such as private sector is encouraged in the case the utility have limited resources to delivered adequate water supply provision. The strategic responsibility of water supply provision is still in the hand of central and local government. The role of central government will be focused on supporting the PDAM operation through technical assistance and support by institution called BPP-SPAM (Badan Pendukung Pengembangan Sistem Penyediaan Air Minum/Supporting Board for Water Supply System Development). This board is a central government institution.

Based on Law No. 7/2004 on water resource management, all tier of government has similar tasks both in strategic and operational level. The differences are only laid on the coverage area. In the strategic level, all government has task to develop policy on water resources, water management scheme and plan. Moreover, in the operational level, all government has responsibility and authority to manage water resources (surface water and groundwater). For more detail on the division of responsibility among level of government cab be seen in the Table IV.1.

In the National level, the Central Government basically has strategic task and operational task. In strategic task, the Central government makes National Policy on Water Resources, Water Resources Management Scheme and Water Resource

Management Plan for trans-national area, trans-provincial area and national strategic area. In the operational level, the Central Government has task to manage water resources in trans-national area, trans-provincial area and national strategic area based on the water management scheme and plan.

In the provincial level, the Provincial Government basically has strategic task and operational task. In strategic task, the Provincial Government makes Provincial Policy on Water Resources. This policy should be based on national policy and coordinated with surrounding provincial area. Moreover, as part of their strategic task, the Provincial Government should make Water Resources Management Scheme and Water Resources Management Plan for trans-municipality/regency area. In the operational level, the Provincial Government has task to manage water resources in trans-municipality/regency area based on the water management scheme and plan.

In the local level (Municipality and Regency), the local government has strategic task and operational task. In strategic task, the local government makes Municipal/Regency Policy on Water Resources which based on provincial policy and should be coordinated with regencies/municipality. Moreover, local government also should make Water Resources Management Scheme and Water Resource Management Plan for the area within their administrative boundary. This plan will used as base for their operational task for managing water resources in their area.

**Table IV.1**  
**Division of Task among Different Level of Government on Water Resources Management in Indonesia**

<b>Government Level</b>	<b>Strategic Task</b>	<b>Area</b>	<b>Operational Task</b>	<b>Area</b>
<b>National Government</b>	National Policy on Water	National	Managing Water Resource	Trans-national Area Trans-provincial Area National Strategic Area
	Water Resources Management Scheme	Trans-national Area Trans-provincial Area National Strategic Area		
	Water Resources Management Plan	Trans-national Area Trans-provincial Area National Strategic Area		
<b>Provincial Government</b>	Provincial Policy on Water	Province	Managing Water Resource	Trans-regency/municipality Area
	Water Resources Management Scheme	Trans-regency/municipality Area		
	Water Resources Management Plan	Trans-regency/municipality Area		
<b>Municipality/Regency Government</b>	Municipality/Regency Policy on Water	Municipality/Regency	Managing Water Resource	Municipality/Regency
	Water Resources Management Scheme	Municipality/Regency		
	Water Resources Management Plan	Municipality/Regency		

Source: Republic of Indonesia Law No. 7/2004 on Water Resources Management

#### **IV.5 Concluding Remarks**

From the discussion above on the implementation of drinking supply chain management and its institutional arrangement related to adoption of privatization and decentralization, it can be concluded that:

1. The development of drinking water supply provision in Indonesia has been taken for more 50 years, starting in 1950. In this initial period (1950-1960s), central government, represent by Department of Public Works & Electric Power and Department of Health was primary actors in developing urban drinking water system.
2. The drinking water supply provision seemed not to be focus of government in the period of 1970s even though there were some limited developments of water supply from central government. In this period, the focus of national development on water resources more tends to agriculture sector. The responsibility for drinking water supply provision was mostly given to the household. Household is freely to determine the way to fulfilling their needs for drinking water. Moreover, the responsibility for manage domestic wastewater also mostly given to the household. As a result, there are three modes of provision of drinking water supply and wastewater disposal, i.e.: provision by formal utilities, alternative provision (through buying from water vendor), and self provision.
3. The development of water supply provision and wastewater disposal have functioned as two separate sectors with little integration in terms of institutional, financial and technical aspect of delivery. This gives consequences to the low performance of those two sectors. The access for safe drinking water only reach 17% of total population and the access to safe wastewater disposal service only 1.3% of total urban population. The rest is still lacking of access to safe and reliable drinking water supply provision and wastewater disposal.
4. Water supply chain concept was not properly implemented in Indonesia's drinking water supply provision. The low coverage of safe and reliable wastewater disposal can show that this sector is not fully considering as important part of developing better drinking water supply provision. The increasing difficulties for people and water supply company in obtaining

good quality raw water can be seen as indication that the water supply chain management is not well adopted.

5. The awareness for improving drinking water supply provision from the perspective of water supply chain management was introduced in the early of 2000's by enactment of the National Policy Document for community based water supply system development (self provision), Law No.7/2004 on water resources management and Government Regulation No. 16/2005 on drinking water supply system development.
6. Based on the discussion in Chapter 2 on the influences of decentralization and privatization to institutional arrangements of water supply chain management (see Figure II.9). The influence is mostly on the possibilities in role sharing between public and private sector. The influences of such concepts in each activity in the drinking water supply chain in Indonesia will be described as follows:

### **Securing Raw Water in Natural Environment**

- The responsibility in securing raw water for drinking water supply is shared among different level of government due to this responsibility fully in public sector. In this context, decentralization is adopted in this activity. Moreover, due to the existence of self provision in wastewater disposal, the individual household also have roles in securing raw water for drinking water supply.
- Due to the new Law No.7/2004 on Water Resources Management, the task of central government, provincial government and municipalities/regency government is on strategic and operational level for quantity and quality aspect of surface water and groundwater. The differences are on the coverage area. The central government is responsible for the area that categorized as trans-national area, and trans-provincial area. The provincial government is responsible for the area that categorized as trans-municipality/regency area. Furthermore,

the municipality/regency government has responsibility in the area within its boundary.

### **Drinking Water Production & Distribution**

- The decentralization and privatization basically has been introduced in drinking water supply in Indonesia in the initial development of this sector. In the 1960s, central government enacted the Law No. 5/1962 on Regional Enterprises. Based on this law, local government was encouraged to establish regional enterprise for providing public service that has cost recovery potential, water supply is one that fits that category. This law basically introduced the separation between owner and provider in public service. Moreover, in the new Government Regulation No. 16/2005 on Drinking Water Supply System Development, it is also stated that the development of drinking water supply system is under responsibility of central and local government through state-owned company in national or local level. In the case that the state-owned company (in local or national level) can not fulfil the demand of drinking water supply in certain area, the cooperation with private sector is possible to carry out. In this context, the commercialization and public-private partnership are preferred modes for drinking water supply privatization in Indonesia.
- The municipality/regency has responsibility to fulfil the minimum daily basic needs for water of community within their area. This task is undertaken by providing water supply service through regional enterprise and by supervising the self provision by individual household.
- The benchmarking activity is undertaken in this activity for evaluating and increasing the performance of drinking water supply company. This benchmarking activity covers the indicator of financial, customer service, operational and human resources. This benchmarking activity

is carried out by PERPAMSI (the association of Indonesia's drinking water supply company).

- Due to euphoria of decentralization in the early of 2001, many local governments established their own water supply company. This leads to inefficient water supply companies due to insufficient of economic of scale.
- The local government is single shareholder of this company. Due to this, even though separation of owner and provider has been done, the intervention of local government is significant that leads to low managerial autonomy of the company. The cost recovery principle is not implemented in the process of determining water tariff. The determination of water tariff is much influence by regional parliament where political consideration is more important than technical and financial aspects.
- Besides, drinking water supply company, the individual household also act as important actor in the drinking water supply chain as customer as well as provider.

### **Wastewater collection and Transportation**

- This activity is decentralized to municipalities/regency. According to this task, municipalities have responsibility for constructing and maintaining sewerage system, formulating sewerage operational plan and regulation on wastewater discharge to the sewerage system.
- There are three mode of provision in this activity. They are: self provision, utilities and alternative provider. For regulating the self provision, the government enacted Law No. 23/1997 on Environment Management and Law No. 23/1992 6n Health. However, this regulation is poorly enforced. This situation leads to inappropriate disposal of wastewater.

- Low awareness and willingness to pay of people for good sanitation service gives severe impact on the feasibility of sewerage network system through piped infrastructure and trucking method.

### **Wastewater Treatment**

- This activity is decentralized to municipalities/regency. According to this task, municipalities have responsibility for constructing and operating and maintaining wastewater treatment plant. Moreover, the municipality/regency have task for formulating sewerage operational plan and regulation on wastewater discharge to the sewerage system.
- Low awareness and willingness to pay of people for good sanitation service gives severe impact on the feasibility of developing wastewater treatment.



## **CHAPTER V**

### **COMPARATIVE ANALYSIS**

Historically, the development of water supply provision in the Netherlands and Indonesia has different starting period. The Netherlands began the development of drinking water supply provision more than a century ago starting in 1850 when the first water supply company was established. On the other side, Indonesia started the development of drinking water supply provision not more than 60 years ago when the central government started to expand the coverage of drinking water supply provision in Jakarta in 1950s. Basically, in the period before 1950s, the development of drinking water supply provision in Indonesia has highly influenced by the development of drinking water supply provision in the Netherlands. This can be seen from the facts that in some big cities in Indonesia such as Jakarta, Medan, and Bandung, the development of drinking water supply infrastructure had been undertaken in the Dutch colonial era. In this context, it is reasonable to say that there is a relationship in the system that developed in the Netherlands and Indonesia.

The long period of the Netherlands in developing their drinking water supply provision has created the experience that is possible to understand and take as lesson learnt for Indonesia. In this chapter, the comparison will be done between the Netherlands and Indonesia in relation with the development of sustainable drinking water supply provision. The discussion of comparison will be done to find similarities and differences. Furthermore, the analysis of the issues related to the similarities and differences will undertaken based on the description on previous chapters (Chapter 3 and Chapter 4) and the theoretical perspective discussed in chapter 2. The comparison will be done for drinking water supply chain management and the influence of privatization and decentralization in drinking water supply chain management.

## **V.1 Drinking Water Supply Chain Management**

It can be argued that sustainable drinking water supply provision is possible to be achieved by seeing drinking water supply as a chain that contains several sequential activities starting from securing raw water source, drinking water production and distribution, water consumption by consumer, wastewater collection and transportation, wastewater treatment, and finally discharge treated wastewater to natural environment.

From this chain, it can be said that the wastewater collection and treatment are important activities that could be provided for achieved sustainable drinking water supply provision. In this context, the absence of adequate sewerage collection and treatment will result the direct discharge of untreated wastewater into surface or ground water sources that will contaminate raw water sources for water supply provision.

Furthermore, it also can be argue that the challenge in developing appropriate institutional arrangements in water supply provision is lying on the need to see water supply provision as a supply chain with many different actors being involved along the chain and involving natural environment as important consideration. This is done in order to response to the problem of water shortages, water resources pollution and unprotected watershed. In this context, drinking water supply chain management and its institutional arrangement are needed to ensure sustainable drinking water supply provision. Institutional arrangement in this context refers to way for keeping the water supply provision system operational, accessible and widely used.

This institutional arrangement is related to cultural characteristic, agreed and valued procedures and rules for operation and varying capacities for management and accountability (Mukherjee & Wijk, 2000) and also can be seen as water policy (Klostermann, 2003). Based on this, the comparison of the Netherlands and

Indonesia in water supply chain management will be examined. The comparison will be based on three criteria, i.e.: government policy in water supply provision, adoption of water supply chain and the actors in water supply chain.

### **Government Policy in Drinking Water Supply Provision**

The development of water supply provision in the Netherlands has taken more than a century. The initial development of the water supply system was in 1850 when the first private company established and started to develop piped water supply system in Amsterdam. On the other side, the development of water supply provision in Indonesia was started in the 1950s, when the central government tried to expand the water supply coverage in Jakarta due to increasing urbanization.

The development of water supply provision in the Netherlands was become focus of government from the early period of the failure of private water company in extending the service coverage for the rural and urban population. This is started in the early of 1900 whereas the government takes many efforts to increase the coverage of water supply provision. The development of sewerage network was started around 1930.

The efforts of government finally give considerable result that the coverage of water supply service through piped connection is reached 100% of total population in the year 2004 with the quality and quantity of the drinking water is good. Moreover, the coverage of wastewater service reached 98% population in 2004. This result can be seen as an indicator of the awareness of the government to see the development of water supply system as an integrated part with the development of waste water system due to the high inter-relationship between these two services. Moreover, the provision of drinking water supply and sanitation was considered as important part to achieve good quality of public health. The policy of Dutch government was clear to develop drinking water supply provision. The flat terrain of the Netherlands has given little constraint in

developing piped water supply and sanitation infrastructure (sewerage and wastewater treatment plant).

In Indonesia, the development of water supply system in the initial period of national development generally was not priority. In the early of 1970s (as starting point of the first 5 years development plan/Rencana Pembangunan Lima Tahun), the focus of water resources development at that time tended more to the agriculture sector for ensuring the achievement of food security. This policy gave consequences to the limited investment for the development of water supply provision system. Due to this situation, the responsibilities of providing water supply and sanitation service mostly were given to the people/individual household through self provision. As the result, self provision (by abstracting water from surface and groundwater) is type of provision that taken by 70% of Indonesian population until 2004. The piped water supply provision only used by 17% of total population and the rest (13%) uses alternative provider. The water supply service is not reliable in the context of quality and quantity. This condition almost the same in sanitation sector whereas almost 98% of total population relied on the self provision for sanitation without proper maintaining and monitoring from the government. This condition leads to the contamination of surface and ground water. In this context, the awareness of government to develop integrated water supply provision and sanitation as a chain was not existed. By delivering it to the population without mechanisms to ensure the self provision was worked well, the drinking water supply scarcity is possibly coming.

Moreover, the dominant of self provisions in water supply and wastewater service in Indonesia can be related to the hilly and mountainous terrain in many parts of urban and rural area in Indonesia that gives big constraint to the development of centralized piped water and sewerage system.

## **Adoption of Water Supply Chain**

The development of water supply provision in the Netherlands during the 1930s-1998 implicitly have been adopted the concept of integration between water supply provision and wastewater service provision. This can be seen from the effort in developing water supply system and sanitation system. The wide spread development of sewerage system and wastewater treatment plant was initiated in around 1930. The development of this system was increased dramatically after the enactment of Surface Water Pollution Act in 1969. As a result, the coverage increased from around 1 mpe (million population equivalent) in 1960 to 8 mpe in 1970 and 27 mpe in 2004 (100% urban household connected to the system, 98% in rural area). In the same period, the development of drinking water supply system was also undertaken whereas in 1963 the coverage of drinking water supply service was increased considerably to 96% of population in urban and rural area. In 1968, this number reached 99%. To date, 100% of population both in urban and rural area is connected to the piped water supply system.

The effort to develop sufficient sewerage and waste water treatment plant in line with water supply provision can be seen as awareness in adopting the water supply chain concept for water supply provision. This is due to the characteristic of water supply chain whereas the drinking water supply provision, sewerage service and wastewater treatment are main activities in the chain.

The water chain concept finally formally stated explicitly in the Fourth White Paper on Water Management in 1998. In this concept, the system view of the drinking water supply is adopted. The water supply chain, the water system and its relation with the natural environment was stated in that document. The adoption of system view for water supply service provision actually is aimed as the efforts to achieve sustainable water supply provision.

From this point of view, it can be argued that water supply provision in the Netherlands have been implemented by using water chain concept. The awareness of the existence of the chain leads the government to create a mechanism in keeping the chain works well. This can be seen from the enactment of several legislations that considers the activity in the whole chain and the integration of water chain with water system and natural environment. Those legislations are: water management Act (1989) that concern to the management on water system (surface water and groundwater) and the integration of water chain with water system, Groundwater Act (1981) that concern to ground water quantity management, Pollution Surface Act (1970) that concern to quality of surface water, Soil Protection Act and Drinking Water Act (2000).

Different with condition in Indonesia, the awareness to implement water supply chain was started in the 2004 with the enactment of Law No. 7/2004 on Water Resources and Government Regulation No. 16/2005 on Water Supply Provision Development System. These law and regulation adopt integrated water management and are enacted after 30 years of the absence of the formal regulation that concerns on the integrated water resources management and drinking water supply provision.

The enactment of these new law and regulation on water resources management and regulation on drinking water supply system can not be separated from the roles of International Financial Institution (IFI). This institution give many influences in the policy making of this regulation and mostly related to the interest for encouraging private sector participation in Indonesia's water resources management, mainly drinking water supply.

The absence of this regulation has led the government to provide water supply service separated from the wastewater and sanitation service. The previous law (Law No. 11/1974 on irrigation) tends to give more focus on water for agriculture sector. Unfortunately, many regulations based on this law are still in preparation

that will give possibilities for hindering the adoption of drinking water supply management.

As the result, water supply provision in the Netherlands is good as reported by benchmarking indicators while in Indonesia is still experienced low quality, access and reliability. In Indonesia, the problem of polluted raw water is still becoming problem for water supply provision both for drinking water supply companies and for individual trough self provision. For drinking water supply companies, the lack of system view in drinking water supply provision gives the difficulties for increasing efficiency due to higher water purification cost. This is related to difficulties in obtain good quality raw water mainly from water bodies, such as river and groundwater.

### **Actors in Water Supply Chain Management**

Based on the characteristic of water supply chain that consists of several sequential activities, different actors are linked in water supply chain with different responsibilities. Dutch water supply chain can be characterised as institutional based due to the actors are formal institution. The institution consists of central, provincial, local government (municipalities and waterboard). The regulatory level is laid in the hand of central government and provincial level and the operational level is laid in local government level. The drinking water supply company, municipalities and water boards are the actors in operational level of water supply chain management in the Netherlands. On the other side, the actor related in water supply chain management in Indonesia is more complicated due to the structure of water supply provision and sanitation service (the existence of self provision and alternative provision of water supply and sanitation service). In this context, community plays roles as both provider and consumer. This condition gives more complicated coordination for managing the water supply chain due to a great of number of actors being involved in the chain. In this context, the awareness of community on the importance of water supply chain

management is required and should be implemented in their individual provision. This is the greatest challenge for Indonesia in improving water supply chain management for sustainable water supply provision.

### *Securing Raw Water Resources*

In the Netherlands, the responsibility for securing raw water resources is shared among different levels of government. The decentralization is adopted in this case. Strategically, the national government has responsibility in formulating water management policy plan that covers surface water and ground water. Operationally, the central government has task to managing large water body, through Rijkswaterstaat. The provincial government has tasks for formulating strategic and operational policy for groundwater quality and quantity in their respective area. The operational task involves issuing permit, levies on groundwater abstraction within their area. For surface water, the provincial government have task in formulating strategic water policy for surface water quantity and quality. The operational task of surface water quality and quantity is in the hand of waterboards. The waterboards integrate this operational task with the task for wastewater treatment.

In Indonesia, the responsibility for securing water resources also is shared among different level of government. Decentralization is adopted in this activity. Moreover, due to the existence of self provision in wastewater disposal, the individual household also has roles in securing raw water for drinking water supply. Based on the Law No.7/2004 on Water Resources Management and Government Regulation No. 16/2005, the task of central government, provincial government and municipalities/regency government is on strategic and operational level for quantity and quality aspect of surface water and groundwater. The differences of this authority are on the coverage area. The central government is responsible for the area that categorized as trans-national area, and trans-provincial area. The provincial government is responsible for the area that



categorized as trans-municipality/regency area. Furthermore, the municipality/regency government has responsibility in the area within its boundary.

### *Drinking Water Production and Distribution*

In the Netherlands, the operational task of drinking water production and distribution activity is in the hand of drinking water supply company. This company has monopoly to produce drinking water to all customers. The central government has strategic task in drinking water production and distribution for formulating strategic policy plan for drinking water supply and preparing strategic 30 years plan for drinking water supply.

In Indonesia, the operational task of drinking water production and distribution can be carried out by central government, provincial government, and municipality/regency government. In this context, each of level government can establish state-owned company to run the managerial and operational task of this activity. In the case that the state-owned company (in local or national level) can not fulfill the demand of drinking water supply in certain area, the cooperation with private sector is possible to carry out. In this context, the commercialization and public-private partnership are preferred modes for drinking water supply privatization in Indonesia. Moreover, the municipality/regency has responsibility to fulfill the minimum daily basic needs for water of community within their area. This task is undertaken by providing water supply service through regional enterprise and by supervising the self provision by individual household. Besides, drinking water supply company, the individual household also act as important actor in the drinking water supply chain as customer as well as provider.

### *Wastewater Collection and Transportation*

Municipality has tasks in sewerage collection and transportation in the Netherlands' drinking water supply chain. According to this task, municipalities have responsibility for constructing and maintaining sewerage system, formulating sewerage operational plan and regulation on wastewater discharge to the sewerage system.

In Indonesia, this activity is decentralized to municipalities/regency. According to this task, municipalities have responsibility for constructing and maintaining sewerage system, formulating sewerage operational plan and regulation on wastewater discharge to the sewerage system. There are three mode of provision in this activity. They are: self provision, utilities and alternative provider. For regulating the self provision, the government enacted Law No. 23/1997 on Environment Management and Law No. 23/1992 on Health. However, this regulation is poorly enforced. This situation leads to inappropriate disposal of wastewater. Low awareness and willingness to pay of people for good sanitation service gives severe impact on the feasibility of sewerage network system through piped infrastructure and trucking method.

### *Wastewater Treatment*

Wastewater treatment activity is decentralized to regional water boards in the Netherlands. This task is closely related to the task of securing quality of raw water source for drinking water. In this context, waterboards has task for issuing regulation related to treatment of wastewater (quality standard, discharge permit) and pollution levies for ensuring the cost recovery of waste water treatment process.

In Indonesia, this activity is decentralized to municipalities/regency. According to this task, municipalities have responsibility for constructing and operating and

maintaining wastewater treatment plant. Moreover, the municipality/regency have task for formulating wastewater operational plan.

To summarize, the comparison on water supply chain management can be seen in Table V.1 as follows.

**Table V.1**  
**Comparison of Drinking Water Supply Chain Management in the Netherlands and Indonesia**

Aspects	The Netherlands	Indonesia
<b>Government Policy in Water Supply Provision</b>	Water supply provision become focus of government from 1900s. This is done by developing piped drinking water and sewerage system.	Water supply provision was not priority of national development in early 1970s. The drinking water supply provision and wastewater service is tended to be given to individual household.
<b>Adoption of Water Supply Chain Concept</b>	<ul style="list-style-type: none"> <li>• Water supply chain is adopted implicitly in the development of water supply provision in the period of 1930s-1998 (the development of water supply system and sewerage and sewage treatment system)</li> <li>• In 1998, water supply chain is explicitly stated in the Fourth Policy Document on Water Management.</li> </ul>	<ul style="list-style-type: none"> <li>• Water supply chain was not adopted in development of water supply provision in the period of 1970-2004 (there is no integration on development of water supply, sewerage and sewage treatment system)</li> <li>• Water supply chain was adopted explicitly in new law on water resources management (Law No. 7/2004) and Government Regulation No. 16/2005 on Development of Water Supply System</li> </ul>
<b>Actors in Water Supply Chain</b>	<ul style="list-style-type: none"> <li>• Formal institution (Central Government, Provincial Government, Water supply company, municipalities and water board)</li> <li>• Household acts as customer</li> </ul>	<ul style="list-style-type: none"> <li>• Formal institution (Central government, provincial government, Municipality/Regency government, public drinking water companies (state-owned enterprise), private drinking water companies)</li> <li>• Community (individual, communal)</li> <li>• Individual household acts both as customer and provider</li> </ul>

Source: Analysis, 2008

## **V.2 the Influence of Privatization and Decentralization in Water Supply Chain Management**

As discussed in chapter 2, the influence of privatization concept in drinking water supply chain is mostly in the context seeing water as economic goods that leads to think about the allocation, protection and conservation of fresh water supply can be optimized through market mechanism and effective management. The market mechanism presumed that cost recovery is important in drinking water supply chain due to the scarcity of freshwater. Moreover, the effective management is needed for better drinking water supply chain. This effective management is also closely related to the division of responsibility among level of government (decentralization).

Privatization and decentralization are adopted in the Netherlands and Indonesia for water supply chain management. The adoption of privatization and decentralization give changes in institutional arrangements of drinking water supply chain in these two countries. In this part, these influences will be discussed based on the aspects: separating owner and provider, autonomy of utilities, competitive discipline, and cost recovery for service.

### **Separating Owner and Provider**

Separating owner and provider is seen as an effort to improving the efficiency and effectiveness of the drinking water supply utilities management. By this separation, the provider will be able to concentrate on the task for providing the service properly based on cost recovery principle while the owner will be able to concentrate on building regulation that ensure the water service is provided well for all community and give little impact on natural environment (societal and environmental responsibility). The separation between owner and provider in water service utilities (water supply and sanitation) is tend to minimize the conflicting interest as a result of functioning as both owner and provider. This is

based on the assumption that water supply provision is mostly in the hand of public sector that can be acted as both owner and provider.

In the Netherlands, the separation of owner and provider in drinking water supply chain is happened only for the activity of production and distribution drinking water. This separation was starting in the period of regionalization of water supply (1910-1950). In the previous period, the public sector (municipalities) acted as both owner and provider after acquisition of the failed private company in extending the service coverage. The needs for increasing service coverage to the urban and rural area lead to the establishment of regional water supply companies. These regional companies were established from the merging of several companies under municipality management. The mode of companies choose in this period mostly is Public Limited Company (PLC) which can be seen as private companies (due to operating under company law) with the several municipalities/provinces as shareholders. This development of water supply utilities as PLC can be seen as an effort to separate the owner and provider in water supply to increase the efficiency and effectiveness of service provision.

In 1938, the peak of number of water company was reached where 231 companies were existed with the composition: 155 companies under municipality management, 41 under private management and 32 regional companies as PLC. In line with the efforts for reorganization of water supply company and the reduction number of water companies, the PLC mode was as dominant mode of water supply company in 1994 whereas 32 of 40 water companies was PLCs that serve several municipalities.

From this description, it can be argued that the separation of owner and provider in water supply companies has been undertaken by Dutch Government from the initial period of water supply provision to the present time. The separation between owner and provider in Dutch's water supply service is done by giving monopoly of drinking water supply provision to the Public PLC that owned by

local government. In this context, it can be argued that the privatization in the Netherlands is not perceived as transferring monopoly of water supply service to private sector. This decision of rejecting the private sector involvement in the water supply service is mostly based on the good performance of water supply service in the Netherlands and the concern for the possibilities of decreasing the performance of the water supply service.

In Indonesia, the separating between owner and provider mostly is done in the activity of production and distribution of drinking water supply. In the initial period of water supply provision in 1950 the role of direct management of water supply provision by central government was dominated the management of water supply provision. Due to the needs for improving water supply provision management, in the early of 1960's, the Law No. 5/1962 on Regional Enterprise was enacted. This law allowed the establishment of regional enterprises owned by local government to improve the management of public service (including water supply provision) and as potential source of regional income. The development of this regional enterprise actually can be seen as the efforts to separating the owner and provider in water supply provision. The enterprise is called as PDAM (Perusahaan Daerah Air Minum) that operated under public law enacted by local government. In the present time, related to the policy of encouraging private sector participation in water supply, the effort to separate the owner and provider is become stronger. It can be seen from the adoption of concession contract with foreign private sector for water supply provision in Jakarta and several examples in other cities. In this context, it can be argued that privatization of water supply service in Indonesia is perceived as transferring the monopoly of water supply service to the private sector for a definite time. This decision to accept the idea for opening the private sector participation in water supply is mostly driven by the expectation on the additional investment for extending the service coverage and improving managerial performance of water utilities. This expectation is based on the fact that public water utilities have lack of investment capabilities and managerial expertise.

### **Autonomy Management of Utilities**

The degree of autonomy of water supply utilities in the Netherlands is high. This is possible due to the structure of Dutch water supply as Public PLC. The multiple shareholders in Dutch Water Supply Company can be seen as efforts to increase the autonomy of management of utilities. The multiple shareholder of Dutch water PLC gives consequence that there is no dominance shareholder that can intervene the management of water utility. This can be seen from the arrangement that one shareholder is not allowed to hold more than 50% of the shares. Due to this general rule, a single dominant shareholder is no existed. The shareholders in Dutch Water Supply are local government (municipalities and province). This condition will ensure that the managerial decision of water supply company will be based in consensus. Thus, it can be argued that the development of regional water supply company through merger of several municipalities is aimed to increase economic of scale as well increasing the autonomy for managerial tasks.

This condition is different with Indonesia. The influence of local government (municipalities/regency) is dominant in the managerial tasks of the water supply companies due to position as single shareholder. This condition leads to the low level of management autonomy in water supply companies in Indonesia.

### **Competitive Discipline**

Competitive discipline in natural monopoly only can be done by creating quasi market for competition between operator/provider. This can be done by developing benchmarking system. The benchmarking system can be seen as a type of competition (administrative competition) besides free market competition which can pressure the low performance provider to take an improvement. This is due to the characteristic of water supply and sanitation service that can only be efficient to be run in the natural monopoly environment.

In the Netherlands, the benchmarking has been done as a compulsory task for drinking water supply companies after the debate on privatization and liberalization of water supply utilities. Privatization in the Netherlands more is considered as idea to increase the efficiency that leads to reducing cost rather than giving the monopoly of water supply provision to private sector. The monopoly of water service is still given to the drinking water supply company that owned by local and provincial government.

The mechanism of competitive discipline is done by making benchmarking system for all activities in the water chain. Benchmarking in drinking water supply company is done on for the activity of production and distribution of drinking water supply. Benchmarking of municipalities is done for the activity of wastewater collection and benchmarking for water board for is done for the activity of wastewater treatment.

This benchmarking system is introduced as media for increasing transparency and encouraging learning across institution involved. By undertaking this benchmarking system into all activities, the process of learning across actor can be done. This leads to the push for improving the performance of each actors involved in the drinking water supply chain. The benchmarking system in the Netherlands for drinking water supply company is done for the aspect of: water quality, service quality, environment, & finance and efficiency.

Competitive discipline is also implemented in drinking water supply chain in Indonesia. This is done by implementing benchmarking system only for local government owned - drinking water companies (PDAM). There is no benchmarking system for the activity of wastewater collection and treatment. The benchmarking is done for the aspect of: financial, customer service, operational, human resources.



On the other side, due to the concession contract of water supply service in Jakarta, a regulatory body has been established. This regulatory body has main function to ensure competitive situation of the water supply sector will run in a socially responsible and in line with the public interest. This regulatory body have roles in regulating the economic actor in the sector in the context of determining the market structure (number of player and nature of the competition), pricing of the service, level of investment and profit player in the market. Moreover, the establishment of this regulatory body is as response to prevent market failure/market imperfection (natural monopoly, externalities, excessive competition and information asymmetry).

### **Cost Recovery for the Service**

Cost recovery in water service mostly related to the concept of sustainable water provision. Cost recovery in water supply chain management in the Netherlands is implemented in all activities along the chain. The most significant is in the activities of production and distribution of drinking water supply. In this context, the Dutch water supply company is fully self sustaining whereas this company recover all cost of water production and distribution to the customer. This cost recovery principles is used in determining drinking water tariff in the Netherlands. The drinking water tariff is determined by water utility management and local government as owners/shareholders trough a mechanism in which water company proposes the increasing tariff and the approval of tariff is on the hand of shareholders.

This water tariff determination based on cost recovery principle is not aimed to give dividend the owner and shareholder. The most important thing in determining the tariff is ensuring the tariff can cover all the cost exists in the production and distribution of drinking water supply.

In Indonesia, the situation is totally different. The cost recovery principle is not implemented in the process of determining water tariff. This can be seen from the evident that 44% of PDAM has water tariff below the cost for operation and maintenance activity. This is due to the perception that water is social goods rather than economic goods. Moreover, the involvement of regional parliament in tariff determination leads to the condition where political consideration is more important than technical and financial aspects. The aim for gain the dividend from water supply company is often put above the needs for increasing the capacities of drinking water supply company to improve their performance.

For wastewater treatment, the cost recovery principle is also implemented in the Netherlands. This activity basically relies on the revenue from pollution levy that used for financing the operation of water boards, such as build and operate wastewater treatment plant. Moreover, for investment and maintenance of sewerage system, the municipality have right to charge every one that connected to the sewerage system for recovering the cost of maintain sewers. However, most of municipalities do not use this right and as alternative they put these cost as part of the property tax.

In Indonesia, the low willingness to pay of community for wastewater treatment service gives constraint in implementing cost recovery in this sector, mainly for centralized wastewater service. The absence of this cost recovery tariff makes the operation and maintenance of the network and wastewater treatment plant relies on limited government subsidy. This condition leads to low level of service performance. The low wiliness to pay also can reveal the low awareness of people on the importance of sanitation service. For summarizing the discussion above on comparison of privatization and decentralization in drinking water supply chain, the Table V.2 is provided.

**Table V.2**  
**Comparison of Adoption Privatization and Decentralization Concept on**  
**Drinking Water Supply Chain Management**

Aspects	The Netherlands	Indonesia
<b>Separating Owner and Provider</b>	<ul style="list-style-type: none"> <li>• Adopted by establishing Public Owned-PLC: a company with public sector as owner and operated under company law</li> <li>• Implemented for activity of Drinking water production</li> </ul>	<ul style="list-style-type: none"> <li>• Adopted by establishing Local Government Owned Drinking Water Supply Company (PDAM) by using public law: Owner is public sector/local government</li> <li>• Implemented for activity of drinking water production</li> </ul>
<b>Autonomy of utilities</b>	<ul style="list-style-type: none"> <li>• High degree autonomy : Develop regional water utilities with PLC modes and multiple local government (municipalities and provinces) as shareholders</li> </ul>	<ul style="list-style-type: none"> <li>• Low degree of autonomy: Water utility experiences intervention from local government as single shareholder and local politician</li> </ul>
<b>Competitive Discipline</b>	<ul style="list-style-type: none"> <li>• Benchmarking for drinking water companies</li> <li>• Benchmarking for Municipalities for management sewerage system</li> <li>• Benchmarking for Water Board for management of wastewater treatment service.</li> <li>• The aspect for benchmarking: water quality, service quality, environment, &amp; finance and efficiency</li> </ul>	<ul style="list-style-type: none"> <li>• Benchmarking only for drinking water supply companies</li> <li>• No benchmarking for sewerage system and wastewater treatment</li> <li>• Establishment of regulatory board in local level. (case: Privatization of Jakarta water supply service)</li> <li>• The aspect for benchmarking: financial, customer service, operational, human resources.</li> </ul>
<b>Cost Recovery for Service</b>	<ul style="list-style-type: none"> <li>• Implemented in tariff determination for water supply</li> <li>• Cost recovery principle is not aimed to obtain dividend for the shareholders</li> <li>• Implemented in levy for wastewater treatment service</li> </ul>	<ul style="list-style-type: none"> <li>• Not implemented in drinking water supply tariff</li> <li>• Not implemented in sewerage and wastewater treatment service</li> </ul>

Source: Analysis, 2008

The analysis in this chapter has defined the similarities and differences on how the Netherlands and Indonesia manage their drinking water supply chain. On the other side, the similarities and differences also has defined for the influences of the adoption of privatization and decentralization into drinking water supply chain management. These findings on similarities and differences will be used as basis for formulating conclusion, lessons learnt and recommendations in the next chapter. Moreover, the different context and characteristic between the Netherlands and Indonesia will be used as consideration in formulation lessons learnt and recommendation.

## **CHAPTER VI**

### **CONCLUSION, LESSONS LEARNT AND RECOMMENDATION**

This chapter will describe the final result of this study in discussing the implementation of drinking water supply chain management and the influences of privatization and decentralization on drinking water supply chain management in the Netherlands and Indonesia. Moreover, the discussion on the possible lessons learnt will be done based on the conclusion combined with the Indonesian context. The recommendation for improving drinking water supply provision in Indonesia will be give at the end of this chapter by analyzing the lessons learnt.

#### **VI.1 Conclusion**

At this section, it will be put some conclusions based on the discussion in the previous chapters by relating it to the research questions of this research. The conclusion will be structured to answer those questions and achieving the research objectives. Based on research question and the objective of research, the conclusion will be divided into four parts, they are:

##### **6.1.1 Drinking Water Supply Chain Concept for Sustainable Drinking Water Supply Provision**

Due to its basic characteristic, drinking water supply provision can be seen as a process that relates to other sequential process in a chain called as drinking water supply chain. In this context, drinking water supply provision is seen as a process starting from securing raw water resources in the environment, water abstraction from natural environment (groundwater and surface water), the production of drinking water by water treatment and its distribution to customer. After this, the chain continues with the collection and transportation of wastewater, treatment

and discharges it back to the natural environment (surface water and/or groundwater). The adoption of drinking water supply chain management is important in order to ensure the sustainability in drinking water supply provision since this concept is related to the water cycle management that is recognized in developing sustainable water supply provision. The water cycle concept is related with the concept that integrate the source, the water treatment and distribution, water use and reuse and wastewater treatment and discharge as well as the connection of the cycle to surrounding and adjacent hydrological basins.

Understanding the characteristic of goods and service of infrastructure is important in infrastructure planning. This is necessary to ensure the sustainability of the infrastructure service. Related to drinking water supply infrastructure planning, understanding the nature of water in a cycle is important for sustainable drinking water supply infrastructure planning. In this context, drinking water supply chain concept should be used as basic concept for planning of sustainable drinking water supply infrastructure.

Conceptually, the adoption of drinking water supply chain concept for delivering drinking water supply is closely related to the environment. The environment value in this context is seen from the efforts to include natural environment as integral part in the chain. Natural environment in drinking water supply chain concept has function both as raw water storage and the place for wastewater discharge. Due to this, environment is important since it is related to the availability of water in adequate quality and quantity. The effort to preserve environment will give sustainable drinking water supply service. In this context, environmental planning is important. Moreover, the spatial planning is also important due to the importance to separate the place of raw water sources from the place of wastewater discharge, for instance, ensuring the catchment area of water or securing land use for water abstraction area can be seen as effort to keep the drinking water supply chain works well.

### **6.1.2 Privatization and Decentralization in Drinking Water Supply Chain Management**

The implementation of drinking water supply chain management needs institutional arrangements that can be defined as “rules of the game” for arranging sequential activities and actors involved in the chain. In this context, the appropriate institutional arrangements in the chain will ensure the achievement of sustainable drinking water supply provision. The division of responsibilities, the way of interaction and cooperation among actors are related to institutional arrangements. Institutional arrangements in drinking water supply chain management are influenced by the concept of privatization and decentralization.

The adoption of privatization and decentralization for drinking water supply chain basically gives a basic framework for a wide range of institutional options for drinking water supply chain management. Privatization and decentralization give influences in the context of assigning public sector role and private sector role for various functions in drinking water supply chain management for each activities in the chain, such as securing drinking raw water resources, drinking water production (abstraction, treatment) and distribution, and wastewater collection & treatment.

The responsibility for securing raw water resources is mostly in the hand of public sector. This is due to the existence of externalities in water allocation among various needs, such as for drinking water, agriculture, and natural ecosystem. Moreover, the activity of securing raw water is closely related to spatial planning in which this responsibility is fully on public sector. Central government and local government can share this responsibility through decentralization.

The responsibility for water abstraction, water treatment and water distribution to end-user is related to drinking water production and distribution. This activity traditionally is in the hand of public sector. However, the existence of cost

recovery in this activity from the collection of revenue from water tariff gives opportunities for market or private sector to be involved. Due to the existence of natural monopoly in this activity and private sector involvement, public sector roles to regulate the market is required in order to avoiding the abuse of monopoly power by a single provider that can become constraint in achieving social and environmental objective of drinking water supply provision.

For wastewater collection, transportation and wastewater treatment, this activity traditionally is in the hand of public sector. However, the existence of potential cost recovery in this activity from the adoption of polluter pays principle gives opportunity for market or private sector to be involved. Due to the existence of natural monopoly in this activity and private sector involvement, public sector roles to regulate the market is required in order to avoiding the abuse of monopoly power by a single provider that can become constraint in achieving social and environmental objective of drinking water supply provision.

The concept of privatization adopted in drinking water supply chain mostly can be done for the activity of drinking water production (involves the activities of abstracting water, treating raw water and distributing drinking water) and wastewater treatment (involves wastewater collection, treatment and discharge treated wastewater to natural environment. This is related to the consideration that water is perceived as economic goods and the needs for increasing the performance of publicly managed drinking water supply utilities. This adoption of privatization concept is broad, from just adopting the principles of commercialization for publicly drinking water supply service, establishing private companies (Public Limited Company that operate under company law) owned by public sector (Dutch Model), making public-private partnership (French Model) or fully transferring the ownership and management right from public to private sector through divestiture (British Model). In this situation, the public sector still has role as regulator to ensure the service are not high-priced or poorly performed



and meet the social and environmental objectives of drinking water supply provision.

On the other side, the concept of decentralization also adopted in water supply chain management is related to the aim for increasing accountability of the sector to the consumer. This gives influence in the division of responsibility among different level of government and the delegation of responsibility to the lower level of government or institution that has special task for delivering the service.

These two ideas of privatization and decentralization gives influences in changing institutional arrangement of drinking water supply chain management mostly in the separation of owner and operator mainly for drinking water supply production, increasing autonomy of utilities/operator that responsible in delivering drinking water supply service, creating competitive discipline for the operator, and implementation cost recovery for service mostly in drinking water production and wastewater treatment service.

### **6.1.3 The Adoption of Drinking Water Supply Chain Management in the Netherlands and Indonesia**

The adoption of drinking water supply chain management will determine the performance of the drinking water supply service. This adoption needs the political will of the government. The successful of drinking water supply provision is influenced by to what extent the concept of drinking water supply chain management is adopted. The Netherlands puts the awareness of developing sustainable drinking water supply provision by using drinking water chain management. This can be seen from the efforts in developing the system for production and distribution drinking water supply in line with the development of sewerage and sewage treatment for securing the raw water resources for drinking water production. Moreover, the support from the enactment of several legislations that considers the activity in the chain and the integration of the chain

with water system and natural environment. The legislation are Water Management Act of 1989, Groundwater Act of 1981, Pollution Surface Water Act of 1970, and Drinking Water Act of 2000. As the result, the performance of drinking water supply service in the Netherlands is good. Nearly 100% of household in the Netherlands has access to piped drinking water supply system and piped sewerage system with some of centralized wastewater treatment.

In Indonesia, this is not happened. The concept of drinking water supply chain management was not implemented in drinking water supply provision before the enactment of Law No. 7/2004 on water resources management and Government Regulation No. 16/2005 on drinking water supply system development. This can be seen from the problem of low service coverage of sewerage and sewage treatment, difficulties in finding good quality raw water for drinking water production and the low quality of drinking water produced. The low service coverage of formal drinking water supply through piped water supply system and the fact of the difficulties in finding good quality raw water give severe impact on the poor to have access to safe drinking water supply. This condition leads the poor to rely their drinking water supply needs to water vendor which is selling the water with higher price than the price of water from the formal piped system. This higher price lead the poor to the condition of pay more and get less. As a starting point for implementation of drinking water supply chain concept, Indonesia enacted Law No. 7/2004 on water resources management and Government Regulation No. 16/2005 on drinking water supply system development. This can be argued that the awareness of implementing drinking water supply chain in Indonesia was started in the year of 2004 based on integrated water resources management.

The actors in drinking water supply chain in the Netherlands can be characterized as formal institution/government institution (central government, provincial government, drinking water supply company, municipalities and water boards). There are several actor involved in drinking water supply chain with different

responsibilities. The concept of integration of drinking water supply chain as one authority is not preferred in the Netherlands. The preferred mechanism is voluntary cooperation among different actors that various responsibility in the chain.

In Indonesia, due to the structure of drinking water supply and sanitation (piped system, self provision, alternative provider), the actor in the chain is more diverse including formal and non formal institution. This led to the more complicated coordination and cooperation. In this context, communities (individual/group) play roles as both provider and consumer. The fact of low awareness of communities on water scarcity issues (the awareness for seeing water as scarce resources that should be treated well) is the greatest challenge for Indonesia in improving water supply chain management for sustainable water supply provision.

#### **6.1.4 Privatization and Decentralization in Drinking Water Supply Chain Management in the Netherlands and Indonesia**

Privatization in the Netherlands and Indonesia for drinking water supply chain is differently adopted. In the Netherlands, privatization is seen as adopting commercial principles in the operation of activity in drinking water supply chain, especially for drinking water production while the ownership of assets still in the hand of public sector. This is reflected in the type of organization of water supply company as public limited company owned by local government. The strong of public sector as owner and in managing entire drinking water supply chain is important key for successful of drinking water supply provision in the Netherlands.

In Indonesia, privatization is seen as involving private sector for increasing the investment level and managerial capacity of publicly owned water supply utilities for extending the service coverage and service quality. The failure of publicly

drinking water supply service in improving the performance of the service has been initiated the concept of privatization. Various modes of privatization have been adopted for different tasks in drinking water supply provision in Indonesia ranged from service contract, management contract, BOOT, joint venture (for example between WMD the Netherlands and PDAM Ambon Municipality) to concession contract (for example: Jakarta drinking water concession).

The fact tells the privatization was mostly not fully success in improving the performance water supply utilities. This can be seen as related to the weak of government in managing the entire water supply chain that gives conducive environment for private sector to run the business well such as quality of regulatory intervention.

The strong government is needed for successful privatization of drinking water supply service. This is in line with the argument from Gleick on the fact that “the greatest need for water services often exist in those countries with the weakest public sector, yet the greatest risk of failed privatization also exist where government are weak (Gleick, Garry, Elizabeth, & Rachel, 2002).

Decentralization in Netherlands and Indonesia is implemented in drinking water supply chain. This can be seen from the role of local government in operational level of drinking water supply chain management where the responsibility for production of drinking water supply and wastewater treatment is in the hand of local government. For more detail on the influences of privatization and decentralization in drinking water supply chain in the Netherlands and Indonesia is concluded as follows:

The separation of owner and provider is done in the Netherlands also in Indonesia. The difference in this aspect is in the possibilities to put the monopoly of the responsibility of drinking water supply provision to the private sector. In the Netherlands, the monopoly is still put on water supply company that fully owned

by government. In Indonesia, the possibilities for giving the monopoly of drinking water supply provision are high due to the different adoption of privatization modes.

The autonomy of water supply company in the Netherlands is high. This is due to the adoption of multiple shareholder in which water supply company is owned by several municipalities and province. The multiple shareholder of Dutch water PLC gives consequence that there is no dominance shareholder that can intervene the management of water utility. This condition will ensure that the managerial decision of water supply company will be based in consensus. This condition is different with Indonesia. The influence of local government (municipalities/regency) is dominant in the managerial tasks of the water supply companies due to position as single shareholder. This condition leads to the low level of management autonomy in water supply companies in Indonesia. The awareness to establishing good performance of drinking water supply companies was still low due to the fact that every local government developed their own local water company without consideration on the level economic of scale to operate profitable.

The competitive discipline in drinking water supply chain is implemented by the introduction of benchmarking system. This system is adopted in the Netherlands and Indonesia. The difference of the benchmarking system is on the list of aspects. In the Netherlands, the benchmarking also put environmental aspect as important aspect, while in Indonesia the focus of benchmarking is still in the field of operational. This environmental aspect is used to indicate the efforts of drinking water supply companies in producing and distributing drinking water in a more sustainable way. Related to the improvement of drinking water supply chain management and sustainability, the environmental aspect is necessary to be included as benchmarking indicator.

The cost recovery principle is implemented in Dutch's drinking water supply chain. This is implemented in the activity of production and distribution of drinking water supply, wastewater collection and transportation, and wastewater treatment. The drinking water tariff is determined based on cost recovery principle. This is aimed for ensuring the sustainability of the drinking water company in delivering the service. The full cost recovery is not aimed to give dividend the owner and shareholder. This condition is different with Indonesia. The drinking water tariff is not determined based on cost recovery principle while the aim for gaining dividend often becomes priority. This is due to the perception that water is social goods rather than economic goods. Political intervention from regional parliament in tariff determination leads to the condition where political consideration is more important than technical and financial aspects. This led to the fact that 44% of PDAM has water tariff below the cost for operation and maintenance activity.

In the Netherlands, for wastewater treatment, the cost recovery principle is implemented by issuing pollution levy. The revenue from this is used by water board for constructing, operating and maintaining the wastewater treatment facilities. Moreover, for investment and maintenance of sewerage system, the municipality have right to charge every one that connected to the sewerage system for recovering the cost of maintain sewers. The situation is different with Indonesia, the cost recovery in wastewater treatment and sewerage system is not implemented yet due to the low willingness to pay of community. The absence of this cost recovery tariff makes the operation and maintenance of the network and wastewater treatment plant relies on limited government subsidy. This condition leads to low level of service performance. The low wiliness to pay also can reveal the low awareness of people on the importance of sanitation

## **VI.2 Lessons Learnt**

The experience of the Netherlands in managing drinking water supply chain is possible to give inspiration for Indonesia in improving its drinking water supply chain management in the context of privatization and decentralization. Some lessons learnt that can be taken from the experiences of the Netherlands for Indonesia in can be seen as follows:

- **Specific and Integrated Legislation for Drinking Water Supply Chain**

The successful of the Netherlands in managing drinking water supply chain is the availability of specific and integrated policy both in strategic level and operational involves: 1. water management act of 1989 that focus on the management of water system (surface water and groundwater) and the integration of drinking water supply chain and the water system, 2. Groundwater Act of 1981 that focus on the quantity management of the groundwater, 3. Pollution of Surface Water Act of 1970 that focus on the management of the quality of surface water, 4. Soil Protection Act (in Environmental Protection Act of 1994) that focus on the quality of groundwater and 5. Drinking Water Supply Act of 2000 that focus on the quality standard of drinking water, organization and planning of drinking water supply provision.

In Indonesian context, the integration of legislation related to drinking water supply chain was not carried out during the implementation of Law No. 11/1974 on Irrigation even though there were several legislation that related to water management, such as Law No. 5/1990 on Natural Resources and Ecosystem Conservation, Law No. 4/1992 on Spatial Planning, etc. The enactment of Law No. 7/2004 on water resources management as a substitution for Law No. 11/1974 on irrigation gives opportunity for creating integrated legislation related to management of drinking water supply chain in strategic and operational level that focus on quantity and quality aspect of surface and groundwater.

- **Privatization as Adoption of Commercial Principles**

In the Netherlands drinking water supply chain management, privatization is not understanding as giving the ownership and managerial responsibility to the private sector. The privatization is seen just as the adoption of commercial principle for managing drinking water supply chain especially for the activity of drinking water supply production and wastewater treatment. This commercial principle is used as basis for implementing cost recovery principle for ensuring sustainable drinking water supply and wastewater treatment service. In this context, the role of public sector is still important and strong in managing the chain by undertaking investment for expanding the service. Water management, including water supply provision and its related activities in the water chain is put in the hand of public sector due to the needs to ensure protection of resources and the access for all.

More over, the implementation of cost recovery for activities in drinking water supply chain is carried out. In this context, the involvement of political consideration in determination of tariff is avoided. Furthermore, in the determination of tariff, the aim is to put more for keeping the sustainability of the service rather than increasing dividend for local government as the owner/shareholder.

The benchmarking system is also done in order to create the environment for competition of the activities in the chain especially for drinking water production, and wastewater treatment.

In Indonesia context, the limited budget and low performance of public sector in managing and expanding the service are become two main considerations for privatization. Private sector involvement is undertaken due to the weakness of public sector in managing the chain. One of the weaknesses is related to the absence of implementation of cost recovery in the chain. The political intervention in drinking water determination and low willingness to pay of community for the



sanitation service were become constraint in implementing cost recovery principles in the drinking water supply chain. The perception of local government on the possibilities for obtaining dividend from the water supply company has given severe condition to the opportunity for extending the service.

- **Managerial Autonomy of Drinking Water Supply Companies**

In the Netherlands, the development of regional water supply utilities with multiple shareholders potentially gives the increasing economic of scale of the utilities to perform efficiently. These utilities are established by merging process of several drinking water supply companies owned by several municipalities. Moreover, the existence of multiple shareholders in the utilities potentially increases the autonomy of utilities management. This managerial autonomy of drinking water supply company gives the potency for the increasing of improving the performance of the service. Provincial government has main role in the process of merger several drinking water supply company in their respective region.

In Indonesia context, the euphoria of decentralization has lead many local governments to establish their own drinking water supply company. On the other side, the decentralization also gives the opportunity for local government to establish cooperation with other local government in managing drinking water supply chain. The provincial government has no clear role in managing this process of merger.

- **The Multi Institution Coordination in Drinking Water Supply Chain**

Due to the structure of the provision of drinking water supply service and sewerage service, the drinking water supply chain management in the Netherlands is done by several formal institutions from local to national level, such as drinking water supply company, municipalities and waterboard. The centralized piped

system create clear division between provider and customer. Each service provider has specific responsibility in the chain. The involvement of various actors requires coordination among the actors. There is no integration of those different actors in the chain into one single authority. This is related to the situation of the difficulties of integration due to the characteristic that sewerage and drinking water supply are completely separate. The concept used nowadays related this issues is voluntary cooperation among formal institutions as service provider. This give lessons for Indonesia that the coordination with various actor in the chain is possible to carried out for managing drinking water supply chain.

In Indonesia context, the structure of drinking water supply and sewerage service provision allowed community to play roles both as provider and consumer. This is due to the existence of self provision, alternative provider and piped system. The existence of this structure of provision will still be the same in the future due to the policy that allowed the community to actively involved in delivering drinking water supply service and sewerage service through non-piped system and on-site system. This policy is undertaken based on the difficulties in extending the piped centralized system due to physical constraint and financial constraint. The physical constraint relates to the condition of hilly area. On the other side, the condition of disperse and uncontrolled urban sprawl caused by high urbanization can be seen as constraint for development of piped water supply system and sewerage system. The limitation in budget and high level of investment for piped system can be seen as financial constraint.

This condition will give more complicated coordination for managing the drinking water supply chain due to great number of actor being involved. The awareness of the community on their role as provider in the drinking water chain is necessary to ensure they can take their role well. This is the challenge for Indonesia in managing and coordinating the drinking water supply chain.

### **VI.3 Recommendation**

Based on the discussion of lessons learnt and the Indonesian context in the previous part, in this part some recommendations will be given for improvement of drinking water supply chain management in Indonesia.

- **Creating Integrated Specific Legislation for Drinking Water Supply Chain Management**

The availability of integrated legislation for drinking water supply chain management is needed for successful of sustainable water supply provision in Indonesia. The enactment of the Act No. 7/2004 on water resources management can be used as umbrella for preparation of specific legislation that focus on the quality and quantity aspects of surface water and groundwater for strengthening the implementation of drinking water supply management. Moreover, this act can also be used as focal point for integrating other laws related to drinking water supply chain, such as laws on spatial planning and laws on environmental planning.

- **Strengthen Public Sector for Managing Drinking Water Supply Chain and the Adoption of Commercial Principle**

The privatization should not be used as first options in improving the management of drinking water supply chain especially for the activity of drinking water supply provision. The public sector should strengthen the sector at the first for ensuring the environment and social aspect of drinking water supply provision. In this context, the implementation of commercial principles in the publicly drinking water supply production and wastewater service is needed. For drinking water supply tariff determination, the political intervention should be rejected. On the other side, the increasing of willingness to pay of the community for wastewater service should be done through campaign of public health. Moreover, the

development of benchmarking system should be strengthened for creating competitive environment for publicly owned water utilities in improving the service. All of this activity required strong involvement of public sector.

- **Increasing Local Government Cooperation for Increasing Managerial Autonomy of Water Supply Utilities**

The central government should encourage the local government to develop cooperation among them in order to establish drinking water supply company that has sufficient economic of scale for operating efficiently. This establishment can be done for small local government owned water company through merging. The respective municipalities will become shareholder in the new company. This multiple shareholder in drinking water supply company is potentially increasing the managerial autonomy of the new company. This is due to the absence of single dominant shareholders. The role of provincial government can be strengthened in this case. The provincial government should be given the authority for facilitating and supporting the merging process even the authority to push and arrange the merging process.

- **Increasing Awareness of Community and Building Mechanism for Coordination in Managing Drinking Water Supply Chain**

It is not necessary to develop the same system with the Netherlands due to different innate characteristic, such as geomorphologic condition that gives different constraint for centralized piped system. The focus of government should be put on how to implement the drinking water supply chain concept in three modes of provision (formal provision by water supply company, alternative provider, self-provision). Moreover, the integration of these three modes of provision is also necessary in order to increase the coverage of the drinking water supply, sewerage and sewage treatment service. In this context, the development awareness of every actor involved for the importance of drinking water supply

chain concept is the most important things to do first. This awareness of water scarcity and the important of drinking water supply chain can be done through the campaign on the importance of sanitation and its relation with drinking water supply. The local government can take role to create mechanism to control the management of drinking water supply chain in the community level.

#### **VI.4. Epilogue**

The understanding basic characteristic of goods and service in drinking water supply provision leads to the needs for the implementation of drinking water supply chain management in drinking water supply infrastructure planning. This chain covers all activities related to the cycle of water. The adoption of the drinking water chain concept will give opportunity for achieving sustainable water supply provision.

This research is discussing a small part of the sustainable drinking water supply provision based on the adoption of the concept of drinking water supply chain management that relate to the adoption of privatization and decentralization. The simple comparative analysis has been done in this research. In order to obtain better insight on drinking water supply chain management and its relation with the concept of privatization and decentralization, the further deeper study can be done both in the level of theoretical and practical level.

## Bibliography

- ADB. *Developing Best Practices for Promoting Private Sector Investment in Infrastructure: Water Supply*. Manila: Asian Development Bank, 2000.
- Al Afghani, Mohamad Mova. "Constitutional Courts Review and The Future of Water Law in Indonesia." *Law, Environment and Development Journal*, 2/1, 2006: 1-18.
- Aliani, A.H. *Local Government in Asia and the Pacific: A Comparative Analysis of Fifteen Countries*. Bangkok: United Nations, 2002.
- Argento, Daniela, and G. Jan van Helden. *Reforming the Dutch Water Chain: How Radical Ambitions turned into a Moderate Pace of Change*. Contollo Dei Settori Regolati, 2008.
- Bakker, K.J. *An Uncooperative Commodity: Privatizing Water in England and Wales*. Oxford: Oxford University Press, 2003.
- Bakker, Karen. "Trickle Down? Private Sector Participation and the Pro-Poor Water Supply Debate in Jakarta, Indonesia." *Geoforum*, 38, 2007: 855-868.
- Bhattacharya, A, E. Parker, and K. Raffiee. "An Examination of the Effect of Ownership on the Relative Efficiency of Public and Private Water Utilities." *Land Economics*, 70(2), 1994: 197-209.
- Biswas, Asit K. "Integrated Water Resources Management: A Reasesment." *Water International*, 29/2, 2004: 248-256.
- Blokland, Maarten, Okke Braadbaart, and Klaas Schwartz. *Private Business, Public Owners: Government Shareholdings in Water Enterprises*. Delft: The Ministry of Housing, Spatial Planning and the Environment, 1999.
- Boorsma, P.B. "Privatization: Political and Economic Considerations." In *Privatization Experiences in African and Asian Countries*, by Meine Pieter Van Dijk and Nico G. Schulte Nordholt, 17-34. Amsterdam: SISWO, 1994.
- Bots, Pieter W.G. "Benchmarking in Ducth Urban Water Management: An Assessment." In *Adaptive and Integrated Water Management Coping with Complexity and Uncertainty*, by Claudia Pahl-Wostl, Pavel Kabat and Jorn Moltgen, 277-300. Berlin: Springer, 2008.
- Brisco, J. *Poverty and Water Supply: How to Move Forward, Finance and Development*. Washington D.C.: IMF, 1992.

- Budds, Jessica, and Gordon McGranaham. "Are the Debates on Water Privatization Missing the Point? Experiences from Africa, Asia and Latin America." *Environment and Urbanization*, 2003: 87-113.
- Byrnes, P., S. Grosskopf, and K. Hayes. "Efficiency and Ownership: Further Evidence." *Review of Economic and Statistics*, 65, 1986: 337-341.
- Calderon, C, and L Serven. *The Effects of Infrastructure Development on Growth and Income Distribution*. Washington D.C.: The World Bank, 2004.
- Coenen, Frans, and Kris Lulofs. *Integrated Water Planning in Dutch Urban Areas: The Effectiveness and Efficiency of Plans and other Integral Instrument*. CSTM, University of Twente, The Netherlands, 2006.
- Dalhuisen, J., and P. Nijkamp. "Enhancing Efficiency of Water Provision: Theory and Practice of Integrated Water Management Principles." *European Water* 5/6, 2004: 35-46.
- Dikun, Suyono. *Infrastruktur Indonesia: Sebelum, Selama, dan Pasca Krisis*. Jakarta: Kementerian Negara Perencanaan Pembangunan Nasional/BAPPENAS, 2003.
- Dolowitz, David, and David Marsh. "Who Learns What from Whom: A Review of the Policy Transfer Literature." *Political Studies* XLIV, 1996: 343-357.
- Drechsler, W. "Governance, Good Governance and Government: The Case for Estonian Administrative Capacity." *Journal of the Humanity and Social Science*, 8(4), 2004: 388-396.
- Emerton, Lucy, and Elroy Bos. *Value: Counting Ecosystem as an Economic Part of Water Infrastructure*. Gland, Switzerland & Cambridge, UK: International Union for Conservation of Nature and Natural Resources, 2004.
- Finger, M., and J. Allouche. *Water Privatization: Trans-national Corporations and the Re-regulation of Water Industry*. London: Spon Press, 2002.
- Finger, Mathias. "The New Water Paradigm: The Privatization of Governance and the Instrumentalization of the State." In *The Business of Global Environmental Governance*, by David L. Levy and Peter J. Newell, 275-304. Massachusetts: MIT Press, 2005.
- Finot, Ivan. *Decentralization and Privatization in Latin America: An Economic Perspective*. CEPAL Review, 2002.

- Fuhr, Harald. "Institutional Change and New Incentives Structures for Development: Can Decentralization and Better Local Governance Help?" *Welt Trends Nr. 25*, 2000.
- Furukawa, S. *The Role of Private Sector Participation (PSP) for Sustainable Water Supply & Sanitation Sector: The Case of Latin America*. Japan: JBIC, 2005.
- Geel, Pieter van. *Innovative Practice in the Drinking Water Supply in the Netherlands: Private Business, Public Owners*. Korea: UNEP/GMEF, 2004.
- Gleick, Peter H. "Water in Crisis: Paths to Sustainable Water Use ." *Ecological Application Vol.8 No.3*, 1998: 571-579.
- Gleick, Peter H., Wolff Garry, L. Chalecki Elizabeth, and Reyes Rachel. *The New Economy of Water: The Risk and Benefits of Privatization and Globalization of Fresh Water*. Oakland: Pacific Institute, 2002.
- Global Water Partnership. *Integrated Water Resources Management - Technical Advisory Committee (TAC) Background Paper No.4*. Stockholm: Global Water Partnership, 2000.
- Habitat II. *Habitat II: Partnership for the Urban Environment*. <http://www.undp.org/un/habitat/presskit/dpi1790e.htm>: United Nations Department of Public Information, 1996.
- Hall, D. *Reclaiming Public Water: Achievements, Struggles and Vision from Around the World*. Amsterdam: Transnational Institute, 2004.
- Houdret, Annabelle, and Miriam Shabafrouz. *Privatisation in Deep Water? Water Governance and Options for Development Cooperation*. Duisburg: Institute for Development and Peace - University of Duisburg-Essen, 2006.
- Jaglin, S. "The Right to Water versus Cost Recovery: Participatio, Urban Water Supply and the Poor in Sub Saharan Africa." *Environment and Urbanization*, 2002: 231-245.
- Johnson, Paul V. "Unaccounted-for Water Puzzle: More Than Just Leakage." *Florida Water Resources Journal*, 1996: 37-42.
- Johnstone, Nick, and Libby Wood. *Private Firms and Public Water*. Massachusetts: Edward Elgar Publishing, Inc., 2001.
- Jong, Pieter. "The Water System and Water Chain in Dutch Water and Environment Legislation." *Law, Environmnetal & Development Journal*, 3/2, 2007: 202.



- Juuti, Petri S, and Tapio S Katko. *Water, Time & European Cities: History Matters for the Futures*. European Commission, 2005.
- K'Akumu, O.A. "Privatization Model for Water Enterprise in Kenya." *Water Policy*, 8, 2006: 539-557.
- Kessides, C. *Institutional Option for The Provision of Infrastructure*. Washington D.C.: The World Bank, 1993.
- Klostermann, Judith E. M. *The Social Construction of Sustainability in Dutch Water Companies*. Wangeningen, The Netherlands: Alterra Green World Research, 2003.
- Klugman, J. *Decentralization: A Survey of Literature from a Human Development Perspective*. New York: United Nations, 1994.
- Kuks, M.M. Stefan. "The Privatization Debate on Water Service in the Netherlands: An Examination of the Public Duty of the Dutch Water Sector and the Implication of Market Forces and Water Chain Cooperation." In *Umweltaspekte einer Privatisierung der Wasserwirtschaft in Deutschland*, by Fritz Holzwarth and Andreas R. Kraemer, 81. Berlin: Ecoscript, 2001.
- Kuks, Stefan M. M. "The Privatization Debat on Water Service in the Netherlands : An Examination of the Public Duty of Dutch Water Sector and the Implication of Market Forces and Water Chain Cooperation." *Water Policy*. 8. IWA Publishing, 2006: 147-169.
- Kundzewicz, Zbignier W. "Water Resources for Sustainable Development." *Hydrological Sciences* 42(4), 1997: 467-480.
- Lambert, D., D. Dichev, and K. Raffiiee. "Ownership and Sources of Inefficiency in the Provision of Water Service." *Water Resources Research*, 29(6), 1993: 1573-1578.
- Lazaroms, Rafael, and Dimitri Poos. "The Dutch Water Board Model." *Water Law* 15, 2004: 137-140.
- Livingstone, M.L. "Designing Water Institution: Market Failure and Institutional Response." *Water Resources Management*, 1995: 203-220.
- Lobina, Emanuele, and David Hall. *Public Sector Alternative for Water Supply and Sewerage Privatization: Case Study*. London: Public Service International Research Unit, 1999.

Memon, Mushtaq Ahmed, Hidefumi Imura, and Hiroaki Shirakawa. "Reforms for Managing Urban Environmental Infrastructure and Services in Asia." *The Journal of Environment Development*, Vol.15, 2006: 138-157.

Moore, M. *Good government?* IDS Buletin, 1993.

Mukherjee, Nilanjana, and Cristine van Wijk. *Sustainability Planning and Monitoring in Community Water Supply and Sanitation: A Guide on the Methodology for Participatory Assesment (MPA) for Community Driven Development Programs*. The World Bank, 2000.

Murray, D.J. *The World Bank Perspective on How to Improve Administration*. Public Administration and Development, 1983.

Nellis, J. *Is Privatization Necessary?* Washington D.C.: The World Bank, 1994.

NHV. *Water in the Netherlands*. Delft, the Netherlands: Netherlands Hydrological Society, 1998.

Olleta, Andreas. *The World Bank's influence on Water Privatization in Argetina: The Experience of the City of Buenos Aires*. Working Paper. International Environmental Law Resources Centre, 2007.

Prasad, Naren. "Current Issues in Private Sector Participation (PSP) in Water Service." *Development Policy Review*, 2006: 669-692.

Rakodi, C. "Getting the Pipe Laid is One Matter and Getting the Water Flowing through the Pipe is Another: User Views on Public Sector Urban Water Provision in Zimbabwe, Sri Lanka, Ghana and India." *International Planning Studies*, 2000: 365-391.

Renzetti, S., and D. Dupont. *Ownership and Performance of Water Utilities*. Greener Management International, 2003.

Rodenburg, C.A., de Groot H. L. F., J.M. Dalhuisen, and P. Nijkamp. *Water Management in Amsterdam, Strategic Report*. Amsterdam: Economic and Social Institute, Vrije Universteit , 2000.

Saal, D., and D Parker. "Productivity and Price Performance in the Privatized Water and Sewerage Companies in England and Wales." *Journal of Regulatory Economics*, 20(1), 2001: 61-90.

Saleth, R. Maria, and Ariel Dinar. *The Institutional Economics of Water*. Chentelham, UK and Northampton, USA: Edward Elgar, 2004.

- Schupen, L., and P. Gibbon. *Private Sector Development Policies: Practices and Problems*. Copenhagen: Centre for Development Research, 2001.
- Schwartz, Klass. *Managing Public Water Utilities: An Assessment of Bureaucratic & New Public Management Models in Water Supply and Sanitation Sectors in Low and Middle Income Countries*. Delft, The Netherlands: IHE-UNESCO, 2006.
- Serageldin, M, S. Kim, and S. Wahba. *Decentralization and Urban Infrastructure Management Capacity*. Harvard University Graduate School of Design, 2000.
- Simpson, Robin. *Decentralization and privatization of municipal services: The perspective of consumers and their organizations*. Geneva: International Labour Office, 2001.
- UNHCS. *Report of the Regional Workshop on Privatization and Financing of Municipalities in the Eastern Africa Sub Region*. Nairobi: UNHSC, 1998.
- United Nation Economic and Social Council. *Substantive Issues Arising in the Implementation of the International Covenant on Economic and Social and Cultural Right, General Comment No. 15 (Draft)*. Geneva: Committee on Economic, Cultural and Social Right, 2002.
- United Nations. *Agenda 21: United Nations Conference on Environmental and Development*. New York: United Nations Publication, 1992.
- United Nations Children's Fund. *UNICEF Strategies in Water and Environmental Sanitation*. New York: UNICEF, 1995.
- Uphoff, N.T. *Local Institutional Development: An Analytical Sourcebook with Cases*. West Hardford: Kumarian Press, 1986.
- VEWIN. *Reflection on Performance: Benchmarking in the Dutch Drinking Water Industry*. The Netherlands: VEWIN, 2006.
- VROM. *Private Business, Public Owners: Government Shareholdings in Water Companies*. The Hague: VROM, 1999.
- WHO & UNICEF. *Meeting the MDG Drinking Water and Sanitation Target: The Urban and Rural Challenge of the Decade*. Geneva: World Health Organization, 2006.
- Williamson, Oliver E. *Institution and Economic Organization: The Governance Perspective, Annual Bank Conference on Development Economics*. Washington D.C.: The World Bank, 1994.

Winpenny, J. *Managing Water as an Economic Resources*. London: Routledge, 1994.

World Bank. *Averting on Infrastructure Crisis : A Framework for Policy and Action*. Washington D.C.: The World Bank, 2004.

—. *Economic Growth in the 1990s: Learning from a Decade of Reform*. Washington D.C.: The World Bank, 2005.

World Bank. *Private Participation in Infrastructure: Trends in Developing Countries in 1990-2001*. Washington D.C.: The World Bank, 2003.

—. *World Development Report 2004: Making Service Work for the Poor*. Washington D.C.: World Bank, Oxford University Press, 2003.

World Health Organization. *Celebrating Water for Life: The International Decade for Action 2005-15, An Advocacy Guide*. Geneva: WHO, 2005.

World Health Organization. *Domestic Water Quality, Service Level, and Health* . Geneva: WHO, 2003.

Wubben, Emiel F.M., and Willem Hulsink. "A Waterloo of Utility Liberalization? How Great Deregulation Expectations were Dashed by the Dutch Water Industry in the 1990s." In *On Creating Competition and Strategic Restructuring: Regulatory Reform in Public Utilities*, by Emiel F.M. Wubben and Willem Hulsink, 185-218. Cheltenham: Edward Elgar Publishing Limited, 2003.