The Analysis on the Implementation of Integrated Water Resources Management

(Case Study: Indonesia's Water Policy)

THESIS

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

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DOUBLE MASTER DEGREE PROGRAMME

DEVELOPMENT PLANNING AND INFRASTRUCTURE MANAGEMENT
SCHOOL OF ARCHITECTURE, PLANNING AND POLICY DEVELOPMENT
INSTITUTE OF TECHNOLOGY BANDUNG

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ENVIRONMENTAL AND INFRASTRUCTURE PLANNING
FACULTY OF SPATIAL SCIENCE
UNIVERSITY OF GRONINGEN

2007

Abstract

Water is essential for human living. Inline with the rapid growth of world population and the increasing of social economic living, the use of water for various sectors is increasing every year. Meanwhile, the availability of world's water remains constant or tends to decline due to the change of land use and climate. The physical problems related to water resources are increasing as well as the water institutional problems. These conditions have far reaching consequences to socio-economic and environment. Integrated Water Resources Management (IWRM) as described by Global Water Partnership in 2000 is deemed reasonable as the approach in solving the water problems, since it introduces the holistic approach requiring the integration of institution, law and regulation, coordination, investment and financial resources based on participation among water users, planners and decision makers. This study will analyze the water issues and the implementation of IWRM in Indonesia. Taking the experience of Malaysia and Tanzania in implementing IWRM into their national policies confirms that the implementation of IWRM needs the reform of institutional arrangements and legal structures. It is worthwhile for this study in order to seize valuable lessons for water resources management practice in Indonesia. The analysis is stem from the three key elements to implement IWRM, which are enabling environment, institutional roles, and management instruments. The analysis is organized into six points: (1) national water policies reflects the concept of IWRM; (2) water law incorporates the principles of IWRM; (3) organizations are in place at policy level for IWRM; (4) organizations are in place at implementation level for IWRM; (5) capacity building delivery systems for IWRM; (6) and other aspects of IWRM implementation. By assessing the status on the implementation of IWRM in Indonesia from its policy and law, organizations, capacity building and other aspects of implementation, the Law Number 7 Year 2004 concerning Water Resources accommodates the principles of IWRM referred to the Dublin Principle. However, consensus and coordination among stakeholders, participation and support, and capacity building must be strengthened regarding to support the law enforcement and to achieve water governance. The result of this analysis is used to identify some strategic recommendations that will contribute to improved water resources management in Indonesia.

Keywords: *Integrated Water Resources Management, implementation, Indonesia, water policy*

Preface

My interest about water management dates back to my subject related to hydrology in my bachelor degree in Civil Engineering. Further, given the chance to study in the Netherlands stimulates my interest to learn about good water management practice, in particular how the Dutch manages the land and water within EU Water Directive. Besides, seeing the condition of water resources in Indonesia raises my concern to study what the problems and the solutions are. Thus, in this study, I analyze the implementation of Integrated Water Resource Management in Indonesia's water policy in order to contribute to improved water resources management in Indonesia.

It is an honor for me to study at Faculty of Spatial Science, Rijksuniversiteit Groningen, and being taught Water Management and International Planning Practice by Dr. Johan Woltjer. It is also such an honor of being taught by very prominent persons in the field of Planning, such as Prof. Dr. G.J. Ashworth, Prof. Dr. G. de Roo, Prof. Dr. E.J.M.M. Arts, Dr. Ir. P. Ike, Dr. J.R. Beaumont, Dr. N. Karstkarel and many lectures of whom I could not mention one by one.

In this opportunity, my greatest gratitude to Allah SWT, the God Almighty that allows me to complete my study and bless me with His Love through the good and bad times. I am immensely grateful to my supervisors Dr. Johan Woltjer and Ir. Hastu Prabatmodjo, MS, Ph.D for the advice, comment, direction, and knowledge that make this work worthy, and for encouraging my motivation during writing my thesis. I also address my grateful to all lecturers in both ITB and RuG who give me valuable knowledge about Environmental and Infrastructure Planning.

I would like to thank for all supports from my Papa and Mama, my brother and sister, my family and relatives, and Joko Julianto, S.T for love, care, and understanding through my ups-and-downs. I am grateful to BAPPENAS for facilitating me in getting Double Degree scholarship in ITB, Indonesia, and to the Dutch Government, NUFFICS and its representative, and NESO Indonesia that granted me StuNed Scholarship to pursue my master programme. I also would like to thank to Dr. Ir. Budi Santoso, MA as the Planners' Functional officer at Directorate of Water Resources and Irrigation of BAPPENAS for mailing me the important materials for my thesis. Great thanks are also addressed to my Indonesian colleagues at DD ITB-RuG 2005 and to Dutch colleagues from Environmental and Infrastructure Planning programme 2006/2007, my fellow StuNed 2006 awardees, PPIG, deGromiest, and Indonesian community in Groningen, for great moments in the Netherlands.

Merylia
Groningen, August 2007

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Chapter 1
Introduction

This chapter aims to describe the research design consisting of background, research objective, research questions, research methodology, and thesis outline. The background describes the problems related to water sector in Indonesia. The research objective depicts the purpose of the study that develops the research questions. How this study will be conducted is explained in research methodology, and the systematic of writing this study is provided in the thesis outline. This study will lead to the academic discourse about the concept of Integrated Water Resource Management that will be discussed in Chapter 2.

1.1 Background

The world population has exceeded to the six-billion mark in 1999 and expected to achieve 8.5 billion in 2025 with the growth rate 2.8% per year (Bos, 2005). All of people in this population need water for various purposes such as household, drink water, industry, manufacturing, power generation, navigation, recreation, and food production. This condition makes the use of water for various sectors is increasing every year inline with the rapid growth of world population and the increasing of social economic living. Meanwhile, the availability of world's water remains constant or tends to decline due to the change of land use and climate. By considering the volume of fresh water availability, the competition among water users will continue to rise. Thus, balancing demand and supply under this difficult condition is the major challenge that is faced by water planners and managers at the end of 20^{th} century (Hamdy, 2002). Beside that, the deterioration of environment and water resources occur consistently. Therefore, water and its resources must be managed, protected, and conserved in a holistic manner to

ensure its sustainability in serving various users while protecting the environment and physical processes (Amron, 2000).

The concept of Integrated Water Resource Management (IWRM) is deemed reasonable as the approach in solving the water problems, since it introduces the holistic approach based on participation among water users, planners and decision makers. As Biswas (2004) argues that solutions to water problems depend not only on water availability which is handled by one single institution, but also it requires the integration process and coordination among development sectors. In addition, by implementing IWRM, planners are encouraged to look beyond the economic sector and consider the implications of water management decisions on employment, the environment and social equity (Cap-Net, 2004).

This study will discuss about the water issues and the implementation of IWRM in Indonesia. However, it is worthwhile in this study to know the experience of Malaysia and Tanzania in implementing IWRM into their national policies in order to seize valuable lessons for water resources management practice in Indonesia. Both Malaysia and Tanzania are developing countries as well as Indonesia, so that the focus of the implementation of IWRM is seen as a factor in addressing poverty, hunger, health and environmental sustainability to achieve the Millennium Development Goals (Jønch-Clausen, 2004).

1.1.1 Malaysia

Malaysia has physical and institutional problems regarding to water resources. Water resources and environmental problems, such as water shortages, river pollution, flood, landslides, and river sedimentation are increasing inline with the growth in population and expansion in urbanization, industrialization and irrigated agriculture that require water supply to generate these activities. Besides, the nature of Malaysia's governmental administration, which is a federation of 13 states with many governmental departments and agencies at the federal and state levels, puts land use and water management as the responsibilities of the federals and state. Hence, there are gaps and overlaps in the responsibilities for land and

water management (Zakaria and Selamat, 2005). Both physical and institutional problems disrupt economic activities, and harm to human and infrastructures.

Despite having an outdated The Water Act 1920 as guidelines for all federal and states, Malaysia needs to solve the water problems in an integrated manner. Therefore, Malaysia has taken some IWRM strategies to address the key water issues by providing an enabling environment for effective and efficient implementation of IWRM. Malaysia has formulated its national water vision to adopt the cross-sectoral integration between water use sub-sectors in IWRM (MNRE-NAHRIM, 2006). To support its water vision, Malaysia has formulated specific water policy statements in its development plans, such as in the National Development Policy documents for the Third Outline Perspective Plan (OPP3) (2001-2010), the Eighth Malaysia Plan (2001–2005), and the Ninth Malaysia Plan (2006 – 2010). Besides, national IWRM-related Plans have been developed within individual agencies and departments (MNRE-NAHRIM, 2006; Mohd. Nor M.D. and Atikah Shafie, 2005). At the state level, the State Government of Selangor has passed the Selangor Water Enactment 1998 and formed Selangor Water Management Authority (SWMA) or *Lembaga Urus Air Selangor* (LUAS) as a pilot manager of river basin organization by the State Government of Selangor to manage water resources in a holistic manner (MNRE-NAHRIM, 2006). Beside that, Malaysia forms Water Resources Council in order to simplify the coordination of individual sectoral policies, strategies and action plans, into an integrated national IWRM strategic implementation and action plan. In addition, there are several IWRM-related workshops and seminars have been held in Malaysia as part of creating an enabling IWRM environment. Moreover, the Malaysia Water Partnership (MyWP) has organized some efforts regarding to creating awareness and building IWRM capacity among the water-related sectoral agencies in Malaysia. Furthermore, IWRM has been a subject taught at the Malaysia's universities. Other important aspects in implementing IWRM in Malaysia are the development of data and information and the establishment of a number of monitoring programmes.

1.1.2 Tanzania

The climate in Tanzania tends to dry, and unreliable rainfall, multiplicity of competing uses, degradation of sources and catchments cause water scarcity in many places in Tanzania. These problems have far-reaching consequences to threaten food security, energy production and environmental integrity and consequently there are water use conflicts between sectors of the economy (The Tanzania National Water Policy, 2002). Beside that, the institutional problems, such as increasing challenges in trans-boundary water resource management, inadequate regulations to monitor groundwater resources development, fragmented planning following sector, regional or district interests, and strengthening water resources management policy and legal and institutional frameworks, have intensified the water problems (URT, 1995a in Maganga, 2002; Mutayoba, 2002; The Tanzania National Water Policy, 2002). The government form is unitary state, but it operates under a plural legal system for water resources management (Maganga, 2002). Therefore, Tanzania has moved to reform water resources management toward the implementation of IWRM by focusing on the use of statutory legal systems to regulate the use of water resources (Mutayoba, 2002; Maganga *et al*., 2004). Currently, Tanzania is under reviewing The Water Utilization Act Number 42 of 1974 and its subsequent Amendments to regulate water resources management to include the key principles of IWRM as stated in the National Water Policy of 2002 and the National Water Sector Development Strategy (NWSDS) 2005-2015.

Under the Tanzania Vision 2025 aiming at achieving a high quality livelihood for its people, attaining good governance through the rule of law and developing a strong and competitive economy, Tanzania stipulated the National Water Policy in 2002. It has some objectives, such as setting an effective legal and institutional framework for its implementation, promoting the beneficiaries' participation in planning, construction, operation, maintenance and management of community based domestic water supply schemes, and focusing on cross-sectoral interests in water, watershed management and integrated and participatory approaches for

water resources planning, development and management. In addition, the changing role of the Government as coordinator and policy and regulation maker is provided in this policy document. The goal of water policy is to achieve the medium term strategy for poverty reduction and indicators for measuring progress in Poverty Reduction Strategy Paper (PRSP) (The Tanzania National Water Policy, 2002). The Ministry of Water and Land Development (MoWLD) has the responsibility in policy making and implementing the policy. Meanwhile, at the practice field, there are Basin Boards in nine river basins, but only five Basin Water offices and Boards in operation for Pangani, Rufiji, Lake Victoria, Wami/Ruvu, and Lake Nyasa Basin (Mutayoba, 2002). Moreover, Tanzania has been organizing the RBM-Project for institutional capacity building within Ministry staff (ibid, 2002). As stated in the National Water Sector Development Strategy (NWSDS) 2005-2015, the government establishes a Public Relations Unit in the Ministry responsible for Water in order to operate an effective education, information and communication framework for increased stakeholder and community knowledge of the Water Sector activities (Ministry of Water and Livestock Development, 2004). Another management instrument stated in the National Water Policy of 2002 is monitoring for the implementation of IWRM, which is monitoring of water use and demand, and the establishment of guidelines and mechanisms for EIAs and their enforcement (Ministry of Water and Livestock Development, 2004).

1.1.3 Indonesia

Indonesia as a tropical country is blessed with abundant water resources, but this condition will not occur for a long time. Although Indonesia is the fifth largest nation in term of water availability (Water Resources Institute Washington 1991 cited in Directorate General of Water Resources, 2005) which has the water availability 15,000 m^3/capita/year more than the average world's water availability 8,000 m^3/capita/year, Indonesia is facing the water crisis. This problem is caused by mismanagement of water that can be seen in the form of high water pollution, inefficient use of water, high fluctuation of river water

discharge, weak institution, and inadequate law (Dikun, 2003). According to Syamsi (2005), the problems of water management in Indonesia analyzed from the macro framework are pollution, environmental degradation, and the deterioration and ineffectiveness of legal structures, regulations, policies, and institutions. There are still fragmentation among sectors, less coordination within institutions, top-down and centralistic management, and less participation (Amron, 2000). Iskandar (2005) identifies that the nature of water resources management problems in Indonesia is complicated, which involves multi-resources, multi-users/consumers, multi-institutions and multi-values. Considering limited supply of water, this complicatedness generates conflict of interest and inter-sector competitiveness. Meanwhile, the water resources management system in the past was strong-sectoral management by different authorities and institutions. These conditions lead to adverse consequences, such as the productivity of land and water resources in low potential level that will disadvantage the national economy. If there is no action taken, the Indonesia's water sector potentially becomes loss-loss ending (Iskandar, 2005). Therefore, there is an increasing pressure to use water resources more efficiently and environmentally sound management in each country (Hamdy, 2002). Moreover, the improvements of water management can promote conservation and make best use of limited accessibility to water resources (Bos, 2005).

In accordance with the political reformation in Indonesia, there is principle transformation toward the understanding on the value of water resources and the needed on a holistic approach involving institution, law and regulation, coordination, investment and financial resources (Helmi, 2003). Therefore, in order to anticipate the transformation, the law about Water Resources has to be readjusted regarding the value of water resources and the controlling objects in a holistic manner, integrated, sustainable, and environmental sound (Chapter 33, The Indonesia's Medium-Term Development Plan 2004-2009). In this regard, the establishment of effective water policy and regulations is a pre-requisite for a sustainable water management. Thus, the Government of Indonesia has legalized

the new water act in the Law Number 7 Year 2004 concerning Water Resources through conservation, water resources utilization, and control of water resources damaging power (Chapter 33, the Indonesia's Medium-Term Development Plan 2004-2009).

This study will discuss about the implementation of IWRM in Indonesia water resource management by focusing on the government's policy and regulation. Then, the concept of Integrated Water Resource Management (IWRM) and the key elements in implementing this concept will be elaborated in Chapter 2. For the case of analysis, the condition of water resources in Indonesia will be described in Chapter 3. The analysis on the reform of water policy in Indonesia and the efforts in implementing IWRM based on the key elements of IWRM is discussed in Chapter 4. The conclusion and recommendation are provided in Chapter 5.

1.2 Research Objective

The study is built from a growing concern about water problems in Indonesia's water sector, which are water crisis under the gap between demand and supply, conflicts among water users and weak institutional arrangements. These problems are great threats to the global and local sustainability of water supply and challenging the sustainable development (Hamdy, 2002). Therefore, it is necessary to solve the problems in a holistic approach involving inter-sectors, inter-regions and inter-users. Integrated Water Resource Management as a tool in holistic approach requires the integration of institution, law and regulation, coordination, investment and financial resources. Such understanding about the concept of Integrated Water Resource Management seems reasonable to bring it into the implementation in the practice field. Assessing how far the water policy in Indonesia has suit to the strategies in implementing the concept of Integrated Water Resource Management approach will be discussed in this study. Hence, this study is expected to identify some strategic recommendations that will contribute to improved water resources management in Indonesia.

1.3 Research Question

Based on the research objective, the research is conducted as an exploration of theoretical and empirical aspects of Integrated Water Resource Management and its implementation in Indonesia's water policy. To further focus on the research, three research questions have been formulated:

- What is the concept of integrated water resource management?
  Through this question, the concept of Integrated Water Resource Management will be explored and elaborated. First, this study will discuss the meaning of holistic approach that underlies the emergence of IWRM. Second, the discussion on the concept of IWRM including why this concept is needed and the key strategies how to implement IWRM will be elaborated afterwards. After discussing the basic concept of IWRM, this study will highlight some experiences in adopting IWRM in Malaysia and Tanzania's water policy in order to seize valuable lessons for water resources management practice in Indonesia.

- What is the condition of water sector in Indonesia and how did the development of Indonesian water policy evolve?
  With this question, this research overviews the pre-condition in the development of water sector in Indonesia, particularly the historical overview of Indonesian's water policy.

- To what extent the implementation of the concept of Integrated Water Resource Management in Indonesian water policy?
  This question will be addressed to analyze the implementation of the concept of Integrated Water Resource Management and its strategies in the current practice of Indonesian's water resource management. Derived from the theoretical review and the issues in Indonesia's water sector, this study will focus on analyzing the key strategies of IWRM in Indonesia's water policy toward implementation of this concept.

1.4 Research Methodology

This study will be conducted by using several methodological steps that are described as follows:

1. Data collection and theoretical review for developing theoretical base.

   This study will be conducted based on literature study in answering the research question about the concept of Integrated Water Resource

Management (IWRM). Beside that, this study also reviews some relevant literatures regarding to Malaysia and Tanzania's experiences in implementing the concept of IWRM into their national policies. It uses literature review by using available literature and other text materials, which are relevant to the research questions such as the books, journal articles, seminar proceedings, working papers and secondary data from official documents, unpublished materials, newspapers, and other sources from internet.

2. Data collection and literature review for reviewing the case of Indonesia's water sector.

   The author will conduct data collection and literature review on the pre-condition of Indonesian's water resources reform. These data are including the water issues that exist before the implementation of IWRM and the historical development of water policy in Indonesia. Therefore, the author will use some materials from internet, books, unpublished materials, seminar and workshop materials, law and regulation documents, newspapers, and other sources from internet.

3. Analysis Data

   Derived from academic understanding and the case on water issues in Indonesian context, the author will analyze the reform on Indonesia's water policy toward the implementation of IWRM and to what extent the implementation of this approach. Assessing the status on the implementation of IWRM is useful to propose strategic recommendation to enhance better water resources management in Indonesia.

1.5 Thesis Outline

The report of this research consists of five chapters, which tries to answer the research objectives. In chapter one, the author will introduce the research design, which consists of background, research objectives, research questions, methodology and thesis outline. In the background, the author will describe the

general overview on the issues of water resources in Indonesia. Chapter 2 provides the study on the theoretical review of the concept of Integrated Water Resource Management. Experiences about the implementation of IWRM in Malaysia and Tanzania will be described in chapter two. In chapter three, the author will describe the empirical case about the condition of Indonesian water sector from literature reviews. This chapter is useful for understanding the water issues in Indonesia that can be used in analyzing the implementation of the concept of IWRM in Indonesia's water policy. Chapter 4 will discuss the empirical exploration, which reflects the current practice and analysis of water resources management in Indonesia. The reformation of water policy is discussed in this chapter to know how far the implementation of IWRM is adopted. Finally, this report will be end up with conclusion and recommendation that are extracted from the theoretical approach and case study approach, which are linking the research objectives and research questions.

Chapter 2
Theoretical Framework on the Concept of IWRM

This chapter is intended to provide the theoretical review towards the topic of the research. In this chapter, the author will elaborate the concept of Integrated Water Resource Management (IWRM) and key elements to implement this concept. The author will begin with the discussion about the holistic approach since the word becomes so popular in underlying the approach to solve environmental problems. The discussion will be sequenced by elaborating the experiences of Malaysia and Tanzania in adopting IWRM into their national policy.

2.1 Integrated Water Resource Management

Integrated Water Resource Management (IWRM) has been widely accepted as the solution to the management of water resources that focused on the sustainable use of water resources. This concept has evolved at the international conferences for almost the past four decades in raising the international community's awareness on the importance of integrated water management (Rahaman and Varis, 2005). As Biswas (2004) argues in his paper that:

> "Solutions to water problems depend not only on water availability, but also on many other factors, among which are the processes through which water is managed, competence and capacities of the institutions that manage them, prevailing socio-political conditions that dictate water planning, development and management processes and practices, appropriateness and implementation statuses of the existing legal frameworks, availability of investment funds, social and environmental conditions of the countries concerned, levels of available and usable technology, national, regional and international perceptions, modes of governance including issues like political interferences, transparency, corruption, etc., educational and development conditions**,** and status, quality and relevance of research that are being conducted on the national**,** sub-national and local water problems." (Biswas, 2004, p. 248)

In essence, the water problems in a region cannot be handled by only the water professionals or one single institution. The solutions to deal with water-related problems that is argued by Biswas (2004) require the integration in managing water resource, which needs the coordination among other development sectors, such as social, economic, environmental, legal and political factors at international, national, regional, and local levels. This part is intended to frame the theory, which will be used in elaborating the concept of Integrated Water Resource Management.

2.1.1 What is a Holistic Approach?

The water resources problems are expected to be more complex in the future (Simonovic, 2000; Wurbs, 1998; Matondo, 2002 cited in Medema and Jeffrey, 2005). Water problems in the world are various significantly from the perspective of time, space, and pattern (Biswas, 2004). According to Matondo (2002), there are many factors that contribute to the complexity of water resources planning and management such as population growth, climate variability, regulatory requirements, project planning horizons, temporal and spatial scales, socio and environmental considerations, and trans-boundary considerations (Medema and Jeffrey, 2005). Therefore, there is an impression to examine a broad array of variables and their interrelationships as a system, because many land-based activities have implications for water flows and quality (Mitchell, 2004). As the result, a holistic approach is often promoted for water management, and leads to the emergence of integrated water resource management (IWRM). It can be seen from the explanation on the first of IWRM Principles by the Global Water Partnership (2000) that:

> "…holistic management not only involves the management of natural systems; it also necessitates coordination between the range of human activities which create the demands for water, determine land uses and generate water-borne waste products." (GWP, 2000)

According to Mitchell (2004), there are two different interpretations of a holistic approach, which are `comprehensive' and `integrative'. A comprehensive

interpretation emphasizes on the definition of relevant ecosystem in the broadest possible way, and seeking to identify and understand all variables and relationships. In contrast, an integrative interpretation focuses on what are considered keys or selected variables and relationships. Yet, analysts and planners can use both interpretations to obtain the benefits in a stage of development. Hereafter, Mitchell (1990) in Mitchell (2004) suggests that comprehensive perspective is desirable to be used at normative and strategic levels in an attempt to identify and consider the wide range variables that maybe significant for coordinated management of land and water systems. Meanwhile, at tactical or operational scales, an integrated approach is desirable to be exercised instead of comprehensive planning. The rationale for using an integrated approach is that it is more selectivity than a comprehensive approach, while it maintains the core characteristics of a holistic approach (defining a system, and examining variables and their connections) (ibid, 2004). Therefore, Mitchell (2004) evokes that the value of IWRM may be greater at the normative and strategic level and providing a framework for different types of approaches at the operational level (Snellen & Schrevel, 2004). The strengths and weaknesses of both approaches are described in **Table 1**.

Table 2.1 The potency of comprehensive and integrated interpretations of a holistic approach

	Comprehensive	Integrated
Strengths	Considers entire system, parts, and interrelationships	Retains systems perspective, but is more selective and focused
	Broader scope means less likely to overlook significant variables	Greater likelihood of completing analysis in a timely manner
	Most value at normative and strategic levels of planning	Most value at operational and tactical levels of planning
	Emphasizes scientific understanding of ecosystems	Encourages use of both scientific and local knowledge systems
Weaknesses	Implies possibility of understanding entire complex systems, and opportunity to control them through interventions, both of which are improbable	May overlook one or more key variables, which could lead to poorer understanding of ecosystems, and discrediting of analysis and subsequent plan
	Because of broad coverage, may take so long to complete that conditions or context change, making findings less useful	

Source: Mitchell, 2004

2.1.2 Context for Integrated Water Resource Management

Initially, the traditional water resources management was supply-driven water management (Al Radif, 1999), not integrated and sub-sectoral, lack of coordination among different water sectors, and lack of environmental needs. In addition, water management institutions focused on centralization and top-down approach that created inefficient governance and increased competition for the limited water resources (ESCWA, 2005). Afterwards, the worldwide movement towards integrated approaches and adopting the demand-driven approach to provide solutions for environmental problems has been a sign of a significant shift towards management which is focused on the sustainable use of natural resources. The first recognized international conference that recommended coordination among different water sectors is the UN Conference on Water held in Mar del

Plata in 1997. The recommendation in the Mar del Plata Action Plan is what today exists as one of the key IWRM issues, namely institutional arrangements.

> "Institutional arrangements adopted by each country should ensure that the development and management of water resources take place in the context of national planning and that there is real coordination among all bodies responsible for the investigation, development and management of water resources" (Mar del Plata Action Plan: Recommendation No. 2 on Policy, Planning and Management cited in Snellen & Schrevel, 2004, p. 5)

Among a number of international conferences concerning water resources management and sustainable development, there are some the most influential of international conferences that contribute to the development of IWRM. They are the International Conference on Water and the Environment (ICWE) in Dublin (1992), the Second World Water Forum in The Hague (2000), the International Conference on Freshwater in Bonn (2001), and the World Summit on Sustainable Development (WSSD) in Johannesburg (2002). The conference on water issues was sequenced in the Fourth World Water Forum in Mexico (2006). The latest forum emphasized the need for capacity building, good governance, and actions at the local level under the theme "Local Actions for a Global Challenge".

IWRM is often referred to the Dublin Principles, which are:

1. Water is a finite, vulnerable and essential resource which should be managed in an integrated manner;
2. Water resources development and management should be based on a participatory approach, involving users, planners, and policymakers at all levels;
3. Women play a central role in the provision, management and safeguarding of water; and
4. Water has an economic value, and should be recognized as an economic good.

The four principles concerns with involving the participations of all stakeholders, considering sustainable development and the physical aspects of water resources, emphasizing on the important role of woman in water management, and decision making at the lowest appropriate level (subsidiarity). However, the fourth principle has become a debate since a full "econominisation" of water resources may not suitable for countries with a Muslim, Hindu, or traditional Chinese background (Solanes and Gonzales-Villareal, 1999). Afterwards, water

professionals argued that the water development programs would sustain by taking into account the affordability and the issues of equity (Rahaman & Varis, 2005).

Although this concept in fact was not really 'new' (Biswas, 2004), a new paradigm is encapsulated in the IWRM concept by the Global Water Partnership, which is defined as:

> "…a process which promotes the coordinated 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."(GWP, 2000)

However, the definition of IWRM has attracted some criticisms by Fitzsimmons (1999), Odendaal (2002), Biswas (2004), and Van der Zaag (2005). Fitzsimmons (1999) cited in Mitchell (2004) argues that determining boundaries for ecosystems is usually challenging because there are no generally accepted rules regarding to spatial variables. Furthermore, Odendaal (2002) as cited in Medema and Jeffrey (2005) concludes that IWRM has never been clearly defined, nor has the question of how it can be implemented, such as whether the GWP definition is suitable for both developed and developing countries, what has to be integrated, and how to make IWRM operational for practice. The same expression is articulated by Biswas (2004) that the definition seems to be ambitious, broad, all encompassing and impressive. In addition, there are still vague definition of IWRM and different view on fundamental issues such as the aspects that should be integrated, the type of integration and the way to implement it, and the stakeholders. He further questions for the practicability of this definition in the real world and its implementation to improve the existed water management. Furthermore, Van der Zaag (2005) in his paper concludes that IWRM is a relevant concept, yet elusive and fuzzy concept, but it is an ongoing learning and a motivation to gain its clarity. Nevertheless, this concept inspires new generation of water managers and researchers to think beyond the scope and act creatively (Van der Zaag, 2005). A critic to Biswas's paper has been delivered by Mitchell. Notwithstanding Biswas is correct in criticizing the vagueness of IWRM concept, he considers only

operational management ('what will be') and disregards normative ('what ought to be') and strategic management ('what can be') (Mitchell, 2004 cited in Snellen & Schrevel, 2004).

2.1.3 How to Implement IWRM?

Historically, economic efficiency was the main objective of water resources management models. Since the evolvement of the concept and gradual international meetings in IWRM discussions, other objectives have been added, for instance regional income redistribution, environmental quality, and social well-being. Many water experts recognize the dimensions of complexities of water resources planning and management because there are many considerations, such as physical interactions of the ground and surface water systems, environment, politics, economics, sociological requirements (ESCWA, 2005). Those considerations must be integrated into a development plan, which is efficient, simple planning and operation models.

According to GWP (2000), there are three key strategic objectives, known as the three E-pillars of IWRM, which enable the translation of IWRM principles into the implementation (operational, planning, and monitoring) of IWRM at all levels. The three E-pillars of IWRM are (see **Figure 2.1**):

1. Social **Equity** (Social Sustainability): Water is a basic need. Thus, humans have the right and access to adequate quantity and quality of water resources for sustaining life. The social perspective is related to meeting the fundamental human needs that treats water as a public good. Therefore, the participation of stakeholders and society in planning and decision-making is important in ensuring the security of water as the societal acceptance.
2. **Environmental** and Ecological Sustainability: sustainable water use in the present must be managed in such a way that does not undermine the life support system, thereby the future generation will be able to use the same resource in the same way as the present generation.

3. Economic **Efficiency** (Economic Sustainability) of water use: Water is a scarce resource; therefore, water must be used with maximum possible efficiency. The issue of water pricing comes up from the economic perspective that encourages treating water as an economic value to attain cost recovery of water services. However, the institutional arrangement is needed to ensure the sustainability of infrastructure and institutions without jeopardize the equity principle.

The key objectives in IWRM form the basic principles for sustainable development, which aim to promote the integration of development and management of water, land, and related resources, in order to maximize the economic and social welfare without compromising the sustainability of environment. Thus, the integration has to occur both within and between the natural system and the human system (GWP, 2000). The integration of development and management in natural system is including the integration of freshwater and coastal zone management, land and water, "green water" and "blue water", surface water and groundwater, quantity and quality in water resources management, and upstream and downstream interests. However, the aspects of the human system integration, which are the integration of all stakeholders in planning and decision-making processes, the integration of water and waste management, and cross-sectoral integration in national policy development, must be taken into account. Therefore, to achieve these integrations, the existing institutional and legislative frameworks need to be reformed at all stages in the water planning and management cycle (Cap-Net, 2004).

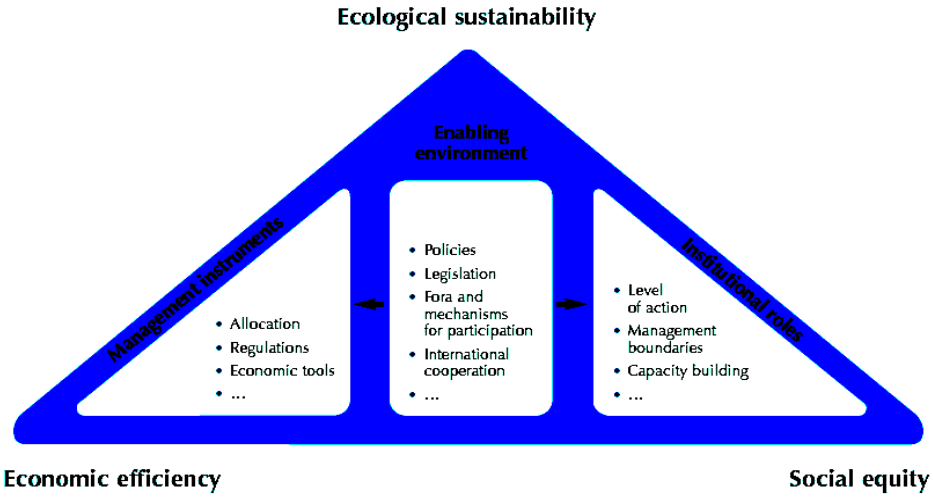

Figure 2.1 The Three E-Pillars of IWRM
Source: Global Water Partnership, 2000

Implementing principles and integration in IWRM requires redesigning institutional arrangements or policy reform (Mitchell, 2004). Thus, there are three key elements of IWRM as provided by Global Water Partnership (2000) to guide planners, managers, and decision makers in adopting the key objectives of IWRM into the implementation, which are (see **Figure 2.1** above):

- Moving towards ***an enabling environment*** of appropriate national policies, legislation and regulations and information for water resources management stakeholders;
- Putting in place ***the institutional roles*** and functions of the various administrative levels and stakeholders through which policies, strategies and legislation can be implemented; and
- Setting up ***the management instruments***, including operational instruments for effective regulation, monitoring and enforcement that enable the decision makers to make informed choices between alternative actions. These choices need to be based on agreed policies, available resources, environmental impacts and the social and economic consequences.

The elaboration of key elements in IWRM is provided in the Global Water Partnership Toolbox (see **Appendices 1**). For IWRM implementation, an enabling

environment of IWRM is the initial phase of an IWRM reform by establishing water policy. National governments have the responsibility for development of laws and adjustments to policies and legislation, and for appropriate reforms in the institutional framework to ensure that institutional and management systems contain the elements of the IWRM approach (GWP, 2006). This, however, requires the role of governments as regulators and controllers in the water sector with its associated infrastructures (Jønch-Clausen, 2004). Besides, the policies and actions must be coherent and consistent within a complex system to achieve effective water governance. Therefore, effective water governance must be open and transparent to build communication and to promote participation among the actors and stakeholders (Adeyemo, 2003). Jønch-Clausen (2004) further argues that governments together with civil society are working to raise awareness of the importance of better water resource management among the policy makers and the public.

2.2 Experiences from Other Countries

Although IWRM has been introduced and the guidance has been provided by GWP since several years ago, the best practice in managing water resources is still an ongoing learning process over the countries. Therefore, this sub chapter will elaborate the experiences from other countries in adopting the IWRM approach into their national policies. In this regard, Malaysia and Tanzania's experiences for the implementation of IWRM will be highlighted here.

2.2.1 Malaysia

IWRM was introduced in Malaysia in the early 1980s. It is marked by doing the first National Water Resources Study completed in 1982, and had been followed by the second National Water Resources Study completed in 2000. The studies assessed and updated Malaysia's water resources availability, formulated Master Plan for Water Resources Management and Development, and forecasted water demand for all users up to 2050 (Zakaria and Selamat, 2005). Before the economic crisis in 1997, the Malaysia's economic growth has been on the average

of 10%, which has brought rapid development in infrastructures, housing and industrial developments. Inline with the growth in population and expansion in urbanization, industrialization and irrigated agriculture that require water supply to generate its activities, water resources and environmental problems have been increasing. Moreover, since Malaysia is a federation of many states with many governmental departments and agencies at the federal and state levels, and land use and water management are the responsibilities of the federals and state, it seems logically that there are gaps and overlaps in the responsibilities for land and water management (ibid, 2005). According to Malaysia National Report, there are some key water issues regarding to both quality and quantity, and institutional and financial problems. They are water shortages, river pollution, flood, landslides, river sedimentation, poor integration and coordination among implementing agencies, lack of integrated institutional frameworks for water and land development and management, capital expenditures insufficient to meet estimated investment, and lack of effective cost recovery mechanism for sustainable water resources development (MNRE-NAHRIM, 2006). These problems disrupt economic activities, and harm to human and infrastructures. Although Malaysia has an outdated The Water Act 1920 giving guidelines for all federal and states in Malaysia, it needs to solve the water problems in an integrated manner. Therefore, Malaysia has taken some IWRM strategies to address the key water issues as reported in the Fourth World Water Forum (ibid, 2006), which are:

- Developing an arching national policies
- Reformation of government machineries
  - Ministry of Natural Resources and Environment – water as a resource
  - Ministry of Energy, Water and Communications – water as a utility
  - Ministry of Agriculture and Agro-based Industries – water for food
- Zoning/protecting catchment areas
- Capacity Building

Since IWRM was introduced in Malaysia, a number of workshops, conferences and forums have been organized. Reforms and initiatives have been taken

regarding to provide an enabling environment for effective and efficient implementation of IWRM. The following information is elaborated in the Malaysia National Report (MNRE-NAHRIM, 2006; Mohd. Nor M.D. and Atikah Shafie, 2005).

- **National Water Vision**

Malaysia has formulated its water vision, which is *"In support of Vision 2020 (towards achieving developed nation status), Malaysia will conserve and manage its water resources to ensure adequate and safe water for all (including the environment."* (MNRE-NAHRIM, 2006)

The key objectives of the Vision adopt the cross-sectoral integration between water use sub-sectors in IWRM, which are water for people, water for food and rural development, water for economic development, and water for environment.

- **National Water Policies**

To achieve the national water vision, specific water policy statements have been represented in Malaysia's official development plans to ensure the political and administrative endorsements of the integrated management of natural resources including water (MNRE-NAHRIM, 2006; Mohd. Nor M.D. and Atikah Shafie, 2005).

- The Economic Planning Unit of the Prime Minister's Department formulated development thrust for sustainable environmental development in the National Development Policy documents for the Third Outline Perspective Plan (OPP3) (2001-2010).
- The Eighth Malaysia Plan (2001–2005) provides one of the nine key strategies to adopt an integrated and holistic approach in addressing environmental and resource issues to achieve sustainable development. One major approach towards IWRM was the introduction of the concepts of river basin organization to manage water in a holistic manner, and form the Selangor Water Management Authority (SWMA) or *Lembaga Urus Air Selangor* (LUAS) as a pilot manager of river basin organization. In this

regard, the State Government of Selangor has passed the Selangor Water Enactment 1998 to manage water resources in Selangor.

– The Ninth Malaysia Plan (2006 – 2010) has similar focus to the Eighth Malaysia Plan on environmental stewardship. Beside that, IWRM approach is adopted to optimize water with the utilization of the integrated river basin management (IRBM), and an Integrated Coastal Zone Management Policy will be adopted to promote conservation and preservation of marine and coastal resources.

- **Development of National IWRM-related Plans**

The other national policies and plans within individual agencies and departments have been developed supporting IWRM, such as the National Physical Plan, the National Economic Recovery Plan, the Industrial Master Plan, the National Agriculture Policy, the National Environmental Policy, the National Environmental Policy, the National Energy Policy, the National Forestry Policy, the National Wetland Policy, the National Bio-Diversity Policy (Zakaria and Selamat, 2005). Beside that, a number of major studies concerning IWRM have been carried out, such as the National Water Resources Study 2000-2050 (Peninsular Malaysia), and the National Study for the Effective Implementation of Integrated Water Resources Management in Malaysia (2005-2006) (MNRE-NAHRIM, 2006).

- **IWRM Workshops and Capacity Building**

An effective and efficient implementation of IWRM requires an enabling environment and capacity building. There are many IWRM-related workshops and seminars have been held in Malaysia as part of creating an enabling IWRM environment, such as the National Conference on Sustainable River Basin Management in Malaysia (2000), the Regional Forum on Capacity Building for Integrated Water Resource (2002), the 1st Malaysia Water Forum (2004), and the National Dialogue on Water Financing (2005).

Furthermore, there is still lack of IWRM awareness of all stakeholders, in particular lack of commitment to do anything about it due to no opportunity to

perform any water-related programs. Hence, the important issue is to connect them with the planners and implementers of water projects in the country. Beside that, in terms of creating awareness and building IWRM capacity among the water-related sectoral agencies in Malaysia, the Malaysian Water Partnership (MyWP) plays an important role by organizing a number of IWRM Training-of Trainers (TOT) workshops and other training programmes. In addition, although there are no IWRM specific courses on preliminary and intermediate education level, IWRM is taught as a subject at the tertiary level.

- **Monitoring Programmes**

There are some monitoring programmes related to water resources that have been implemented in Malaysia, such as National River Water Quality Monitoring Programme within 120 river basins, the National Marine Water Quality Monitoring Programme, the Island Marine Water Quality Monitoring Programme involving 71 selected islands, and the National Groundwater Quality Monitoring Programme.

According to Malaysia National Report, although the sectoral policies, strategies and action plans are now increasingly been formulated to incorporate the principles of sustainability, the water resources management is still sectoral-driven. Therefore, there is an effort to simplify the coordination of individual sectoral policies, strategies and action plans, into an integrated national IWRM strategic implementation and action plan by forming a joint National IWRM coordinating committee as Water Resources Council. Through the formation of this committee, the relevant agencies can be facilitated in adopting economic instruments as part of the strategy to move towards the desired 'total cost' paradigm (MNRE-NAHRIM, 2006).

In brief, Malaysia is under reform in implementing IWRM by providing positive initiatives included in the key elements of IWRM, which are enabling environment, institutional roles, and management instruments. However, Malaysia still needs to update the Water Act 1920 to include the key elements of

IWRM and to be guidelines for water resources management in all over states in Malaysia. Moreover, capacity-building programme in implementation of IWRM in Malaysia can be a positive experience to be adopted in water resources management practice in Indonesia. Beside that, the experience of Malaysia in managing water resources within many states can be a valuable lesson learned for Indonesia inline with the decentralization and regional autonomy.

2.2.2 Tanzania

Water resources management in Tanzania is currently under reform (Mutayoba, 2002; Maganga *et al*., 2004). The change comes from the need to solve the emerging water management problems such as increasing demand for water and the need to protect and preserve the resource and its environment (Mutayoba, 2002). Besides, water resources in Tanzania have not been managed in a comprehensive manner, which is characterized by fragmented planning and management, lack of integrated approaches and conflicting sectoral policies which have contributed to increasing conflicts over water use (URT, 1995a in Maganga, 2002; Mutayoba, 2002). Moreover, the water right system is not well defined related to duration of water rights and amounts of water requirements by duration and season. It is clear that there is a need to a new approach of water resources management emphasizing on participatory, multi-sectoral and multidisciplinary, and the linkage between land and water use (Mutayoba, 2002). The emphasis of Integrated Water Resources Management (IWRM) in current water reforms in Tanzania focuses on the use of statutory legal systems to regulate the use of water resources. Tanzania has had the Water Utilization Act Number 42 of 1974 and its subsequent Amendments to regulate water resources management, but they are currently under reviewed (The Tanzania National Water Policy, 2002; Maganga *et al*., 2004). Nevertheless, Tanzania operates under a plural legal system. As the consequence, land and water resources are regulated by different pieces of legislation and institutions, including statutory law, customary laws of the 120-plus ethnic groups, Islamic law, etc (Maganga, 2002). However, Tanzania has stated in its National Water Policy of 2002 that conflicting water related laws and

regulations will be harmonized, and relevant customary law will be integrated into statutory law (The Tanzania National Water Policy, 2002).

Under the Tanzania Vision 2025, which aims at achieving a high quality livelihood for its people, attaining good governance through the rule of law and developing a strong and competitive economy, Tanzania revised its 1991 National Water Policy in 2002. The revised National Water Policy (NAWAPO) and reforms of existing laws, institutional framework and structures are aimed at meeting the objectives of this Vision. The revision of the policy has been done through a multi-stakeholder consultation following national and international socio-economic policy reforms in the 1990s (The Tanzania National Water Policy, 2002). The development of a comprehensive framework for sustainable development and management of the Nation's water resources by setting an effective legal and institutional framework for its implementation is the main objective of the revised Policy. It contains of three sections arranging three sub-sector issues, which are water resources management, rural water supply, and urban water supply and sewerage. In addition, the policy aims to promote the beneficiaries' participation in planning, construction, operation, maintenance and management of community based domestic water supply schemes. This policy focuses on cross-sectoral interests in water, watershed management and integrated and participatory approaches for water resources planning, development and management. Furthermore, the policy arranges the changing roles of the Government from service provider to that of coordination, policy and guidelines formulation, and regulation. Beside that, the medium term strategy for poverty reduction and indicators for measuring progress in Poverty Reduction Strategy Paper (PRSP) is another triggering factor to manage the resources in an integrated manner (The Tanzania National Water Policy, 2002).

According to the National Water Policy of 2002, there are six types of instruments and other measures that will be used in the implementation of the policy, which are:

1. Technical instruments are used to control water uses including construction the gate of abstractions, flow metering, and application of cleaner production technology.
2. Economic instruments include water-pricing, charges, penalties and incentives to be used to stimulate marketing mechanism, and serve as an incentive to conserve water, reduce pollution of water sources, and facilitate water allocations.
3. Administrative instruments include information management systems and monitoring, information products, water resources plans including water source protection plans, water resources models and decision support systems, various water resources guidelines.
4. Legal instruments include restrictions and all prohibitions imposed by the regulatory body and the Government. These are individual licenses for abstractions and their revisions, guidelines, discharge permits, codes of conduct, guidelines, standards, Environment Impact Assessments, and agreements, treaties and protocols for trans-boundary water resources.
5. Regulatory instruments include appropriate management structures and procedures. These procedures and criteria to be adopted include applications for and granting of permits, a clearly defined water right system, appropriate standards and guidelines that control water abstractions from water bodies, controls on specific technologies aimed at reducing water use or waste loads, control of discharge of waste products into water sources (in terms of quantity, quality, timing and location of discharges), and standards for water provided for specific uses or for goods or materials which are potentially polluting.
6. Participatory instruments include sensitization, community education, consultations and discussions.

In order to achieve the targets in the National Water Policy of 2002, Ministry of Water and Livestock Development (MoWLD) has completed the National Water Sector Development Strategy (NWSDS) 2005-2015. In this Strategy document, the way to implement the National Water Policy of 2002 is set out, and specific

actions regarding to the institutional and legislative changes are provided (Ministry of Water and Livestock Development, 2004).

In Tanzania, the current institutional framework is the responsibility of one central level Ministry in the Ministry of Water and Land Development (MoWLD) with full participation of all stakeholders in the decision making process. However, it is complex, both in law and in practice with a number of overlapping responsibilities (The Tanzania National Water Policy, 2002). Furthermore, IWRM in Tanzania is exercised within river basin concept by declaring Basin Boards in nine river basins, which are Pangani, Wami/Ruvu, Rufiji, Ruvuma and southern coast into the Indian Ocean, Lake Nyasa, Lake Rukwa, Lake Tanganyika, Lake Victoria, and the internal drainage basins of Lake Eyasi, Manyara and Bubu. However, at present, there are only five Basin Water offices and Boards in operation for Pangani, Rufiji, Lake Victoria, Wami/Ruvu, and Lake Nyasa Basin (Mutayoba, 2002). In addition, in implementing the Water Policy inline with Tanzania's Povery Reduction Strategy Paper, the RBM-Project has been organized to train about environmental flows and guidelines for conducting EIAs to Ministry staff (ibid, 2002). Further, according to the Tanzania's National Water Policy (2002), Tanzania is lack of data gathering networks due to lack of resources and tools and no unified and adequate coordinated information management for water resource management. Therefore, according to the National Water Sector Development Strategy (NWSDS) 2005-2015, the government establishes a Public Relations Unit in the Ministry responsible for Water in order to operate an effective education, information and communication framework for increased stakeholder and community knowledge of the Water Sector activities (Ministry of Water and Livestock Development, 2004). The monitoring programmes of water use and demand, and guidelines and mechanisms for EIAs and their enforcement are established in order to ensure the enforcement of environmental protection and conservation measures (Ministry of Water and Livestock Development, 2004).

In short, Tanzania is under water reform toward the implementation of IWRM. The government form is unitary state, but operates under a plural legal system for

water management due to diverse ethnics and traditions. Therefore, it needs to move to an integrated manner under the statutory legal. The Water Utilization Act Number 42 of 1974 and its subsequent Amendments to regulate water resources management need to be reviewed to include the key principles of IWRM as stated in the National Water Policy of 2002 and the National Water Sector Development Strategy (NWSDS) 2005-2015. However, the enforcement of those policies is more important at the implementation level. In this regard, Indonesia may take the lesson from Tanzania on how to manage water resources in dry climate and setting institutional arrangements in the framework of IWRM approach.

2.3 Concluding Remarks and Framework of Analysis

Based on theoretical review in this chapter about the concept of IWRM, it can be concluded that the water issues regarding to water availability, demand and supply, climate change, institutional arrangements and legal structures are increasing. These, therefore, need a paradigm shift from traditional management towards a new integrated approach and sustainable use of natural resources management that requires more participation, coordination among development sectors, financing and monitoring, and capacity building. An enabling environment by doing policy reform is needed in order to implement an effective water governance. Since there is no blue print for the concept of IWRM, the implementation of this concept tends to be different from one country to another. It is influenced by different characteristics of geographical condition, climate variability, type of government and administration system, institutional arrangements and legal structures, and cultural values.

Malaysia and Tanzania's experience confirm that the implementation of IWRM needs the reform of institutional arrangements and legal structures. Furthermore, the closeness of Malaysia to Indonesia makes its geographical and climate conditions are almost similar to those of Indonesia. Therefore, water resources issues regarding to physical problems are almost similar to the Indonesian context. Beside that, Malaysia as a federation of thirteen states has many governmental

agencies at state and federal levels, which govern the land and water management. Since the governmental administration in Indonesia is decentralization, the experience of Malaysia in adopting IWRM into its state and federals' policies may be a valuable lesson learn for the policy formulation at national and regional level in Indonesia. Furthermore, Tanzania has a similar type of government, which is the unitary state. However, Tanzania operates under plural legal systems due to various ethnic and traditional laws, and it is the institutional problem there. Indonesia can learn from Tanzania's experience in how Tanzania manages its pluralistic legal structure and deals with conflicts emerging from this system. Beside that, the climate in Tanzania tends to dry; hence, Indonesia can learn from the experience of Tanzania how to manage water resources in the dry area in Indonesia. The status of IWRM in Malaysia and Tanzania will be delivered in **Table 4.2** in sub chapter 4.5.

From the concluding remarks of this chapter, the next chapter of this study will discuss about the condition of water sector in Indonesia in. Afterwards, in chapter four, the analysis on the issues of Indonesia's water sector will be accomplished by focusing on the discussion about water policy. The key elements of IWRM, which are enabling environment, institutional roles, and management instruments, will be discussed by organizing them into some points: national water policies reflects the concept of IWRM, water law incorporates the principles of IWRM, organizations are in place at policy and implementation level, capacity building delivery systems for IWRM, and other aspects of IWRM implementation. The framework of analysis is provided in **Figure 2.2** as follows:

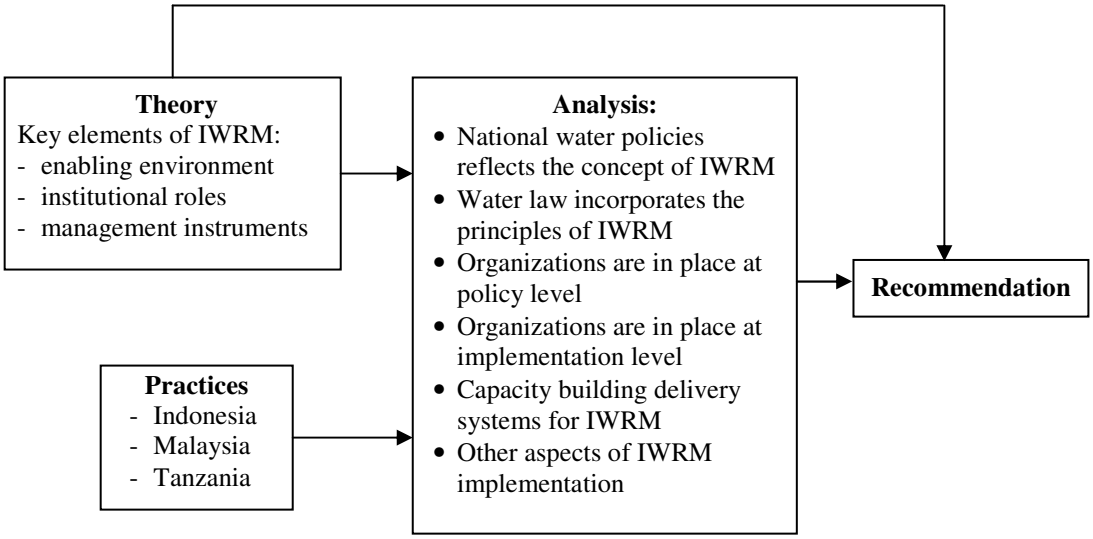

Figure 2.2 Framework of Analysis

Chapter 3
Water Sector in Indonesia

In this chapter, the author will elaborate the condition of Indonesia and its water sector. To understand the condition of water sector in Indonesia, it is necessary to recognize the geographical and climatic conditions in Indonesia. It is because water availability is diverse in the term of spatial and time. Therefore, the author will start with the explanation about geographical and topographical conditions of Indonesia. Furthermore, water resources in Indonesia and water-related problems are elaborated in the next section. Beside that, the historical review on the development of Indonesia's water resources is described to understand the evolvement of water policy during pre-reformation.

3.1 Geographical Condition

Indonesia is located between 60°02' north and 110°15' south latitude and from 940°45' to 1410°05' east longitude. Beside that, Indonesia consists of about 17,508 large and small islands where about 6,000 of the islands are inhabited. It is the largest archipelago nation covering the total land area about 1.92 millions square km and a total length of coastline of about 84,000 km (Directorate General of Water Resources, 2003; Anshori, 2005).

Being situated between two continents and two oceans, Indonesia is characterized by high temperature, high humidity and abundant rainfall, which is marked by two seasons, the rainy season from November to March and the dry season from April to October. Despite the abundance of water resources potency, the Indonesia's surface water resources have already experienced a shortage during the dry season, and flood events during the rainy season. It is because of the variability of its geographical and climatic conditions. Naturally, Indonesia has two different

kinds of climatic conditions. From Figure 3.1, in the western part of the climate divergence line, which is the Wallen line passing along Strait of Makasar, the climate is influenced by monsoon pattern with humid and dry conditions. Meanwhile, in the eastern part of the line, the climate tends to dry. Yet, to the east of Papua region, the climate is relatively humid. The variability of climatic conditions affects the pattern of rainfall and the quantity of flood hazard. Moreover, there are other factors such as *El Niño* and *La Niña* phenomenon and topographical and morphological conditions that influence the intensities of rainfall (Suhud, 2007). For example, the western part of the island of Java has moisture level higher than the eastern part of it. Besides, there are many areas suffering flood, but the others are experiencing water shortage. However, the areas that are frequently suffering flood can experience a shortage as well.

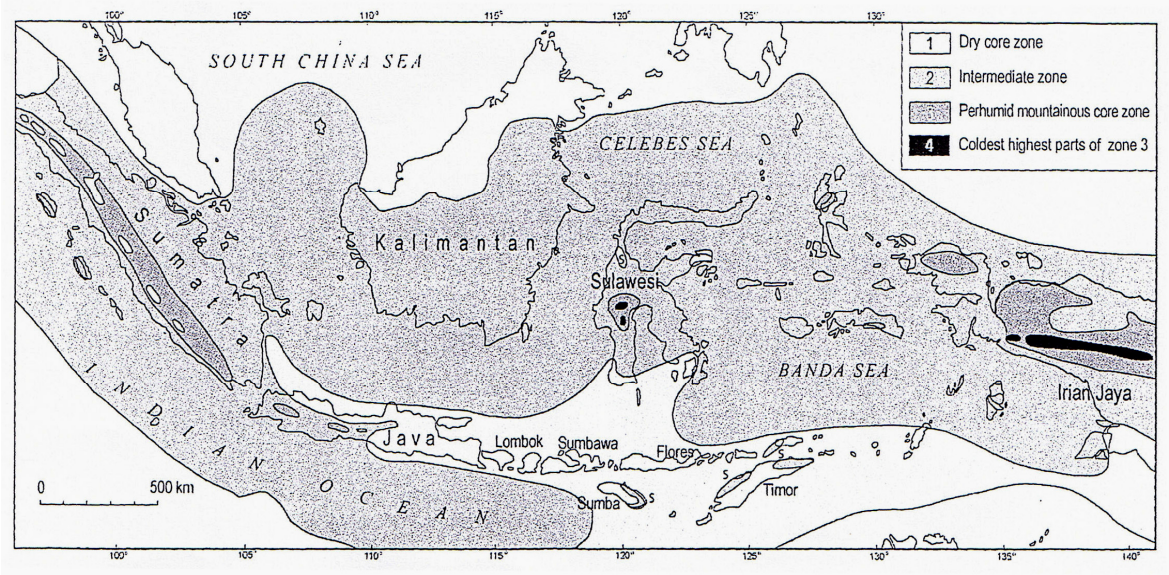

Figure 3.1 Climatology Zone in Indonesia
Source: Suhud, 2007

3.2 Water Resources in Indonesia

3.2.1 Water Resources Condition

Although Indonesia is the world's fifth largest nation in the term of water availability covering of 15,000 m^3 per capita per year and is blessed with abundant water resources, yet seasonal and spatial variation in the rainfall pattern

and lack of adequate storage create competition and conflicts among users. The mean rainfall in Indonesia is 2779 mm/year that flows as the surface water about 1832 mm/year and 278 mm/year as the groundwater (Directorate General of Land and Water Management, 2005). Although Indonesia has an abundance of rainfall, which 80% falls during the rainy season, variation in the rainfall exists over the country. It ranges from the very arid areas of Nusa Tenggara, Maluku and parts of Sulawesi Island (less than 1,000 mm) to very wet areas in parts of Papua, Java and Sumatra Island (more than 5,000 mm) (Directorate General of Water Resources, 2003). In addition, the annual renewal water resources are approximated about 3,085 km^3 while the estimated freshwater demand in 1990 was 1600 m^3/second. Notwithstanding the abundance of water availability, the water resources potential per capita varies spatially (see Figure 3.2). In the island of Java, it covers only 1580 m^3 per capita per year of water availability in 2001, and this amount will decrease to 1200 m^3 per capita per year in 2020 (Dikun, 2003). Meanwhile, there is 418,800 m^3 per capita per year of water availability in Papua and Maluku. The large variation in water availability may therefore be a limiting factor in the national development.

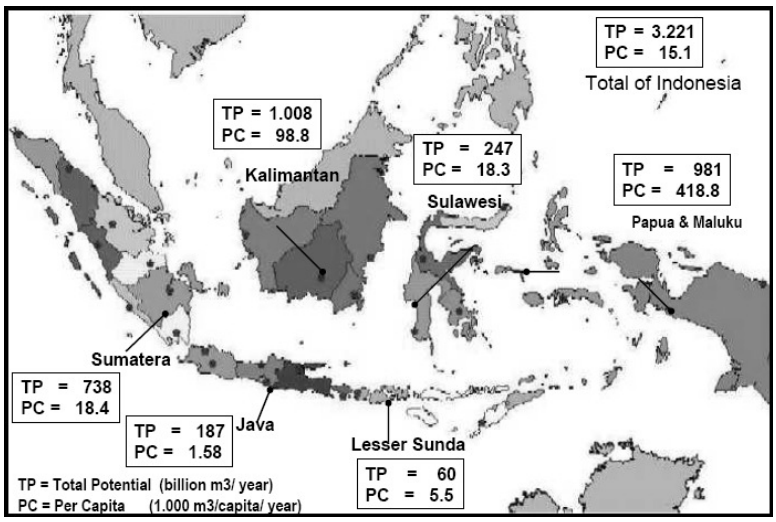

Figure 3.2 Status of Water Availability in Indonesia in 2001
Source: Anshori, 2005

Indonesia surface water potential is provided by over 5590 rivers, except for rivers in Kalimantan and a few rivers in Java, that many rivers are short with limited flood carrying capacity (Dikun, 2003; Directorate General of Water

Resources, 2003). The natural characteristics of most rivers are originated from volcanic mountains that have different bed slopes, which are steep, moderate and flat in upper, middle, and lower reach of watersheds. Because of high rainfall intensities and erosion at upstream, most rivers carry large quantities of sediment, which results in river regime problems such as sedimentation and flood at the lower reaches.

According to data from Directorate General of Water Resources (2006), those river basins are grouped into 133 river territories so-called *Wilayah Sungai* (WS). Those WS consist of 13 district WS at district/*kabupaten* level, 51 provincial WS at provincial level, and the remains 69 WS are consisting of 5 WS at crossing boundary of two countries, 27 WS at two or more provinces, and 37 WS under the authority of central government. This arrangement is intended to facilitate planning, development, management and administration.

The problems in some river basins are related to the availability of water resources in meeting demands to the current needs. It is because of the increasing of critical watersheds due to uncontrolled forest devastation, which degrades the carrying capacity of watersheds (Sjarief, 2003 cited in Dikun, 2003). Critical watersheds can also be found in Papua, Bali, West and East Nusa Tenggara that were not categorized as critical watersheds in 1982. The increasing number of critical watersheds can be seen from Figure 3.3 that has almost doubled every ten years. There were 22 river basins deemed in a critical stage in 1984, 39 river basins in 1992, 59 river basins in 1998, and 62 river basins in 1999 (Dikun, 2003). Moreover, the industrialization and urbanization also contribute to water quality degradation. In addition, groundwater potential in Indonesia is very limited and can support only part of the urban and rural needs for water supply while it provides irrigation water for limited areas. Hence, Indonesia is putting a greater emphasis on holistic approach, which requires an environmental sound in planning and management system of water resources.

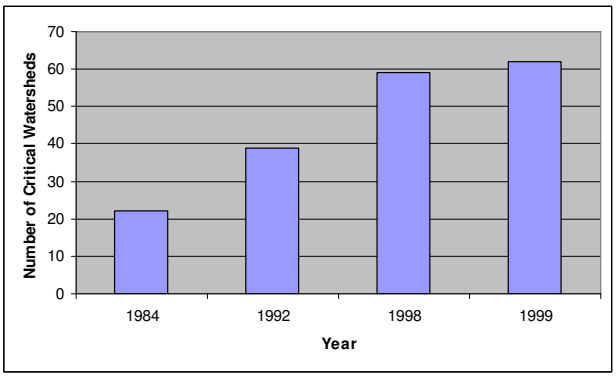

Figure 3.3 Numbers of Degraded Watersheds in Indonesia
Source: Sjarief, 2003 in Dikun, 2003

Despite the variations in water availability, the demand on water resources has rapidly increased inline with the development programs and the population growth. The total water demands in Indonesia are currently used for supporting irrigation, domestic, municipal and industries. About 70 percent of total water needs are consumed for irrigation purpose. Currently, over 5.5 million hectares is provided with technical irrigation, and another 1.6 million hectares is available as village irrigation (Anshori, 2005). Furthermore, it is expected that the water need for irrigation is 74.1 percent in 2020, while 11.34 percent for domestic, municipal and industries (DMI) purposes, 11.53 percent for maintaining the rivers and the remains for livestock and ponds (Department of Settlements and Regional Infrastructure, Directorate General of Water Resources, 2003 cited in Dikun, 2003).

The increasing of water demands is inline with the population growth, which Indonesia has the average annual population growth 1.49 percent during periods 1990-2000 (Statistics Indonesia, 2007). Based on Population Survey in 2000, Indonesia's population was 206.3 million which was spread over a number of islands. Furthermore, it is expected that with current growth rate of 1.66 percent, the population will grow to 250 million by the year 2020 (Directorate General of Water Resources, 2003). The growing population leads to an increasing demand for food and greater pressures on land and water. Beside that, Indonesia has

experienced rapid urbanization with more and more people living in towns and cities. Most of populations are concentrated in the island of Java and Bali, which make up only 7 percent of the total area of Indonesia, inhabited by 65 percent of total population (Dikun, 2003). Meanwhile, the water availability in the island of Java covers only 12 percent of total water availability in Indonesia. Therefore, the water use to support urban and rural needs in this island is likely to be greater than that in other islands. It explains that the water uses is highly constrained by unbalanced condition of demands and the potential availability of water, particularly during the dry season with extended drought. The projection of total annual water demand for each island in 2020 is shown in Table 3.1 as follows.

Table 3.1 Annual Water Demand and Estimated Natural Basic Discharge in 2020
Unit: MCM (million cubic meters)

Region	DMI	River Maintenance	Irrigation	Fishpond	Livestock	Total Demand	Estimated Natural Basin Discharge
Sumatera	2,630	2,733	15,992	1,275	155	22,766	482,173
Jawa & Bali	9,850	9,799	54,918	809	258	74,569	122,699
Kalimantan	768	820	3,643	753	29	6,014	556,700
Sulawesi	686	769	14,243	354	110	16,612	143,343
Maluku & Nusa Tenggara	406	444	5,526	40	69	6,485	45,909
Irian Jaya	107	124	48	0	2	281	496,422
Indonesia	14,401	14,670	94,370	3,213	623	127,277	1,847,246

Source: Directorate General of Water Resources, 2003.

The table above shows that 127 billion m^3 of 1,847 billion m^3 available water (estimated natural basin discharge) will be used for DMI, river maintenance, irrigation, fishpond, and livestock. The remains about 1,620 billion m^3 is available for other new developments of DMI, mining, and for agricultural uses. Nevertheless, the increasing in non-agricultural demand leads to the competition for water uses and the increasing conflict among water users, which further affects environmental, social and economic conditions. In order to support future development in water resources and to promote long-term water resources conservation and preservation, a number of policy instruments have been set up under the water sector reform for adopting an integrated approach to improve water resources management.

3.2.2 Water Resources Issues

There are some issues in Indonesia's water resources regarding to economic, environmental, and socio-cultural problems, which affect to the land development. According to Syamsi (2005), the problems of water management in Indonesia analyzed from the macro framework are pollution, environmental degradation, and the deterioration and ineffectiveness of legal structures, regulations, policies, and institutions. Furthermore, Anshori (2005) in his paper elaborates the water resources management issues and problems, which are related to physical and institutional problems. The water issues are discussed as below:

- **The capacity of water supply to meet water demands**

As discussed before that water availability varies in the perspective of time and space. Beside that, the high ratio of demand to supply on the island of Java (and Bali) and some parts of Sumatra and Sulawesi has become a major constraint. Another environmental degradation in watersheds is the extreme erosion in the densely populated watersheds due to the conversion of upland forests and coastal wetlands to agricultural use. Meanwhile, most demands are fulfilled by run-off-river schemes, which are subject to extreme fluctuation of river flow. The seasonal and annual variations create the problems on the availability of river water. The river flow in most basins is important in meeting demands during rainy season while it is shortages in the dry season. This condition adversely affects the irrigation and non-irrigation demands. Beside that, a number of reservoirs and dams have been constructed in major river basins, such as Citarum, Brantas, Serayu-Bogowonto, Bengawan Solo and others to meet demands. However, these developments are constrained by lack of good reservoirs site, high population densities and the social and economic costs of resettlement, ecological impact due to high rate of erosion and pollution problems, and other environmental issues.

- **Sustainable irrigation systems**

Sustaining irrigation for food production requires an effective irrigation operation and maintenance (O&M) program. However, the financial problems become the major constraint for efficient and sustainable irrigation since the funds are used

primarily for supporting staff and administration activities. Moreover, the current system of Irrigation Service Fees has failed due to lack of accountability of O&M's revenue and provision. The suspended maintenance culture together with periodically external-aided rehabilitation in Indonesia's irrigation operation and maintenance system has resulted in a costly short-lived irrigation system. In addition, the government's strategy to expand irrigation and swam reclamation need to be reviewed, particularly the intervention to the option of the most effective cost and environmentally sustainable.

– **Water pollution control deficiencies**

As the result of the development of economic activities, particularly in industrial sector, land and water issues have increased significantly. The spread of industries and manufacturing in and around urban areas have impact to the environment and the health and welfare of surrounding communities. Although industrial water pollution control has been addressed through programs like PROKASIH (Clean River Program), stronger enforcement of the national discharge standards is still needed for each economic sector. The municipal waste disposal and treatment has received little attention and funding because of some difficulties related to financing, cost recovery and human resources. It, therefore, needs institutional and organizational arrangements and financial scheme for municipal waste disposal and treatment. Attention also needs to be given to water conservation and water pollution caused by mining and non-point sources of pollution.

- **Municipal and industrial water supply**

A number of different agencies and organizations undertake the supply and distribution of water for domestics, municipals and industrials use. The various water supply providers are regional drinking water supply company (PDAMs), formal private sector, informal sector-small scale private providers and by individuals. Meanwhile, only 37.3 percent of total urban population get adequate access to water supply comprising of 16.2 percent with piped water and 21.2 percent with non-piped water but protected supply. According to the projection of water demands, the consumption of water by households and industries will grow

rapidly and will reach an amount to about 30 percent of total demands by 2020. In order to support continued rapid growth and improvement in human health and welfare, however, these needs will have to be met. It requires a shift of water supply in the dry season from agriculture to municipal and industrial use. Such diversions have already undertaken, but greater attention in the process of water allocation is needed to minimize both the social and economic costs for farmers and the disruption to food production.

- **Institutional deficiencies**

Beside physical problems, Indonesia also faces several institutional deficiencies in Indonesia's water resources management, such as:

- In water allocation priorities, the government has set general priorities for domestic use, agriculture, industry and electric power generation, sport and recreational, environmental, etc. Yet, neither these general priorities clarify the allocations amongst specific users, nor do they set priorities under long term and emergency shortages. It is because of inadequate economic, social and environmental criteria for water allocation.
- Service and access to safe drinking water are available to only part of the population. Although goals for expanding the service exist, limited funding becomes the major constraint to obtain these goals. The quality of raw water supplies from particular rivers is deteriorating due to urban and industrial effluent being discharged into rivers. Remedial programs are slow in implementation. Moreover, there is lack of adequate measures to promote effective waste management, such as pollution charge or enforcement of standards. It is also because legal provisions requiring payment of bulk irrigation water and effluent discharge are not implemented.
- Financial responsibilities are integral to a country's institutions. However, there are many questions left regarding to water pricing, such as for what aspects of resource development and management that society should pay, kind of activities that should be subsidized, and kind of facilities and responsibilities that government should transfer to the beneficiaries who pay for the service.

In addition, Amron (2000) notes some institutional problems in water resources management as cited below:

- Target and sectoral approach in development process creates inter-sectoral gap and tends to lessen the synchronisation amongst sectors, such as forestry, agriculture, industry, and irrigation. It is because of poor coordination among government agencies and few economic incentives to encourage inter-government cooperation and action.
- Top-down and centralistic management to meet the target leads to reducing creativity and capability of region and society.
- The role of government as provider and society as beneficiaries does not trigger the participation and inclusiveness of all stakeholders in the development process.
- There is lack of capacity to accommodate the need of society in anticipating the change of water demand and land use. It is because institutions for policy formulation, investment planning, governance, management, strategic allocation of scarce resources and water pollution control are weak.

3.3 The Past Development of Water Policy

The policy concerning water resources in Indonesia has been begun since the Colonialism era by issuing *Algemeene Water Reglement* (AWR) in 1936. This Law was followed by *Algemenee Waterbeheersverordening* in 1937 and *Provinciale Water Reglement* for West Java and East Java in 1940. After the Independence Period, those laws were being used according to the transitional Constitution Law of 1945 (Dikun, 2003). Furthermore, in the New Order era, the implementation of water policy had been put in the first, second, third, fourth, fifth and sixth Five-Year Development Plans what so-called *Pelita*, as follows (Dikun, 2003; ICID, 2003):

1. First *Pelita* (1968 – 1973): The development initiative was focused on the increasing of food production. Therefore, the development activities were directed to the program of rehabilitation and improvement of irrigation

systems to support this priority. In addition, infrastructure development of new irrigation schemes was also undertaken. As the result of the program of rehabilitation and improvement, Indonesia produced 13.8 million metric tonnes at the end of the First *Pelita*.

2. Second *Pelita* (1973 – 1978): The development initiative of water resources was focused on supporting efforts towards self-food sufficiency, securing the farming areas, and supporting transmigration program and industrial development. In this period, the Law Number 11 Year 1974 concerning Water Resources as the legal policy in water sector was stipulated.
3. Third *Pelita* (1978 – 1983): The initiatives of development in second *Pelita* were continued in this period and strengthened by other water policies, such as the Government Regulation Number 22 Year 1982 concerning the Arrangement of Water Resources and the Government Regulation Number 23 Year 1982 concerning Irrigation.
4. Fourth *Pelita* (1983 – 1988): A major initiative was taken to support transmigration and regional development through the construction of the new systems in less developed regions. In parallel with this, conservation of forest, land and water was incorporated as a separate program within Directorate General of Water Resources Development (DGWRD). A major program of tertiary development, provision of drainage infrastructure and small and medium scale irrigation was also started during this time.
5. Fifth *Pelita* (1988-1993): Inline with the development initiative towards advanced industry supported by powerful agriculture, the water resources development was directed as balancing support to such initiative. In this period, the government issued other policies to implement the Law Number 11 Year 1974 concerning Water Resources, such as the Government Regulation Number 20 Year 1990 concerning The Control of Water Pollution, the Government Regulation Number 27 Year 1991 concerning Swamps, and the Government Regulation Number 35 Year 1991 concerning River Basin.
6. Sixth *Pelita* (1993 – 1998): Policy reform on irrigation development and management in sixth *Pelita* was focused on to keep achievement of self-food

sufficiency by increasing operation and maintenance the irrigation schemes, finishing some and on-going projects, rehabilitating schemes, and to support the development of advanced industry. Furthermore, in this period, the Government has been introducing a bottom-up approach system for the development by setting the Coordination Forum among inter-related institutions at national level to ensure the integration of water resources management for sustainable development. Entering the crisis period at the end of sixth *Pelita*, the government kept investing in the development of water resources infrastructures in order to support the security of national food production.

Beside that, some traditional practices in irrigation and water resources development have been done in some areas in Indonesia according to the local culture and their customary laws. For mentioned, there are *Subak* in Bali and in some parts of Lombok Island; *Keujreun Blang* in Aceh; *Tuo Banda* in West Sumatra; *Raja Bondar* in North Sumatra; *Mantri Siring* in South Sumatra; *Ili-ili* in Lampung; *Mitra Cai* in West Java; *Dharma Tirto* in Central Java; *Ulu-ulu Desa* in West Java; *Malar* in Sumbawa; and *Tudung Sipulung* in South Sulawesi (Dikun, 2003; Directorate General of Water Resources, 2003). Although those traditional practices have been administered in Water User Association (WUA)/*Perkumpulan Petani Pemakai Air* (P3A), the irrigated agriculture practice of Subak still exists in modern practice of irrigation in Indonesia.

3.4 National Water Resources Policy Reform

Since the early 1990s, the Government of Indonesia (GoI) has started to promote the need of integrated water resource management in the future. It was marked by the arrangement of some seminars by some interest groups. For instance, National Development Planning Agency (BAPPENAS) had held an international seminar about Integrated Water Resource Management for Sustainable Use in Indonesia in 1992. Furthermore, Department of Public Work had also held a national symposium about Water Resource Management in 1993. The results of those

seminars are followed up by changes in development programs of water resources by considering some aspects, such as conservation, the utilization of water resources, and control of damaging power of water resources. In order to prepare for the Second Long-Term Development Program, BAPPENAS and Department of Public Work started to arrange some seminars on water resources involving some relevant institutions, academicians, and non-governmental organizations. Those seminars have recommended several changes in institutions, regulations, and management system regarding to Water Resources (Directorate of Water Resources and Irrigation, 2006).

Furthermore, the monetary crisis in 1997-1998 has pushed the government to seek for loans that are Quick Disburse to relieve the negative national balance account at that time. Related to this case, the World Bank offered a program of *Structural Adjustment Loan* (SAL) to the Government of Indonesia with the requirement that there should be some structural changes in institutions, regulations, and management of a sector. Initially, in the name of NATSAL *(Natural Resources Structural Adjustment Loan)*, this program was related to the sectors of Forestry, Agriculture, and Water Resource. In the preparation process, NATSAL was changed to AGSAL (*Agricultural Structural Adjustment Loan)* and *FORSAL (Forestry Structural Adjustment Loan).* Further, it was changed to WATSAL that was only related to water resource sector. In order to obtain the WATSAL program, the Head of BAPPENAS formed a work group for Policy Reform in Irrigation Sector (*Pokja Reformasi Kebijakan Sektor Pengairan*/RKSP) consisting of institutions related to water resources in 1998. The comprehensive reform in the national water resources and irrigation sector was announced in the form of Letter of Sector Policy Reform (Policy Matrix) from the Government of Indonesia to the World Bank in April 1999. The main agenda of *Water Resources Sector Adjustment Program* (WATSAP) was to amend the Law Number 11 Year 1974 concerning Water Resources. Beside that, another agenda was to assess and renew its implementing regulations, such as Government Regulation on Water Resources Management Number 22/1982, Government Regulation on Irrigation Number

23/1982, Government Regulation on River Number 35/1991, and Government Regulation on Swamp Number 27/1991 (BAPPENAS, 2001). Furthermore, considering the physical and institutional problems in the water sector, Indonesia amended this law based on some triggering factors, such as decentralization of national administration to the regions, the global principles of sustainable development and MDG target to clean and safe water, the principles of IWRM expressed in IWRM Toolbox, the need to balancing the water use and conservation, the national reform principles as mandated by the People's Consultative Assembly (MPR) Decrees, and anticipating the global trend towards the commercialization of water resources (Syamsi, 2005).

3.5 Concluding Remarks

Derives from the description of water issues above, it can be summarized that Indonesia's water resources sector still faces increasingly complex long-term investment challenges and management problems, such as legal structures, regulations, policies and institutions. The problems arise from the adverse impacts of population growth, urbanization and industrialization. Unless effectively addressed, it will become a major constraint to the national economic development and food security. Although Indonesia has stipulated the Law Number 11 Year 1974 concerning Water Resources and other related regulations, environmental and institutional problems were continued to exist. Therefore, it is essential that the government adopt a more holistic approach and reform the sector policies by setting an effective institutional framework, improving planning and management systems, and promoting participation. In the next chapter, the author will analyse the reform on Indonesia's water policy and efforts in implementing the Integrated Water Resources Management.

Chapter 4
Implementation of Integrated Water Resources Management in Indonesia

In this chapter, the author will discuss about the implementation of Integrated Water Resource Management (IWRM) in Indonesia's water sector, which derives from the theoretical review and based on information about the case study in previous chapters. As elaborated in Chapter 2, that there are three key elements that must be considered in implementing IWRM, which are an enable environment, the institutional roles, and management instruments. In this analysis part, the author will focus on the discussion about water policy in Indonesia, as a part of creating an enabling environment for the effective implementation of IWRM. The author will analyze the status of IWRM in Indonesia and to what extent this concept has been adopted into Indonesia's water policy.

4.1 An Enabling Environment of IWRM in Indonesia

Having explained in the previous chapters that the water resources problems related to physical and institutional problems are increasing. Therefore, the world has undertaken some efforts to solve these problems by organizing some international meetings, which result an integrated approach so-called IWRM. Indonesia is also facing these problems, and needs to shift from sectoral and top-down approach and supply-driven management to an integrated approach of water resource management. Although Indonesia has had the Law on Water Resource Number 11 Year 1974, it could not accommodate the growing problems and the transformation of paradigm. The recent developments have to consider environmental aspect, more integrated, and adjust to demand-driven management. Beside that, the role of government has to change from the service provider to the enabler and as the facilitator of public and private participation (Amron, 2000).

Therefore, an effective IWRM requires for water policy reform. Indonesia has made some efforts to create an enable environment in adopting IWRM into its water policy through among other seminars (as described in sub chapter 3.4), Indonesia Water Forum I (2000), and Indonesia Water Forum II (2002). In Indonesia Water Forum I in 2000, the agreement of vision on "**An efficient and effective sustainable water use for the welfare of the people**" and positive commitment on government policy reform to adopt IWRM have been achieved. The Vision is enlightened into five missions, which are: (1) sustainability of water resources conservation; (2) adjusting water use for multi-purpose need to fulfill quality and quantity; (3) control of the destructive force of water; (4) empowerment and improvement of public, private, and government in water resource management; and (5) the improvement of transparency, data availability and information system of water resources management. The Vision has been promulgated in Decree of Minister Coordination of Economic Number KEP-14/M.EKON/12/2001 concerning The Direction of National Water Resources Management Policy. Furthermore, Indonesia Water Forum II in 2002 declared the establishment of Indonesia Water Partnership (IWP) as national networking for all water resources stakeholders in Indonesia, and recommendation about policy and strategy for the future flood mitigation and management (Partowijoto, 2004).

4.1.1 National Water Resources Policy

As described in sub chapter 3.4, the comprehensive reform in the national water resources and irrigation sector was announced in the form of Letter of Sector Policy Reform (Policy Matrix) in 1999, which contains of the required reformation of institutions, regulations and water resources management. The matrix is organized into four national water resources and irrigation reform objectives (BAPPENAS, 2001), which are:

1. Objective 1: Improving the national institutional framework for water resources development and management with some sub objectives, such as establish a national water resources management coordination framework;

adoption of a national policy for water resources management; involvement of private sector in development and stakeholders in basin management policy and decision-making; improve national water resources information and decision support systems; and improve national hydrological and water quality data collection and management system.

2. Objective 2: Improving the organizational and administrative framework for river basin management with some sub objectives such as improve provincial regulatory management of river basins and aquifers; develop sustainable corporate framework for management of strategic river basins; and introduce secure, equitable and efficient water allocation.
3. Objective 3: Improve regional water quality management regulatory institutions and implementation containing some sub objectives, which are establish an effective and enforceable national regulatory framework for water pollution control; and integrated water quality management implemented in six highly developed river basins.
4. Objective 4: Improve irrigation management policy, institutions and regulations with sub objectives are improve irrigation governance, transparency, and accountability through farmer empowerment and management transfer; improve regional government irrigation services; and ensure fiscal sustainability and efficiency of O&M and rehabilitation of irrigation schemes.

This Water Resources and Irrigation Policy Matrix, as part of the Letter of Sector Policy, obviously proposed to revise Law Number 11 of 1974 on Water Resources and its various implementing regulations. The reform policy is intended to conform to regional autonomy and fiscal legislation. It also proposed for the establishment of a national apex body for water resources and for the participation of non-government stakeholders in policy and decision-making in provincial, basin and district water resources councils. Moreover, it is indicated in the Policy Matrix that the government to be formally adopted the National Water Resources Policy (NWRP) and NWRP Implementation Plan as binding on all ministries and

organizations having water resources management functions (including surface water, groundwater and water quality from upper watershed to lowland and coastal areas) (BAPPENAS, 2001). As stated in the Policy Matrix (BAPPENAS, 2001; Anshori, 2005; Syamsi, 2005), the NWRP would include policy principles to guide legislative, institutional and regulatory interventions that:

1. Introduce **a water use rights framework** for surface and groundwater water allocation and utilization conducive to economic and social development, equity and environmental sustainability
2. Improve **efficiency in the utilization of water**, particularly for irrigation
3. Facilitate **conjunctive allocation and use of surface and groundwater** through a unified licensing mechanism
4. Seek attainment of **regional surface and groundwater water quality levels conducive to national socio-economic development and environmental sustainability**, and **compatible with both Spatial Land-Use and Basin Development Plans**
5. Develop institutions for prioritized, **integrated spatial and river basin planning processes based on participatory** involvement of stakeholder representatives in publicly transparent water resources and irrigation decision-making activities
6. Strengthen the **enabling mechanisms for community management and financing of irrigation networks, municipal water supply and sanitary wastewater disposal**
7. **Establish a monitored planning, programming and budgeting system** for prioritized and sustainable water resources development investment and management under the new legal framework for regional autonomy and related national revenue sharing
8. **Create a regional water resources regulatory and management structure** to support and **implement integrated river basin management under the principle "One Basin, One Management"** through Provincial Basin Management Units and, wherever feasible, the self-financing entities can become corporatization under Regional Government control

9. Reinforce the **principle of beneficiary contribution** towards the government costs of public water supply and irrigation services, and the principle of **"Polluter Pays"** for the public costs of water pollution abatement applicable to all pollution sources including publicly owned entities and municipal authorities
10. Improve the **regulatory and incentive framework for private sector participation and partnership** in water resources and water quality management, as well as irrigation management through investment, operating and maintenance concessions
11. **Improve coordination** between forestry, agriculture, conservation and water resources sector public and private activities to promote environmentally sustainable watershed, floodplain and estuarine management
12. Establish specific **integrated policies for environmentally sustainable wetland conservation and swampland development**

From the principles of policy reform above, there are several points **reflecting** the principles of the 1992 Dublin Water Conference, such as a paradigm shift of water resource management from supply to demand management, an integration administration among development sectors, conservation of water resources, involvement and participation of stakeholders, public and private sector, and 'polluter pays' principle. Another important point from this Policy Matrix is the implementation of integrated river basin management in Indonesia under principle "One Basin, One Management".

Furthermore, under Presidential Decree Number 123 Year 2001 concerning the National Coordination Team for Water Resources Management, the Minister Coordination of Economic as the head of the Coordination Team has issued Ministerial Decree Number KEP-14/M.EKON/12/2001 concerning The Direction of National Water Resources Management Policy. This policy contains of eight general outcomes that will be achieved from the national approach as follows:

1. Achievement of **synergy and conflict resolution amongst region and sector** in order to protect national security and future generation's need
2. Achievement of **integrated water resources management process based on river basin** with taking into consideration the national, provincial, and district' interest
3. Achievement of **balance of effort on water resources conservation and utilization** in order to realized the sustainable water use benefit for people prosperity in present and future generation
4. Achievement of **balance on social, environmental, and economic for water resources** in order to secure people basic need and optimize economics' value of water with taking into account the conservation effort
5. Improvement and development the **financial system/mechanism by applying principal on beneficiaries and polluters' pay the water resources management service cost**
6. Development of **water resources institutional system** in order to maintain the synergy amongst stakeholder
7. Improvement on **effectiveness of law enforcement** in water resources matter
8. Adjustment of **water resources institution in the terms of decentralization and regional autonomy**

Beside that, according to the Law Number 17 Year 2007 concerning the National Long-Term Development Plan 2005-2025 (*Rencana Pembangunan Jangka Panjang Nasional*/RPJPN) that stipulates the development vision in 2005-2025 "The Autonomous, Advance, Equitable and Prosperous Indonesia (*Indonesia Yang Mandiri, Maju, Adil dan Makmur*)", the government commits to manage natural resources and environment as national development assets. Therefore, to obtain this vision, the sixth of eight national development missions, "Achievement of the Harmonious and Eternal Indonesia (*Mewujudkan Indonesia asri dan lestari*)", is regarding to the improvement of the management of development process and conservation to achieve sustainability of natural resources (including forest, oceanic, water resources, and mineral) and environment.

In addition, to implement the Law Number 25 Year 2004 concerning System Planning for National Development, the Government of Indonesia has stipulated the Law Number 7 Year 2005 concerning the National Medium-Term Development Plan 2004-2009 (*Rencana Pembangunan Jangka Menengah Nasional*/RPJMN). The development and management of water resources are specifically focused in Chapter 33 of the National Medium-Term Development Plan 2004-2009. The integrated and sustainable management of water resources to address water problems is one of targets of water resources development. In policy direction of water resource development, this Plan indicates the need for institutional reform by changing the authority and responsibility of the respective stakeholders. In this regard, the water resources council and the irrigation committee should be established and strengthened. In addition, the formulation of various implementing regulations to enforce the Law on Water Resources Number 7 Year 2004 will be completed during this period. The Plan covers 5 programs for development of water resources, namely: (1) the program for the development, management, and conservation of rivers, lakes and other water sources; (2) the program for the development and management of irrigation networks, swamps, and other irrigation forms; (3) the program for the supply and management of raw water; (4) the program for the control of floods and safeguarding of coastal areas; and (5) the program for the reform of institutions and administrative aspects. However, the strategic and management plan for water resources management in Indonesia has not yet completed or in the stage of discussion among relevant stakeholders.

4.1.2 National Water Law

Based on the proposed reform in Letter of Sector Policy, hereby the Law on Water Resources Number 11 Year 1974 was amended to the new Law Number 7 Year 2004. The Law expresses that water resource is a gift from the Almighty God that provides benefits for the welfare of the entire people of Indonesia in all sectors. It is built from the concern to implement the mandate of the Indonesia's

Constitutional Law of 1945 article 33 paragraph (3), which has been amended four times during period 1999-2002, that:

> "The land and the waters as well as the natural riches therein are to be controlled by the state to be exploited to the greatest benefit of the people *(Air beserta sumber-sumber air dikuasai oleh negara dan dipergunakan untuk sebesar-besar kemakmuran rakyat)*"

In article 6, for the control of water resources by the state, the state guarantees the right of everyone to get water for fulfilling daily basic need and to carry out management of right on water. Government and/or regional government conduct control of water resources by still recognizing the local traditional rights and law while it does not contradict the national interest as well as the laws and regulations.

Water resources management in Indonesia shall mean the effort of planning, implementation, observation, and evaluation in regard to the conservation of water resources, the utilization of the water resources, and the control of the destructive force of water as expressed in Law on Water Resources Number 7 Year 2004 article 1 paragraphs (7), (8), and (9). Furthermore, the commitment of the Government to adopt IWRM is clearly expressed in:

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 as a social, environmental, and economic function that will be implemented and realized in a harmonious manner.

There are some points in this Law, which are:

- Securing water right, which means the right to obtain and to use or exploit surface and ground water, not the right to own and for trading in Chapter 1 article 1 paragraph 13-15
- The paradigm shift from social function to social, economic, and environmental function Chapter 1 article 4
- The role of central and local government (Decentralization or regional autonomy) in Chapter 2 article 14-19
- Water resources information system comprises information concerning the hydrological, hydro-geological conditions, water resources policies, water resources infrastructures, water resources technology, the environment of the water resources and its surrounding area, as well as the social, economical and cultural activities of the community relating to the water resources in Chapter 8 article 65-69
- Improving public participation (the principle of democratization) in Chapter 9 article 82-84
- Financial scheme of water resources management by the Government, regional government, state owned enterprises/regionally owned enterprises that manage the water resources, cooperatives, other enterprises, and individuals, either respectively or in the form of a cooperation in Chapter 10 article 77-81
- The establishment of Water Resources Council in Chapter 12 article 86-87
- Investigation that civil investigators with the Police Force of the Republic of Indonesia (POLRI) may be given special authorities as an investigator as referred to in the Code of Criminal Procedure in accordance to the prevailing laws and regulations in Chapter 15 article 93.

Those points are in accordance with the concept of IWRM with some adjustments to the condition of Indonesia. Nevertheless, in practice, there are many things mandated in this Law that are on going status or at to some degrees in implementation. For example, water right and water value as an economic good

are still debatable among Indonesian people since the view of water as a social good and a renewable resource still exist. Many people exploit surface and ground water inefficiently. In this regard, the public awareness must be improved by socializing the action of water saving. Moreover, the issue of water privatization must be taken into account by considering the equity principle, the right to access the water, and conservation. The Government as enabler must set an appropriate institutional setting, for instance by setting regulatory body and cross subsidies, to ensure that the water privatization will not harm marginalized and vulnerable people. Furthermore, the Law does not specifically arrange the role of woman as referred to the third principle of the Dublin Principles, instead of securing the water right for everybody. In fact, gender issues must be involved in decision-making process since woman plays the important role as water user. Therefore, the law enforcement and the implementation taking sides to the people (gender and vulnerable people) are necessary to address the potential emerging problems. Beside that, the law and other implementing regulations must be socialized to public, for example through media/press, to improve the awareness and supporting law enforcement.

Water Resources Organizations

4.2.1 Organizations at Policy Level

As explained in sub chapter 3.4 and sub chapter 4.1.1, the guidance of water policy reform was Letter of Sector Policy (Policy Matrix) to address water resources problems and structural deficiencies through policy, legislative and institutional adjustments. Beside the revision of Law on Water Resources Number 11 Year 1974, another proposed reform was the establishment of an inter-ministerial team (a Coordination Team) based on existing regulations for the formulation of water sector policy, guidance, strategic planning, inter-agency coordination and dispute resolution (BAPPENAS, 2001). Therefore, nine concerned Ministers have been formed in the Coordination Team based on Presidential Decree Number 9 Year 1999 concerning Establishment of

Coordination in the Policy of River Efficiency and River Basin Conservation, whose duties were based on the principle as follows (ICID, 2003):

- Management would be based on beneficial and sustainable principles for the welfare of the nation and its living environment.
- Consideration should be given to all habitat conservation and environmentally sustainable needs for all natural resources and living creatures.
- Where possible, corporate basin management organizations such as state owned enterprises (*Badan Usaha Milik Negara*/BUMN) and regional owned enterprises (*Badan Usaha Milik Daerah*/BUMD) should be utilized.
- Public, community, and NGO participation in basin management institution should be promoted.

Subsequently, the Government considered that the national water resources policy encompassing all governmental aspects needs the formulation of policy, coordination, and integrated action of inter-sector, inter-region and actors in order to maintain the sustainability of water resources. Therefore, the Government stipulated Presidential Decree Number 123 Year 2001 concerning the National Coordination Team for Water Resources Management. This Law was issued to correspond with the decentralization system marked by the issuance of Law Number 22 Year 1999 concerning Local Government, Law Number 25 Year 1999 concerning Fiscal Balance between Central and Local Government, and Law Number 25 Year 2000 concerning National Development Program (*Program Pembangunan Nasional/*Propenas) 2000-2004. The coordination team for water resources management is an institution of non-structural coordination, which has the responsibility to assist President in formulating national water resources policy and other policy instruments needed in water resources sector. This team is expected to become the embryo of the National Council of Water Resources (*Dewan Sumberdaya Air Nasional)* comprised of various ministers responsible for water resources development and management. Based on the Law on Water Resources Number 7 Year 2004 Chapter 12 article 86 paragraph (3), the

membership of the National Council of Water Resources consists of the governmental and non-governmental elements in an equal number based on the principle of representation.

Afterward, the Law Number 82 Year 2002 replaced the Law Number 123 Year 2001 in order to improve the task and function of Coordination Team for Water Resources Management by re-structuring the organization. The structure of the Coordination Team for Water Resources Management is:

Chairman (serve as member)	:		Minister Coordination of Economic
Vice-Chairman (serve as member)	:		State Minister of National Development Plan/Head of BAPPENAS
Executive Chairman (serve as member)	:		Minister of Settlement and Regional Infrastructure
Members	:	1.	Minister of Home Affair
		2.	Minister of Agriculture
		3.	Minister of Forestry and Plantation
		4.	Minister of Transportation
		5.	Minister for Energy and Mineral Resources
		6.	Minister for Fisheries and Maritime Affairs
		7.	Minister of Health
		8.	Minister for Trade
		9.	Minister of Finance
		10.	State Minister for Environment
Secretary I	:		Deputy of BAPPENAS for Means and Infrastructure
Secretary II	:		Directorate General of Water Resources

The Law on Water Resources Number 7 Year 2004 has mandated to establish the National Council of Water Resources (*Dewan Sumberdaya Air* Nasional) as assigned in Chapter 12 article 87 paragraphs (1):

> "Coordination at the national level shall be carried out by the National Council of Water Resources established by the Government…"

However, at present, the establishment of the National Council of Water Resources has not been realized yet or it is still under discussion in the National Coordination Team of Water Resources Management. What does make it so slow? It is supposed that there is still ineffective coordination among cross-sectoral stakeholders and different view in understanding the decentralization and administration system based on Law Number 22 Year 1999 concerning Local

Government (amended by Law Number 32 Year 2004) and Government Regulation Number 25 Year 2000 concerning Government Authorities and Autonomous Provincial Government Authorities. Hence, all stakeholders are still seeking for an appropriate form for the institutional framework of national water resources council. Therefore, coordination and consensus in water governance must be exercised, so that it does not create a new institutional problem obstructing the implementation of Law Number 7 Year 2004 concerning Water Resources.

4.2.2 Organizations at Implementation Level

The authorities of existing water resource management at provincial and basin level what so-called Basin Water Resources Management Coordination Committee (*Panitia Pelaksana Tata Pengaturan Air*/PPTPA and *Pelaksana Tata Pengaturan Air*/PTPA) have been set up to coordinate water allocation and water quality management (see Figure 4.1). Beside that, the Provincial River Basin Management Unit (*Balai* PSDA) authorities have been set up to strengthen water resources management in eight selected river basins. The roles, responsibilities, and functions of *Balai* PSDA are management of water allocation for several users, rivers, waterways, flood control and drought handling, swamps, in stream pollution control, estuary, and inter-district irrigation system (Anshori, 2005; Syamsi, 2005). The existing organization at district level to manage water and irrigation system is Water User Agency/WUA (*Perkumpulan Petani Pemakai Air*/P3A). Based on Law on Water Resources Number 7 Year 2004, the membership of water resources management committee at provincial, local and district level consists of government agencies and representatives of water users, whereas the central government authorizes the water resources management plan in the trans-provincial river basin, trans-national river basin, and nationally strategic river basin. However, the establishment of provincial and river basin territories (SWS) water resources council to replace the existing Water Resources Management Coordination Committee (provincial PTPA and basin PPTPA) is still waiting for the issuance of Presidential Regulation and Ministerial Regulation

(Directorate General of Water Resources, 2006). Meanwhile, clear task and role of central and regional government under regional autonomy are necessary to reduce the gaps or overlapping programs and authority. Moreover, the coordination, cooperation and integration among sectors at central and local level need to be enhanced.

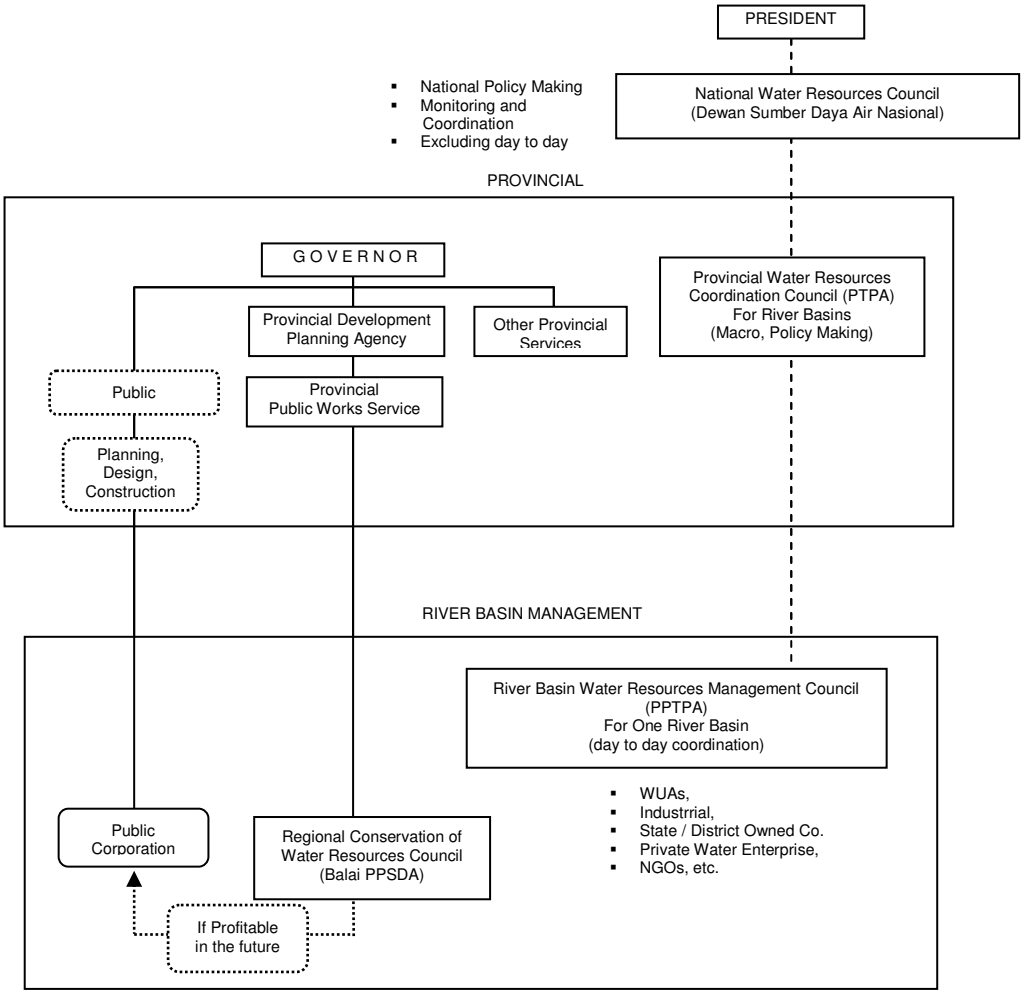

Figure 4.1 Organizational Structure of Water Resources Management
Source: Syamsi, 2005

In addition, the central government, based on existing legislation, has established the authorities in two developed and strategic river basins for national development, which are the *Jasa Tirta* Water Service Public Corporation in the Brantas River (*Perum Jasa Tirta I*) and the Citarum River (*Perum Otorita Jati Luhur*/PJT II). State-Owned Enterprises (*Badan Usaha Milik Negara*/BUMN)

manage these authorities, which are autonomous river basin management corporations. When the revenue and implementation capacity has achieved the desired value, they would be independent public corporations. Furthermore, the government has established another strategic river basin (Bengawan Solo River) to be managed by State-Owned Enterprises along the lines of PJT Brantas. In addition, the other four river basins (Jeneberang River Basin in South Sulawesi, Seputih-Sekampung River Basin in Lampung, Jratunseluna River Basin and Serayu-Bogowonto River Basin in Central Java) are in discussion between the Government and the four concerned regional governments for corporatization under State-Owned Enterprises according to the amended regional autonomy legislation (Anshori, 2005). However, the government has planned to strengthen the authority of PJT Brantas and *Perum Otorita* Jatiluhur.

4.3 Capacity Building in IWRM

According to UNDP, capacity building is:

> "…the creation of an enabling environment with appropriate policy and legal frameworks, institutional development, including community participation (of women in particular), human resources development and strengthening of managerial systems…" (Wikipedia, 2007)

In addition, UNDP acknowledge that it is a long-term and continuing process requiring the participation of all stakeholders, such as government agencies, non-governmental organizations (NGOs), water user groups, academics, business and professional associations, the community and others.

The effort to improve the capacity of institution at provincial and river basin management has been done through a program of Basin Water Resources Management Plan (BWRMP) financially supported by some international donor agencies, such as the World Bank, the Netherlands Grant, and Grant Aid from European Union (Anshori, 2005; Dikun, 2003). In addition, a networking Indonesia Water Partnership (IWP) has been established since Indonesian Water Forum II in 2002. IWP is a networking for all water resources stakeholders in Indonesia that has many work programs, such as: facilitating Indonesia Water

Forum every 3 years; supporting the government for public awareness campaign on water management, utilization and conservation; promoting integrated water resources management approach by motivating collaboration and consensus within national and international level; contributing to the formulation of water resources management policy and strategy; and providing information and communication services including advancement of knowledge and technology. As one of its programs, IWP is supported by GWP in performing the role as the facilitator for developing a National IWRM Plan with financial assistance from US Department of State (Partowijoto, 2004). Nevertheless, capacity building is a long-term program, so it must be enhanced to a sustainable and continuity program. The government and academics can start to include IWRM as a subject in university.

4.4 Other Aspects in IWRM

As an effort to support democratization in water resources management, it is necessary to enhance the transparency and access to information in the process of water resources management. The openness will trigger the participation of all stakeholders and public to involve in the programs of water resources management. However, it requires data availability and accurate information about water resources. The Law Number 7 Year 2004 regulates system information for water resources in chapter 8 article 65-69 that the central and local governments and various institutions can manage the water resources information system in accordance to their authorities to support the water resources management. The type of information that can be distributed consists of information concerning the hydrological, hydro-meteorological, hydro geological conditions, water resources policies, water resources infrastructure and technology, the environment of the water resources and its surrounding area, as well as the social, and economical and cultural activities of the community relating to the water resources.

The Sub-Directorate of Data and Information in the Directorate of *Bina Program* has prepared a five-year program to develop a Water Resource Management Information System or *Sistem Informasi Manajemen* (SIM). Based on this program, the Provincial Public Works (*Dinas PUP*) and the Provincial River Basin Management Unit (*Balai PSDA*) have been instructed to prepare their SIM Program, which is partly funded by Water Resources and Irrigation Reform Implementation Project (WISMP) fund. It is a grant from the Netherlands Government administered by the World Bank (Directorate General of Water Resources, 2006). Furthermore, to distribute the information concerning to water resources management, the government institutions or other agencies can use media, such as newspaper, television, radio, advertising, internet and other information and communication instruments. In addition, the public awareness on water crises can be enhanced through effective information and communication. The participation and active involvement of private sector, users, and NGOs is important in order to encourage all water users in Indonesia to become involved in conservation strategies. Beside that, the participation leads to increase the awareness of people, and to contribute to alleviate potential regional or national water crisis (Syamsi, 2005).

Furthermore, Indonesia consists of various ethnics and traditions. In the blessed of cultural diversity, the role of traditional water resources management has given significant benefit to water resources development in Indonesia. It is supported by the fact that water is used for agriculture as the major living in rural areas. There are a number of traditional practices of irrigated farming, as mentioned in **Chapter 3**, still exists in modern irrigation practice. The protection of traditional practices has been stipulated in Law on Water Resources Number 7 Year 2004 article 34 that the development of water resources in river basins is carried out by considering the uniqueness and aspiration of the region as well as the local community. It means that the state accommodates to the traditional management of water resources, which has special characteristic that can only be found in an area, and is benefit for nature as long as it is not contradictory to the laws and

regulations. Therefore, managing local wisdom is important to build local initiatives and to promote community-based management and development.

Financial sources for water resources management may come from the government, regional government, and state owned enterprises/regionally owned enterprises that manage the water resources, cooperatives, other enterprises, and individuals, either respectively or in the form of cooperation, and international donor agencies. Since the Government of Indonesia has financial limitation for development and management, the Government should be creative in finding alternative financial sources, for example by promoting public private partnership (PPP), Debt Nature Swap (DNS), grant etc.

The analysis on Indonesia's water policy is provided in the table below. It describes the status of IWRM in Indonesia with some elements of the implementation, which are: (1) national water policy reflecting the concept of IWRM; (2) water law incorporating the principles of IWRM; (3) organizations prepared for IWRM at policy level; (4) organizations are in place at implementation level for IWRM; (5) capacity building to deliver the concept of IWRM; and (6) other aspects in IWRM implementation such as information and data availability, financial scheme, and traditional practices based on cultural and local wisdom.

Table 4.1 Status of IWRM in Indonesia

Implementation of IWRM	Status	What Activities underway/planned/key actions
1. National water policy reflects the concepts of IWRM	There are some water policies guiding water policy reform: Letter of Sector Policy Reform (Policy Matrix) containing of the required reformation of institutions, regulations, and water management; Decree of Minister Coordination of Economic No. KEP-14/M.EKON/12/2001 concerning The Guidance of National Water Resources Management Policy; the Law No.	Need to form a water resource management plan or strategic plan

Implementation of IWRM	Status	What Activities underway/planned/key actions
	17/2007 concerning the National Long-Term Development Plan (RPJPN) 2005-2025; Presidential Regulation No. 7/2005 concerning The National Medium-Term Development Plan (RPJMN) 2004 - 2009	
2. Water Law incorporates the principles of IWRM	The Law No. 7/2004 concerning Water Resources	Need for law enforcement and implementation (sensitive to gender and vulnerable people)
3. Organizations are in place at policy level for IWRM	On going; the National Council of Water Resources (*Dewan Nasional Sumberdaya Air* /DNSA) is in the process of being formed. However, the establishment of a Coordination Team from nine concerned Ministers has been formed based on Presidential Decree No. 9/1999 concerning Establishment of Coordination in the Policy of River Efficiency and River Basin Conservation. After that, the National Coordination Team for Water Resources Management was established based on Presidential Decree No. 123/2001 (amended by Presidential Decree No. 83/2002 concerning The Amendment of Presidential Decree No. 123/2001).	Establishment of the National Council of Water Resources (*Dewan Nasional Sumberdaya Air* /DNSA) reflecting the Law on Water Resources is in discussion among relevant stakeholders. Therefore, coordination and consensus in water governance must be exercised. Support from all stakeholders is necessary. The activity is stakeholder meetings.
4. Organizations are in place at implementation level for IWRM	The authorities of water resource management at provincial and basin level (*Pelaksana Tata Pengaturan Air*/PTPA and *Panitia Pelaksana Tata Pengaturan Air*/PPTPA) and district irrigation management committee (WUA). However, the establishment of provincial and river basin territories (SWS) water resources council to replace the existing Water Resources Management Coordination Committee (provincial PTPA and basin PPTPA) is still waiting for the issuance of Presidential Regulation and Ministerial	The clear task and role of central and regional government under regional autonomy are necessary to reduce the gaps or overlapping programs and authority. Need to enhance coordination, cooperation and integration among sectors at central and local level.

Implementation of IWRM	Status	What Activities underway/planned/key actions
	Regulation. The establishment of the Provincial River Basin Management Unit (*Balai* PSDA) authorities in selected 8 important river basins. Specific authority of PJT Brantas and *Perum Otorita* Jatiluhur.	Strengthening the authority of PJT Brantas and *Perum Otorita* Jatiluhur
5. Capacity building delivery systems for IWRM	Basin Water Resources Management Plan (BWRMP) has been done to improve the capacity of institution at provincial and river basin management with financial support from international donor agencies. Indonesia Water Partnership (IWP) has been established since Indonesian Water Forum II in 2002. Supported by GWP in performing role as a facilitator for developing a National IWRM Plan with financial assistance from US Department of State.	Need for sustainable capacity building for water management institutions. It is a networking amongst public sector, private sector and the community to support IWRM.
6. Other aspects of IWRM implementation	The Sub-Directorate of Data and Information in the Directorate of *Bina Program* has prepared a five-year program to develop a Water Resource Management Information System or *Sistem Informasi Manajemen* (SIM). Traditional practices in irrigation and water resources, such as *Subak* in Bali, *Ili-ili* in Lampung, *Mantri Siring* in South Sumatra, *Mitra Cai* in West Java, *Dharma Tirto* in Central Java, *Keujreun Blang* in Aceh, *Tua Banda* in West Sumatra, *Raja Bondar* in North Sumatra, *Tudang Sipulung* in South Sulawesi. Financial source from the Government, regional government, and state owned enterprises/regionally owned	Need to train the staff to operate this information system. Need to provide publications of training materials, socialize the action program (water saving program) and the law/its implementing regulation through media. Managing local wisdom to build local initiatives and to promote community-based management and development. Promoting public private partnership (PPP), alternative financial

Implementation of IWRM	Status	What Activities underway/planned/key actions
	enterprises that manage the water resources, cooperatives, other enterprises, and individuals, either respectively or in the form of cooperation, and international donor agencies.	scheme i.e. Debt Nature Swap (DNS), grant etc.

4.5 Status of IWRM in Malaysia and Tanzania

In this sub chapter, I provide the table on the analysis of the status of IWRM in Malaysia and Tanzania. Having explained in **sub chapter 2.2.1** and **2.2.2**, this table summarizes the status of IWRM in both countries. From the table 4.1 and 4.2, the differences of status of IWRM in Malaysia, Tanzania, and Indonesia as well, prove that the process to involve the IWRM approach into the practice of water resource management requires water policy reform.

Table 4.2 Status of IWRM in Malaysia and Tanzania

Implementation of IWRM	Malaysia Status of Implementation	Tanzania Status of Implementation
1. National water policy reflects the concepts of IWRM	Water policy is in the process of being formed (on going process). Yet, the Third Outline Perspective Plan (OPP3) (2001-2010), the 8th Malaysia Plan (2001–2005), and the 9th Malaysia Plan (2006 – 2010) accommodate various aspects of water policy statements	The National Development Vision 2025 and the Poverty Reduction Strategy Paper (PRSP) are the stems of The National Water Policy of 2002; the National Water Sector Development Strategy (NWSDS) sets out how to implement targets in the National Water Policy of 2002.
2.Water Law incorporates the principles of IWRM	No over arching national policy, the Water Enactment of 1920 is out of date and needs to be reviewed. The Selangor Water Enactment 1998 was passed by the State Government of Selangor to manage the water resources in the state of Selangor	The Water Utilization Act No. 42 of 1974 and its subsequent Amendments are under reviewed

Implementation of IWRM	Malaysia Status of Implementation	Tanzania Status of Implementation
3. Organizations are in place at policy level for IWRM	National Water Resources Council formed in 1998. In one state, Selangor sets up SWMA /LUAS to manage the water resources of the rivers in Selangor.	The responsibility of one central level Ministry with full participation of all stakeholders in the decision making process: the Ministry of Water and Livestock Development (MoWLD).
4. Organizations are in place at implementation level for IWRM	River authorities planned for Selangor Water Management Authority (SWMA/LUAS) only but not fully operational.	Basin Board in nine river basins: Pangani, Wami/Ruvu, Rufiji, Ruvuma and southern coast into the Indian Ocean, Lake Nyasa, Lake Rukwa, Lake Tanganyika, Lake Victoria, and the internal drainage basins of Lake Eyasi, Manyara and Bubu. However, there are only five Basin Water offices and Boards in operation for Pangani, Rufiji, Lake Victoria, Wami/Ruvu, and Lake Nyasa Basin.
5. Capacity building delivery systems for IWRM	The Malaysian Water Partnership (MyWP) plays an important role by organizing a number of IWRM Training-of Trainers (TOT) workshops and other training programmes. Various sectoral organizations have some forms of capacity building. Although there are no IWRM specific courses on preliminary and intermediate education level, IWRM is taught as a subject at the tertiary level.	The RBM-Project is organizing the training program about environmental flows and guidelines for conducting EIAs for Ministry staff.

Implementation of IWRM	Malaysia Status of Implementation	Tanzania Status of Implementation
6. Other aspects of IWRM implementation	Each of water-related sectoral agencies gas developed their own Information and Communication Technology (ICT) infrastructure and databases. For spatial information, the Malaysian Centre for Geospatial Data Infrastructure has set-up a clearinghouse for such information, stored in the form of GIS maps. Monitoring programmes: National River Water Quality Monitoring Programme within 120 river basins, the National Marine Water Quality Monitoring Programme, the Island Marine Water Quality Monitoring Programme involving 71 selected islands, and the National Groundwater Quality Monitoring Programme.	Establish a Public Relations Unit in the Ministry responsible for Water. Environmental protection and conservation measures, and enforcement mechanisms are identified and implemented in all basins by establishing mechanisms for acquiring and monitoring water use and demand, and guidelines and mechanisms for EIAs and their enforcement.

4.6 Concluding Remarks

From the analysis above, it can be concluded that Indonesia has entered a new approach in managing water resources from traditional management (strong sectoral, top-down and highly centralized management) to an integrated approach requiring participation, coordination among development sectors, financing and monitoring, and capacity building. Although the Law Number 7 Year 2004 concerning Water Resources has been promulgated, there are some points that have not yet realized or are still on-going process. Furthermore, the law and other policy document do not specifically mention the gender issues. Meanwhile, woman has an important role in water resources management as the water user. Therefore, woman has to be involved in decision-making process and law enforcement.

Decentralization can be an effective tool to implement an integrated water resource management according to the principle of subsidiarity where regional, local, and district government together with the representative of water users are involved in decision making at lowest appropriate level. However, consensus and coordination among stakeholders must be strengthened regarding to support the law enforcement and to achieve water governance. Beside that, clear task and role of central and regional government under regional autonomy are necessary to reduce the gaps or overlapping programs and authority. However, as Indonesia is still developing, problems relating to water and environment are expected to increase. Therefore, the implementation of IWRM in Indonesia is in the stage of learning process, which it takes time and gradually changes.

A positive point in Indonesia's water policy is the new Law on Water Resources Number 7 Year 2004 acknowledges the traditional practices in water management as the uniqueness of cultural diversity. It is the point that is not provided in the concept of IWRM by GWP. Therefore, to make an effective implementation of IWRM, the government as the enabler and facilitator should accommodate the cultural value in society.

From the case of Malaysia and Tanzania, it can be seen that those countries are in the step of implementing IWRM to solve water problems. Although Malaysia has no over arching national policy, Indonesia can learn from Malaysia's experience in managing water resources within many states. It is useful for Indonesia, which is in the process of adjusting an appropriate form of decentralization system. Furthermore, Tanzania is in process of reviewing its national water law in order to streamlining sectoral and pluralistic legal system. However, it has promulgated its National Water Policy in 2002 and the National Water Sector Development Strategy (NWSDS) 2005-2015.

Chapter 5
Conclusion and Recommendation

This chapter is intended to provide conclusions from the theoretical approach and the analysis of the case study that are discussed in the previous chapters. Finally, in the last part, it provides some recommendations for better implementation of Indonesia's water resources management in the framework of IWRM.

5.1 Conclusion

Integrated Water Resource Management (IWRM) has been widely accepted as solution for better management of water resources towards sustainable development. It is essentially a process for better management of water resources encompassing governance, stakeholder participation, and balancing development for resource sustainability. No general blueprint that is suitable for every country due to different political, socio-economic, geographical and climatic, and cultural contexts. However, IWRM provides three elements that are guidance for countries to implement this approach. Creating an enable environment by setting political and administrative framework and commitment is vital to ensure the successful implementation of IWRM. Furthermore, the institutional role is important to put the functions of all administrative levels and stakeholders in place in implementing water policies, strategies and legislation. Management instruments are necessary to enable the decision makers to make rational and informed choices between alternative actions (GWP, 2000). By implementing these three key elements, redesigning institutional arrangements and policy reform is the requirement. Taking two countries, Malaysia and Tanzania, as experiences in implementing IWRM confirms that the implementation of IWRM needs the reform of institutional arrangements and legal structures.

Water is an important resource for maintaining life and for Indonesia's economic development. Even though Indonesia is blessed with abundant water potential and rainfall, its diverse geographical condition and climate make the pattern of which vary in the term of space and time (Dikun, 2003. However, the growing number of population and economic activities in various regions in Indonesia demand for water higher than the availability of water. The problem of water supply versus water demand is becoming more serious due to the deterioration of environment such as uncontrolled forest devastation in the upstream, uncontrolled groundwater pumping, pollution, and inefficient use of water. These physical problems are caused by mismanagement of water, which is in the form of weak institution and ineffective policies and regulations in managing water resources. If there is no action taken, the water problems will become the major constraint to the development of Indonesia. Derives from the increasing water issues related to physical and institutional problems in Indonesia, it needs to move from traditional management of water resources, which is centralistic, sectoral and fragmented management, and supply-driven management to a more holistic approach and reform the sector policies by setting an effective institutional framework, improving planning and management systems, and promoting participation.

Based on the cases of water problems in Indonesia, creating an enabling environment for IWRM has been done through a number of seminars, forums, and workshops. The detailed proposal on water reform has been put in Letter of Sector Policy Reform (Policy Matrix) from the Government of Indonesia to the World Bank in 1999. Hence, the Law Number 11 Year 1974 was replaced by the Law Number 7 Year 2004 concerning Water Resources with the scopes of conservation, the control of destructive force of water, and water resources utilization. Beside that, another recommendation to establish a national apex body in the form of the National Council of Water Resources (*Dewan Sumberdaya Air Nasional)* has been stipulated in the new Water Resources Law. It marks that Indonesia has adopted a new approach, IWRM, in managing water resources. By assessing the status on the implementation of IWRM in Indonesia from its policy

and law, organizations, capacity building and other aspects of implementation, the Law Number 7 Year 2004 concerning Water Resources accommodates the principles of IWRM referred to the Dublin Principle. Furthermore, this study has some findings, such as:

- The Law Number 7 Year 2004 concerning Water Resources does not specifically mention about gender issues, instead of securing water right for all people.
- Poor understanding about water value as an economic good, often associated with privatization, are still debatable among Indonesian people since the view of water as a social good and a renewable resource still exist. Therefore, the issue of water privatization must be taken into account by considering the equity principle, the right to access the water, and conservation.
- Decentralization can be an effective tool to implement an integrated water resource management according to the principle of subsidiarity where regional, local, and district government together with the representative of water users are involved in decision making at lowest appropriate level. However, consensus and coordination among stakeholders must be strengthened regarding to support the law enforcement and to achieve good water governance. Beside that, clear task and role of central and regional government under regional autonomy are necessary to reduce the gaps or overlapping programs and authority.
- The establishment of National Strategic Plan for water resources management has not been completed yet.
- The establishment of the National Council of Water Resources as the national apex organization has not been realized yet. It is supposed there is still ineffective coordination among cross-sectoral stakeholders, and different view in understanding the law and regulations regarding to decentralization and administration system.
- A positive point in Indonesia's water policy is the new Law on Water Resources Number 7 Year 2004 acknowledges the traditional practices in

water management as the uniqueness of cultural diversity and the government should maintain it.

- As Indonesia is still developing, problems relating to water and environment are expected to increase. Therefore, the implementation of IWRM in Indonesia is in the stage of learning process, which it takes time and gradually changes.

5.2 Recommendation

Water is an important resource for maintaining life and for Indonesia's economic development. As stated in the Constitutional Law of 1945, that water is a gift from God providing benefits for the welfare of the entire people in Indonesia in all sectors. Therefore, water is governed by the state and utilized for people welfare. However, there are some strategic recommendations to contribute to improve the management of water resources in Indonesia, as follows:

- **Accommodating gender sensitivity**

According to the third of the four Dublin Principles that states "*Women play a central role in the provision, management and safeguarding of water*", the water law and policy should accommodate the role of woman in water resources management. Notwithstanding the Law on Water Resources Number 7 Year 2004 does not mention the role of woman in water resources management, the implementing regulations should accommodate the participation of both woman and man at all levels including planning, designing, and managing water resources. Indonesia can take the lesson from Tanzania, which the National Water Policy of 2002 states the gender sensitivity and considers the role of woman in water resources management.

- **Improving public participation and public awareness**

The implementation of the concept IWRM is not only in institutional reform, but it must be socialized to the people and create awareness among Indonesian people to apply the IWRM principles in practical life. Since many people in Indonesia

still perceive that water is abundant and a social good, and use or exploit it as it is a renewable resources; therefore, increasing public awareness is important. It can be done through water saving campaign by using information and communication media. Beside that, increasing the involvement of civil society, which is encompassing age, gender, social-economic status, and cultural diversity, is important to gain public support for improving coordination among stakeholders, decentralization, good governance, and law enforcement. The Dublin Principles has affirmed that water resources development should be based on a participatory approach by involving users, planner and policy makers at all levels.

- **Enhancing capacity building**

Since there is no general blueprint of IWRM for every country and given the uniqueness characteristic of Indonesia, capacity building is important to strengthen the institutions. As UNDP (Wikipedia, 2007) defines that capacity building consists of some elements, such as the creation of an enabling environment with appropriate policy and legal frameworks; institutional development, including community participation (of women in particular); human resources development and strengthening of managerial systems; and a long-term and continuing process. Besides, the building of institutional capacity is a means of enhancing performance. According to Global Water Partnership (2000), capacity building in the context of IWRM is the sum of efforts to nurture, enhance and utilize the skills and capabilities of people and institutions at all levels (local, national, regional and international), so that they can make better progress towards a broader goal. Therefore, capacity building in Indonesia is needed at all levels to improve awareness and commitment in implementing IWRM principles. Furthermore, to ensure that capacity building is undertaken for a long-term and continuity program, the introduction of IWRM can be included as a subject into educational curriculum. Indonesia may learn from the experience of Malaysia in building institutional and individual capacity by including IWRM as the subject taught at the university level.

- **Improving governance participation and support**

IWRM is achieved by partnership and not simply by legislation. Therefore, participation of governance is needed to support the implementation of IWRM principles in practical field/operational and to achieve consensus and coordination among all stakeholders. In addition, the political support from the parliament is important in conditioning IWRM. Beside that, financial support from governments and international donors is needed for implementation. In this regard, since the Government of Indonesia is facing lack of fund for development and management, it must be creative in finding other alternative sources for financial scheme, such as through Public Private Partnership (PPP), Debt Nature Swap (DNS) mechanism and Grant. Jønch-Clausen (2004) notes that as the IWRM concept challenges existing ways of doing things, thus support, awareness and understanding of the needs for change among the highest political decision-makers, managers, practitioners and other stakeholders are needed at this stage.

- **Integrating water resources management with local land use (spatial) plan**

As Biswas (2004) argues that the water problems of a country cannot be solved by the water professionals and/or the water ministries alone, so to make an effective implementation of IWRM at the lowest appropriate level, it is suggested that IWRM be linked with local land use (spatial) plan, for example water-sensitive urban design. It can be started by making list of land use changes that can cause flood and control development of land use to minimize water run-off and over exploitation of ground water in urban area. Beside that, the concept of IWRM encapsulated by GWP (2000) implies that an integrated manner in water resources management should link the management of water and land use.

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APPENDICES 1
Content of Key Elements in the IWRM Toolbox prepared by GWP providing guidelines for implementing IWRM

A THE ENABLING ENVIRONMENT

A1 Policies – setting goals for water use, protection and conservation.
This part of the framework deals with water policies and their development. Policy development gives an opportunity for setting national objectives for managing water resources and water service delivery within a framework of overall development goals.

A2 Legislative framework – the rules to follow to achieve policies and goals.
The required water laws covers ownership of water, permits to use (or pollute) it, the transferability of those permits, and customary entitlements. It underpins regulatory norms for e.g. conservation, protection, and priorities.

A3 Financing and incentive structures – allocating financial resources to meet water needs.
The financing needs of the water sector are huge, water projects tend to be indivisible and capital-intensive, and many countries have major backlogs in developing water infrastructure. Financing approaches and incentives are required to achieve the development goals.

B INSTITUTIONAL ROLES

B1 Creating an organisational framework – forms and functions.
Starting from the concept of reform of institutions for better water governance, the practitioner needs to create the required organisations and institutions – from transboundary to basin level, and from regulatory bodies, to local authorities, civil society organisations and partnerships.

B2 Institutional capacity building – developing human resources.
Upgrading the skills and understanding of decision-makers, water managers and professionals will take place in all sectors, and capacity building for regulatory bodies and for empowerment of civil society groups will need to be undertaken.

C MANAGEMENT INSTRUMENTS

C1 Water resources assessment – understanding resources and needs.
A set of tools are assembled to assist water resources assessment, starting with the collection of hydrological, physiographic, demographic and socio-economic data, through to setting up systems for routine data assembly and reporting.

C2 Plans for IWRM – combining development options, resource use and human interaction.
River, aquifer and lake basin planning entail a comprehensive assembly and modelling of data from all relevant domains. The planning process must recognise social, economic and environmental needs using a range of assessment tools.

C3 Demand management – using water more efficiently.
Demand management involves the balancing of supply and demand focusing on the better use of existing water withdrawals or reducing excessive use rather than developing new supplies.

C4 Social change instruments – encouraging a water-oriented civil society.
Information is a powerful tool for changing behaviour in the water world, through school curricula, university courses on water and professional and mid-career training. Transparency, product labelling and access to information are other key instruments.

C5 Conflict resolution – managing disputes, ensuring sharing of water.
Conflict management has a separate focus as conflict is endemic in the management of water in many places and resolution models must be at hand.

C6 Regulatory instruments – allocation and water use limits.
Regulation in this context covers water quality, service provision, land use and water resource protection. Regulations are key for implementing plans and policies and can fruitfully be combined with economic instruments.

C7 Economic instruments – using value and prices for efficiency and equity.
Economic tools involve the use of prices and other market-based measures to provide incentives to all water users to use water carefully, efficiently and avoid pollution.

C8 Information management and exchange – improving knowledge for better water management.
Data sharing methods and technologies increase stakeholder access to information stored in public domain data banks and effectively complement more traditional methods of public information.