Institutional Arrangement of Integrated River Basin Management: Analysis of River Basin Organization

Lessons from UK and USA (Case Study: Indonesia)

THESIS

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Abstract

Existing institutional arrangement of river basin management in Indonesia leads to some problem concerning authority, boundaries, coordination, and integration. Some studies reveal that the problem is also faced by other developing countries in Asian and Latin America. Now Indonesia is trying to reform water sector by issuing new Water Resources Act. In basin level, it will emphasize on institutional and financial framework. This process is pushed by the declining of water resources and government reorganization through decentralization in 2000. There is a plan to reorganize existing institution responsible to river basin management (river basin organization) in order to enhance its environmental and financial performance.

This research makes comparative analysis of river basin organization among United Kingdom (UK), United States of America (USA), and Indonesia. It also considers the opportunity to take a lesson from UK and USA experience for Indonesia. UK and USA has long history in dealing with water sector problem including water management at basin level. Many book and studies often use UK and USA as object to be analyzed. It is assumed that conducting comparative analysis with UK and USA to take lesson will be useful.

The research concludes on several findings. Firstly, from theoretical exploration, it reveals that good implementation of integrated basin management concept in a country can't be fully duplicated without any consideration. Some elements have to be carefully paid much attention before transferring policy, such as physical attributes, structure of the demand in the basin, legal structures of the state, historical experiences, principles of institutional design, and development of basin management. This finding from theoretical exploration lead to the importance of understanding context in which river basin organization in UK and USA emerge. Secondly, from study case and comparative analysis, it finds the positive aspect on integration either intra-environmental aspect or environmental-economics aspect. It finds also that strongly environmental institution is needed to ensure that environmental standard is fulfilled by water-related stakeholder.

For the case of Indonesia, recomendation is proposed not to create a new institution in accordance with water reform proces but improving authority and redesigning institutional frame work of existing institution.

***Keywords**: institutional arrangmement, river basin organization, integration, environmental aspec.t*

Preface

My thesis is inspired by my experience as planning staff of Forest and Plantation Agency in my region. One of my office's tasks is to implement central government project through Ministry of Forestry to rehabilitate critical land in up-stream area in Citanduy River Basin. The project is conducted annually through reforestation and soil conservation program and supervised by a Technical Management Unit, Watershed Management Office of Cimanuk-Citanduy as branch office of Directorate General Land Rehabilitation and Social Forestry, Ministry of Forestry. Although this project has been performed since 1980s, the result is not as good as expected. Instead, the number of critical land in up-stream area increases and influences the performance of Citanduy River Basin. I think there is something wrong in this project but I am sure it is not from technical aspect. As there is no coordination among agencies responsible to Citanduy River Basin either in planning process and implementation stage of the project, I think the problem come from institutional aspect. In addition, the course of International Planning Practice and Water Management encourage me to choose theme of institutional aspect of river basin management as topic of my thesis.

Firstly, I would like to thank to my first supervisors, Dr. Johan Woltjer for guidance and suggestion from thesis proposal until final thesis. I also appreciate all advice from Dr. Roos Akbar as my second supervisor from ITB, especially when he came to RuG Groningen. Secondly, I would like to thank to following people for all support, since I studied the first year at ITB, Bandung until finished studying at RuG, Groningen : Prof. G.J.J. Linden, and staffs at Faculty of Spatial Planning, RuG; Dr. Ir. Uton Rustan, M.Sc., and staffs at Department of Regional and City Planning, ITB, Bandung; Dr. Ir. Haryo Winarso, M.Eng; Dr. Ir. Dedy S. Priatna, MSc; Staffs at Pusbindiklatren, Bappenas, Jakarta; Monic Soesman and staff at NESO, Jakarta; Drs A. Gumawang Jati, MA, and staffs at Language Center, ITB, Bandung; Friends of Double Degree Program 2005 for being family in Bandung and in Groningen; friends, and Colleagues in Local Government of Tasikmalaya Regency, West Java; my parents and my beloved wife, Dewi Anggraini, for endless support and love.

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Chapter 1
Introduction

1.1 Background

River basin in Indonesia, based on Ministerial Regulation of Public Work No. 48/1989 is divided into 90 river basins (SWS). Most of them (73 river basins) are fully located in one province and are known as provincial river basin, while 17 remains are inter-provincial river territories or national river basin. All of those river basins fall into to two category, *developed river basin* and *less developed river basin*. Developed river basin is defined as basin in which the water infrastructures both irrigation network and dam has been completely built to serve large agriculture area. It is also located in developed area in term of agriculture and industry. On the other hand, less developed river basin is a basin with poor water-infrastructure and located in less developed region.

In developed river basin, Indonesian government created two River Basin Cooperation, namely Perum Jasa Tirta II (PJT II) of Citarum River Basin, in West Java Province in 1970 and Perum Jasa Tirta I (PJT I) of Berantas-Bengawan Solo River Basin in East Java Province in 1990. These two River Basin Cooperation fall under central government authority through State Ministry of Enterprise because it is state-owned enterprise. In less developed river basin, government created Basin Water Operation Unit (Balai PSDA) in 1996 to implement water resources management concept with river basin approach (Anshori, 2002). This agency is set up under Provincial Public Work Service. However, the division of organization managing river basin is not completely separated. There is also Balai PSDA in developed river basin which share task and function with River Basin Cooperation.

Since Balai PSDA is under provincial government, its boundaries also follow provincial boundaries, namely administrative boundaries. This fact generates first

problem of integrated river basin management as it has to be theoretically managed based on hydrological boundaries. Jasper (2003) emphasize that an river basin institution operating on administrative boundaries couldn't work well because it will be constrained by what happens in upstream or downstream area. It can be understood as upstream and downstream area does not fall in one management. The second problem is duplicating role emerged in developed river basin when two institutions (River Basin Cooperation and Balai PSDA) are responsible for management in one river basin. The principle of one basin one management is not met.

As Indonesian government issued new Water Resources Act No 7/2004, formal starting point to reform water sector was started. This law was created to anticipate water scarcity and enhance private and communities participation in water management. This act will also implicate on water management at basin level. Government has a plan to establish other new River Basin Cooperation beside the existing ones. It is accordance with one of four objectives of water reform, namely improving the organizational and financial framework for river basin management (Bandaragoda, 2006). The plan to establish new River Basin Cooperation and the spirit of new Water Resource Act to enhance private and communities participation lies in the master plan to create self-financing river basin organization concept. The dependency on national budget does not stimulate any development of functional responsibility at the level of the river basin (Jasper, 2003). This condition leads to the need of understanding cost recovery concept in river basin management in which beneficiaries has to pay some amount of money for their water allocation. The other issue of water reform at basin level is the role of stakeholders and its relation with existing river basin organization either in developed or less developed river basin.

Some studies reveal that problem in river basin management faced by Indonesia is a general problem emerge particularly in developing countries. Study conducted by Bandragoda (2006) in some Asian countries concludes that all countries now try to

improve water resources through more effective water management institution. Unfortunately, the institutional reforms run slowly due to social, economic, and political constraint. It is also recognized that management of water resource especially in river basin level is still purely on sectoral lines by multiply government agencies with little inter agency coordination. Another study conducted by Garcia (1999) to review the role of river basin organization in Latin America reveal that most of countries still face serious institutional shortcoming that come from legal, organizational, and financial issues.

The decision to take lesson from UK and USA's experience is based on some consideration. UK is a country which has century and a half of institutional development of river basin management (Newson, 1992). It also experienced several adjustment in its river basin organization to deal with a change in social, economic, and political context. It gives comprehensive development from local authority service in water aspect toward regional authorities under central government. Uniformly regional river basin organization with integrated approach over many environmental aspect might be useful as a lesson for country in which role of central government is still dominant. On the other hand, USA gives different perspective with its river basin organization. There are many types of river basin organization as reflections of balance power between federal and state government. Different type of river basin organization has also different function based local environmental problem. Moreover, two extreme natural characteristic, dry in the west and wet in the east, gives different emphasizes in function of river basin organization. In short, two countries, UK and USA, will give comprehensive perspective of river basin organization from uniform river basin organization to diverse one, from central government dominance to balance power of federal-state government, and from uniformly function of river basin organization to different function based on locally environmental problem. Two pole of perspective in river basin management is considered to be important lesson as most of developing

countries try to reform their water management and search appropriate model of river basin organization.

United Kingdom and United States of America's Background

UK and USA has long history concerning river basin management. UK had fully implemented concept of integrated river basin management since 1974 when established Regional Water Authorities. This organization even played dual role as operator and regulator. Many authors criticized this dual role because it would generate conflict of interest. UK experienced ultimate phase in managing river basin when performed privatization in 1989 in which sold water supply and sewage treatment companies to private sector and created National River Authority as a substitution of RWAs. In 1995, based on Environmental Act, National River Authority merged with Majesty of Pollution become Environment Agency. This agency is ultimate evolution of river basin organization in UK which is not only as provider but also as guardian of environment.

USA also has long history concerning managing river basin. It was started by creating Mississippi River Basin Commission in 1879 to anticipate regular flood from Mississippi River. Before that year, flood protection was locally performed by riparian authorities and couldn't work well. The most monumental history of river basin organization was the establishment of Tennessee Valley Authority (TVA) in 1933. Unlike UK with one uniformly River Basin Organization, USA has many type of organization with different environmental aspects.

1.2 Research Objectives

The objective of this research is to acquire knowledge of how river basin organization can implement integrated river basin management approach can and deal with water-related problem based on social, economic, and political context. This research tries also to get some recommendation for appropriate river basin organization for Indonesia considering lesson from UK and USA.

1.3 Research Question

The research questions can be formulated based on previous research objectives as follows:

1. *How are institutional arrangement in river basin management in UK, USA, and Indonesia?*

   This question will discover experience of UK, USA, and Indonesia in managing river basin especially how the institution or river basin organization develop through several stages in period of time, implement concept of integrated river basin management, and cooperate with other governmental agencies and stakeholder, and deal with some constraint.

2. *What can be learn from UK and USA for Indonesia?*

   This question will discuss some elements both similarities and differences in three countries based on earlier discussion by comparative analysis. After that, important aspect will be drawn and explored its opportunity to be adopted by Indonesia.

1.4 Research Methodology

This research will be developed by several methodological steps as follows:

1. *Developing theoretical framework*

   This stage develop concept of institutional arrangement on river basin management as tool to implement integrated river basin management concept and then focusing on river basin organization by recognising type of several river basin organization, its function, and example. This stage also include concept of development stage of river basin together with several important aspect should be considered in determining type of river basin organization

2. *Collecting and Information from the experiences from United Kingdom, United States of America, and Indonesia.*

   Data of the research come from secondary data sources: books, journals, and internet articles. This data encompass evolution river basin organization in three

countries and recent river basin organization. The first data is useful to understand context in which river basin organization develop. The second one as ultimate development of river basin organization give information its emphasize on water-related issue, and coordination with other stakeholder.

3. *Analysing the possibility of policy transfer*

   Based on data and information from previous discussion, this stage tries to elaborate possibility to transfer the policy. It will be done by comparing elements and characteristic of each river basin organization in three countries try to find out policy that might be transferred and what condition could support the implementation and what the constraint.

4. *Formulating recommendation to improve river basin performance through river basin organization in Indonesia*.

   At the end, this research will suggest some recommendation to increase performance of river basin organization in Indonesia based on experience from UK and USA adjusted by Indonesian context.

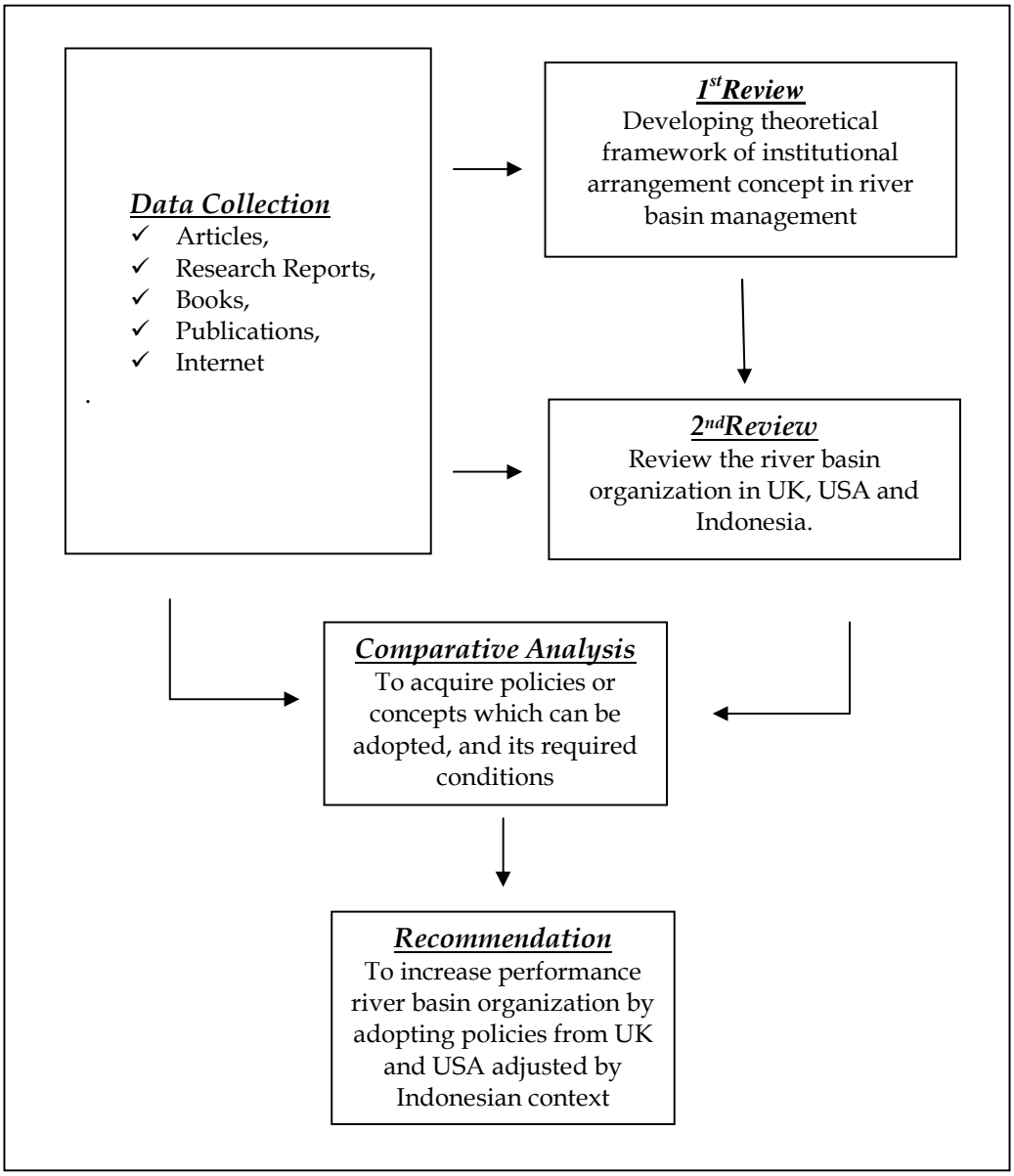

Figure 1. Research Methodology

1.5 Structure of Research

The research will be divided into five chapters as follow:

Chapter 1 : Introduction

This chapter contains background, research objectives, research question and methodology. The background will explain justification of this research and strengthened by its objectives and research question to guide further chapter.

Chapter 2 : Theoretical Framework

This chapter describes discussion of institutional arrangement, types of river basin organization (function, authority, and example), how to choose appropriate river basin management considering development stage and some important aspects, and policy transfer.

Chapter 3 : River Basin Organization in UK, USA and Indonesia.

This chapter consists of comprehensive practice of river basin organization in three countries: UK, USA, and in Indonesia either their evolution or current condition.

Chapter 4 : Comparative Analysis

This chapter will discuss comparison among three designated basin, the similarities, differences, and some important aspects to be learned

Chapter 5 : Conclusions and Recommendations

Concluding remarks will be drawn based on discussion on previous chapter, followed by recommendation for Indonesia adoption.

Chapter 2
Theoretical Framework

2.1 Institutional Arrangement on River Basin Management

River basin management inevitably requires set of rule and institution to exercise it. It means that river basin institution is tools to implement integrated river basin management concept. That is the reason institutional arrangement needed in integrated river basin management.

Ostrom (1990) in Jasper (2003) define institutional arrangement as sets of working rules that are used to determined who is eligible to make decision in some arena, and what actions are allowed or constrained. Rules in this context means what procedure must be followed, what information must or must not provided and what pay-off will be assigned to affected individuals.

In the context of river basin management, institutional arrangement is very important because institutional problem often arises because of competing among water user and conflict between upstream and downstream area. World Bank (2005) emphasize that that successful implementation of decentralized water resources management will depend on feature of the basin-level arrangement created by stakeholders and/or central government officials which include :

1. The presence of basin-level institution;
2. The extent of clarity of institutional boundaries, and their match with basin boundaries;
3. Whether and to what extent basin-level institutional arrangement recognize sub-watershed communities of interest;
4. The availability of forum for information sharing and communication among basin-stakeholders;

5. The ability to make, monitor, and enforce contingent contract whereby basin stakeholder can agree to contribute to improvements in basin conditions;
6. The institutionalization of regular monitoring of basin conditions by means that are trusted by water users;
7. The availability of forum for conflict resolution

Moreover Jasper (2003) emphasizes the importance of institutional arrangement in integrated river basin management to achieve:

- the functioning of a platform for stakeholders involved in decision making
- water resource management on hydrological boundaries
- an organizational set-up in river basin and sub-basin authorities with their respective by-laws to incorporate decision making at the lowest appropriate level
- a planning system oriented at the production of integrated river basin plan
- the introduction of a system of water pricing and cost recovery

Nevertheless, the existence of river basin institution to manage river basin is perceived insufficient. Some principle must be met as Schramm (1980) point out general guidelines to follow:

1. Institutional framework for the project must allow consideration of a wide range of alternatives to solve observed problem, including those that may be outside the specific responsibilities of planning bodies;
2. Planning agencies must have the expertise needed for multiple objectives planning and evaluation procedures, especially in economic, social, and environmental areas;
3. Institutional framework must facilitate adaptation of the plan to meet changing national, regional, and local priorities;
4. Institutional framework must seek representation of all parties affected by the specific development plans and management;
5. Institutional framework must reward initiative and innovation among the members of the technical team and within cooperating agencies;

6. Technical team must be sufficiently free from day-to-day responsibilities so that they can concentrates on long-range planning and anticipation of future problems;
7. Institution must have capacity for learning and improving over time, including sufficient continuity over time and the ability to evaluate past programs;
8. There must be sufficient authority within the institutional framework to enforce conformity of execution with construction and operating plans;
9. Institutional framework must be capable of guaranteeing an acceptable minimum level of professional performance by the technical team
10. Plan of implementation stage must include provisions for the timely and qualitatively and quantitatively sufficient supply of needed services by other agencies, as well as provision to assure continued functioning.

However, the implementation of principles guiding river basin management doesn't guarantee it perform successful. A study in Australia found that although the principles of integrated river basin management are well understood, there are still some problems in implementation. AACM and Centre for Water Policy Research (1995) and Bellamy et al (1999) in Hooper (2003) describe some process as constraints in implementation:

- Problem related to the lack of coordination
- The need to help community catchments management groups mature
- Confusion between bottom-up consultation and community participation and top down policy and government investment;
- The lack of integration of economic development with ecological management;
- The effectiveness of local community institution

In short, institutional arrangement as a tool to implement integrated river basin management concept is very important to achieve several goals related to stakeholder, decision making, basin plan, and financial aspect. Some principles give

guideline how institutional framework should be developed and directed to minimize failure in implementation due to institutional and process issue.

2.2 River Basin Organization

2.2.1 Type of River Basin Organization

Institution to implement integrated river basin management approach is often called River Basin Organization (RBO). This organization varies in every countries with different emphasizes. Based on scope and authority, Radosevich and Olson (1999) divide river basin at basins into three main classes:

1. *Coordinating Water Resources Council*

   This usually consist of a council of department heads covering the natural resources management and consumptive uses (e.g., agriculture) agencies as well as planning, etc. Such a council would meet irregularly to endorse policy, new initiatives, etc. It would have a small supporting staff and would not intrude on the active functions of existing agencies. Its role is essentially coordinating, recommending policy, supporting, compilation of data, auditing, and reporting, and would have no real management and control functions. It can work well in a "mature" water industry where most development options have been implemented, where good data and models exist, and where existing agencies (and perhaps basin commissions) function well with only the need for improved communication, coordination and cooperation to reconcile overlaps and fill gaps. In effect, water is more about improved management strategies and processes than about water development. Example of this form : Regional Water Authorities in UK in 1980s

2. *River Basin Commission*

   This is a more powerful model than the coordinating council and involves an agency with a larger staff (depending upon the size and complexity of the basin) rather than relying on other agencies to carry out some of their analysis and

report writing. It would concentrate on developing: good data systems and predictive hydrologic models; establishing base-line water use and environmental conservation measures in the basin; developing policies and strategies to guide water planning and development, and environmental (aquatic-ecosystem) rehabilitation and management; and, a systematic process of monitoring and reporting on the "behavior and health" of the basin and uses within it. Example of this type is Murray-Darling Basin Commission, Australia.

3. *River Basin Authority*

   This form of organization is larger, more powerful, and complex in comparison to the other RBOs, and normally is always a national or even state/provincial level organization. It is usually a multi-disciplinary, full-functioning organization covering all aspects of natural resources planning and management, and with regulatory powers. Its jurisdiction is the hydrologic boundaries of the basin, but often is involved in regional (out-side the basin or inter-basin) activities for optimum resource use and equitable accounting of benefits and costs. When established or reformed, it may "absorb" the operation and management role, personnel and facilities of some existing organizations. Examples of this type are the Hydrographic Confederations of Spain, Tennessee Valley Authority in the USA, and Snowy Mountain Hydro-Electric Authority in Australia

Instead of dividing river basin organization into three simple organizations, Hooper (2006) divides it more complete into nine type of organization:

1. *Advisory Committee* **:** A formalized or quasi-formal organization in which individuals take responsibility for undertaking action planning and provide advice; governments 'hand over' strategic planning to such organizations; they frequently have no or limited legal jurisdiction. Examples include: Fitzroy Basin Association, Eastern Australia and Verde Watershed Association, South-western USA

2. *Authority* **:** An organization which makes planning decisions at a central or regional government level; may set and enact regulations, or have development consent authority; authorities are founded on democratic principles and a framework of law to which all relevant individuals and institutions are subject in a basin setting. Examples include: Grand River Conservation Authority, South-eastern Canada ; Niger Basin Authority, West Africa; Tennessee Valley Authority, Central-eastern USA
3. *Association:* Similar to an Advisory Committee, this is an organization of like-minded individuals and groups with a common interest. In a river basin they have varying roles: providing advice, stimulating basin awareness, education and ownership of basin natural resources management issues; educational functions and information exchange. An example is the Missouri River Basin Association, Midwest USA.
4. *Commission:* An organization which is delegated to consider natural resources management matters and/or take action on those matters. A basin commission's powers vary, and include advisory/education roles, monitoring roles, undertaking works, fulfilling goals of a specific government's charter or an international agreement. Commissions normally are instituted by a formal statement of a command or injunction by government to manage land and water resources; commissions may also have regulatory powers. Examples include: Delaware Basin Commission, North-eastern USA; Great Lakes Commission, North America; International Commission for the Protection of the Danube River, Central & Eastern Europe; International Commission for the Protection of the Rhine , Western Europe; International Joint Commission, North America; Lake Chad Basin Commission, Central Africa; Mekong River Commission, South-east Asia; Murray-Darling Basin Commission, South-eastern Australia; North Carolina Environmental Management Commission, South-eastern USA; Ohio River Water Sanitation Commission, Central- northern USA; Tarim Basin Water Resources Commission, Western China.

5. *Council:* A formal group of experts, government ministers, politicians, NGOs and lay people brought together on a regular basis to debate matters within their sphere of basin management expertise, and with advisory powers to government. A council is contrasted with a commission which, although also a body of experts, is typically given regulatory powers in addition to a role as advisor to the government. An example is the Fraser Basin Council, western Canada - North-western USA.
6. *Corporation* **:** A legal entity, created by legislation, which permits a group of people, as shareholders (for-profit companies) or members (non-profit companies), to create an organization, which can then focus on pursuing set objectives, and empowered with legal rights which are usually only reserved for individuals, such as to sue and be sued, own property, hire employees or loan and borrow money. Also known as a "company". The primary advantage of a for-profit corporation is that it provides its shareholders with a right to participate in the profits (by dividends) without any personal liability because the company absorbs the entire liability of the organization. Examples include: Damodar Valley Corporation, Northern India; The former Snowy Mountains Engineering Corporation (now Snowy Hydro), South-eastern Australia.
7. *Tribunal* **:** A basin entity which has formalized procedures and quasi-judicial powers; a heavy Emphasis on bureaucratic decision making; stakeholders may formally participate through hearings; major decisions are taken by independent bodies, like a water pricing tribunal. A Tribunal acts as a special court outside the civil and criminal judicial system that examines special problems and makes judgments, for example, a water tribunal, which resolves disputes between water users. Very few such entities exist purely for river basins management purposes but rather for special purposes, for example, government pricing tribunals. Some tribunals have specific water functions which are a component of a broader river basin's management process, where an RBO may or may not exist. These entities have limited traditional powers of civil government and do not report to other government agencies, except where a local government body may oversee

entities such as 'country' drainage districts, which charges for water. They play an important role in developed countries and many developing countries. An example is the Valencia Water Court, Spain.

8. *Trust* **:** A trust is legal device used to set aside money or property of one person for the benefit of one or more persons or organizations. It is an organization which undertakes river basin works; develops and implements a strategic plan; its mandate is to be the river basin 'advocate'; it co-ordinates local programs through Memoranda of Understanding or other agreements; it raises local levies (funds) for its works and programs. A Trust keeps monies raised in 'trust' for the benefits of its citizens. An example is the former Hawkesbury-Nepean Catchment Management Trust (now part of the Sydney Catchment Authority), South-eastern Australia.
9. *Federations* **:** A collaboration of organizations or departments within one government or between state and national governments to establish and undertake actions for river basin management. Local government groupings have emerged in some locations in the USA for regional natural resources governance. Governance actions at various levels (national, state and local) include: agreements on water sharing and water quality management, shared statements of intent; shared policy development; information exchange; joint actions for management of ecosystem degradation. Collaboration is expressed in terms of framework directives, cost-sharing arrangements, joint statements of intent, partnerships, joint programs and agreed policy. Examples include: International Network of Basin Organizations; Global, based in France; Chesapeake Bay Commission and the Chesapeake Bay Agreement, Eastern USA; Council of Great Lakes Governors and the Great Lakes Basin Water Resources Compact, North America; European Commission – Water Framework Directive (Directive on River Basin Management)

Meanwhile, river basin organization can be divided based on its function to water-related activities. Radosevich and Olson (1999) divide it into three groups:

1. Monitoring, investigating, and coordinating river committee such as Water Resources Council in Srilanka and parts of Malaysia, and several of the river commissions in China.
2. Planning and management commissioning such as the Murray-Darling basin Commissions of Australia, and the international Mekong river Commissions of South East Asia and International Joint Commissions between Canada and the USA
3. Development and regulation authorities such as Tennessee Valley Authority in the USA.

Several type of river basin organization either based on scope and authority or based on function give clear understanding that each organization has different emphasize on environmental problem will be handled, the goal want to be achieved, and government capacity to manage water sector. The division of river basin organization into several type also helps to identify what is the requirement should be fulfilled to implement a certain type or rive basin organization.

2.2.3 Choosing Appropriate River Basin Organization

Choosing appropriate river basin organization needs knowledge of river basin development in which the organization will exercise its task and responsibilities. The development of river basin reflects real condition its water resources. Bandaragoda (2006) divide development stage of river basin into three main categories:

1. **Infrastructure Development Stage:** Usually there is no shortage of good quality water. However, the gradually increasing demand drives the need for development of infrastructure to utilize the resources. At this stage the institutions are geared for infrastructure development, generally focused on a single sector (Irrigation; municipal and domestic supplies etc.). As the water resources of the basins are developed further, the sectoral institutions expand their functions to address the emerging inter-sectoral competition for water.

2. **Utilization/Transition Stage :** A significant development of infrastructure has taken place. Although there are opportunities for further development, the cost-effective actions such as water conservation and saving, improved management of water deliveries, and maintenance and management of already-built structures are implemented to make the best use of the already developed facilities. In this phase, managing the supply of water for various uses is a primary concern. Pollution and water scarcity are localized issues, but they begin to emerge as major concerns. Institutions continue to be concerned primarily with sectoral issues, such as managing irrigation water or managing supplies of drinking water. In many situations, environmental issues exist but they are not adequately recognized at this stage of development. Sri Lanka, Indonesia, Thailand and the Philippines have qualified to be in this stage according to the regional study.
3. **Allocation Stage :** Most of the river basins in the country reach closure, and depletion approaches the potential available water, with limited scope for further development. Efforts are placed on increasing the productivity, or the value of every drop of water. An important means of accomplishing this is to reallocate water from lower to higher-value uses. Managing the demand becomes increasingly critical. Construction of infrastructure is limited to those that aid regulation and control. Institutional issues concern allocation, conflict resolution, regulation, pollution prevention and environmental preservation, or restoration. Several important management and regulatory functions gain prominence, including inter-sectoral allocation. Coordination becomes important, involving significant transaction costs. Either a single entity emerges to effectively carry out these functions or several interlinked organizations may manage these functions in a given river basin.

There is no author state the best model of river basin organization. Good river basin organization in one country can't be fully transplanted or replicated to other countries. Every country has unique characteristic influencing pattern of river basin.

World Bank (2003) give notion to be paid much attention before choosing one type of river basin organization.

1. The physical and morphological attributes and endowments of the basin and its water system, and the supply (development) opportunities.
2. The structure of the demand in the basin, and the capacity and willingness to pay for water-related services by the water users.
3. The administrative, legal, regulatory, and law enforcement structures of the state. Special relevance are of course the questions whether the country has a federal or unitary structure, and to what extent it is decentralized or decentralizing. Similar pertinence is the macro-economic policies and the degree of deregulation of the economy.
4. The historical experiences and culturally defined preferences with respect to governance, collective action, conflict negotiation, etc. Some cultures feel more comfortable with bottom-up approaches whereas others tend to attach greater importance to top-down approaches.
5. Principles of institutional design from the growing body of scientific literature on institutional and related development It should be appreciated that behavioral dynamics are very culture-specific, and that most research so far concerned the European and American cultural settings.
6. Finally, the development of basin management arrangements is an on-going, continuous process, responding to the dynamics of the changes in the social economic environment of the country. It typically works with time horizon of 5-10 years. Thus, any assessment of the importance or influence that the above

Similar suggestion on choosing appropriate type or river basin organization is given by Radisevich and Olson (1999). They explain that there is one right model that suits all circumstances. At least four attributes has to be meet :

1. System of government, law, and administration
2. Hydro-geological and ecological characteristic

3. Stage of development and the current system of water management and administration
4. The need and potential for sustainable water and related resources development and environmental management

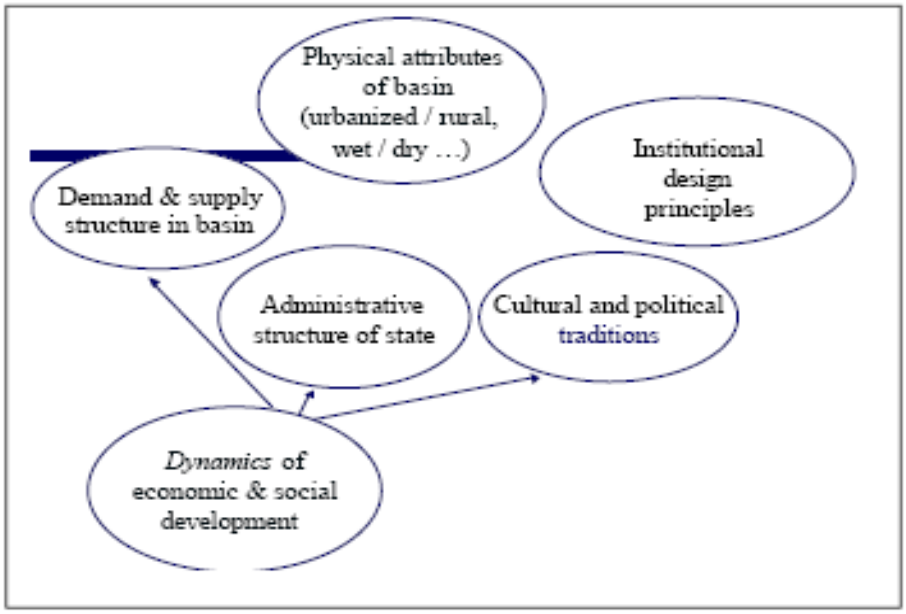

Figure 2 Set of Factors Determining the Appropriate and Workable Basin Organization
Source : World Bank (2003)

In brief, choosing appropriate river basin organization shouldn't be conducted by directly copying or replicating model from other countries. Instead, it should consider national and local context (basin level) and institutional arrangement principle. Because performance of river basin organization will influence broad aspect not only at basin level but also beyond the basin.

2.3 Policy Transfer

A successful implementation of certain policy in one country can not be fully copied by another country without any consideration in implementation. Dolowitz and Marsh (2001) point out that transferability process should consider the different

condition among countries such as socio-cultural condition. So that it causes the degree of policy transfer as follow:

- Copying, occurs when a country adopts a programme in use elsewhere without any changes.
- Emulation, happen when country accepts that a particular program elsewhere provides the best standard for designing legislation at home
- Hybridization and synthesis, combing element or programme in two or more countries to develop a policy best suited to the emulator
- Inspiring, expand ideas about what possible to implement

In the case of institutional arrangement in integrated river basin management, policy transfer has to be carried out carefully considering historical background and main issue from which water resource management emerged. To performs successful policy transfer, a "contextual fit' is needed to avoid uncritical imposition of developed-country institutional model on developing-country river basin context. It might a result of 'dysfunctional or even counter-productive" (Shah et al, 2001 in Bandaragoda, 2006).

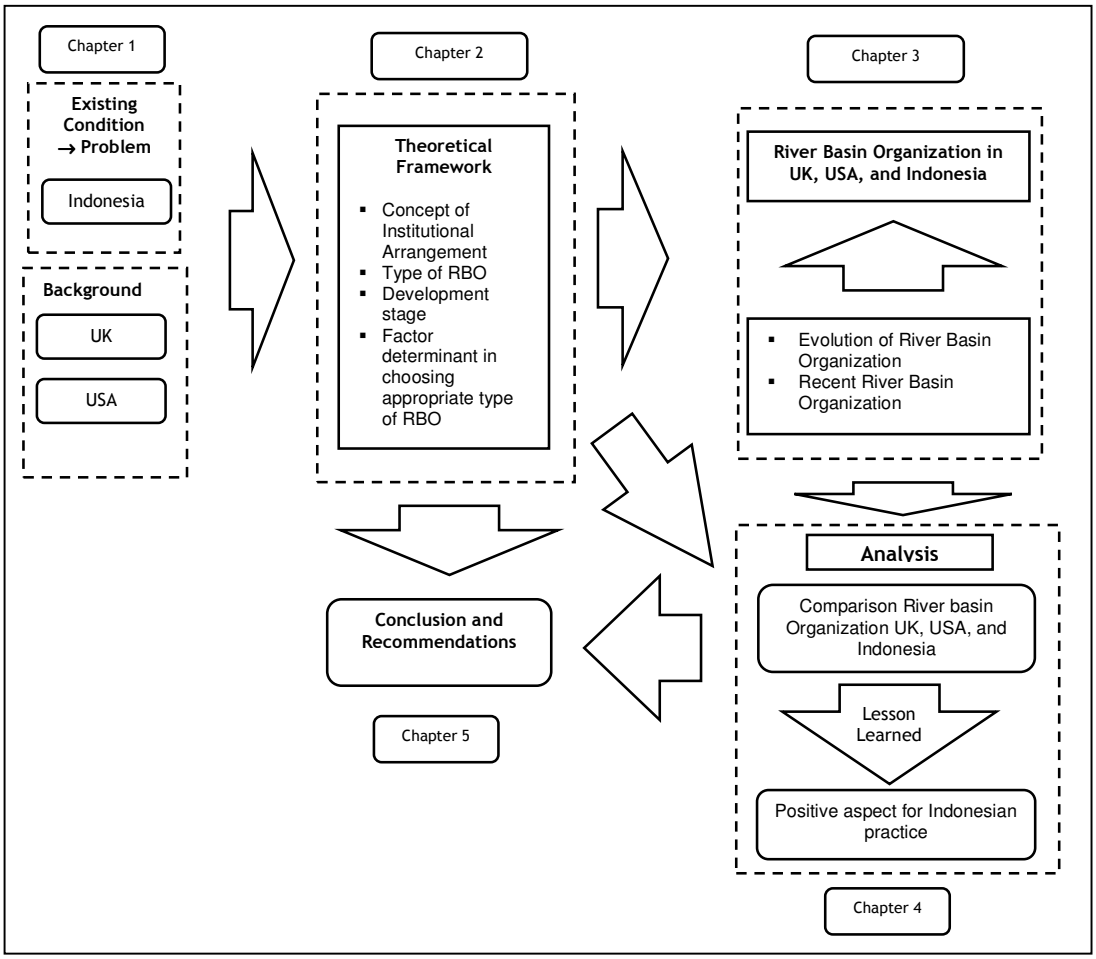

Figure 3. Framework of Analysis

Chapter 3

Institutional Arrangement of River Basin Management in UK, USA, and Indonesia

This chapter depicts institutional arrangement of river basin management in United Kingdom (England and Wales), United States of America, and Indonesia. It will discuss evolution of river basin organization and current river basin organization. This chapter will be closed by concluding remark to summarize similar and different aspect among three countries.

3.1 United Kingdom

3.1.2 Evolution of River Basin Organization

The first institutional configuration was the establishment of 47 Catchments Boards for each major river catchments in 1930 based on Land Drainage Act 1930. The Ministry of Agriculture was the authority to control land drainage (flood protection). At the same time the ministry was also organizing-wide Fisheries Boards. Kinnersley, 1988 in Newson, 1992 highlight these development as an attempt to bring various local interest in a close relationship with central government because of strong position of local interest.

In 1948 River Boards Act created 34 Boards (including Thames and Lea Conservancies). These boards were set to be administrator of system licenses introduced first for discharging pollutants to rivers.

The next evolution was the formation of 29 river authorities (replaced 34 Boards) based on the Water Resources Act 1963. They were responsible for the development of water resources, land drainage, fisheries, the prevention of pollution, and the

issuances of permits to withdraw water. Each authority had a management board consisting of representatives of local governments and appointees of central government (fisheries, agriculture, and other water-using interests). The river authorities were probably the first nationwide integrated management agencies based on hydrologic units. The allocation of functions to the river authorities also meant a highly-decentralized system of water management (Craine, 1969 in Kromm, 1985).

In addition, local authorities at that time played significant role not only as management board member of river authorities but also as undertaker of sewerage. They also had operational responsibility in water supply through local authorities companies together with private companies (Johnson and Handmer, 2002).

Those evidences show that local authorities achieve ultimate role on water management since Water Resources Act 1963 enacted. They gained regulatory role in management board member of river authorities and operational role as sewerage and water supply.

Because composition of water management depended mainly on the configuration of local authorities, the reorganization of local government in 1972 forced government to change water functions and create new regional agencies removing river authorities. Government no longer saw water supply and sewage treatment as locally offered public services, but instead viewed water as a commodity to be managed and sold to the public by efficient multipurpose regional monopolies. Parliament agreed that each of the boards of directors for the new agencies have a majority of its members representing local interests. There was also general agreement that both water supply and the reclamation and disposal of used water were to be under the same management, and that the boundaries were to be based on hydrological conditions, not the new governmental units (Okun 1977 in Kromm, 1985). Since April 1st , 1974, at the same time local government reorganization was

implemented, the Water Act 1973 removed most water related services from some 1,600 governmental and private organizations in England and Wales (Scotland and Northern Ireland retain separate water management systems), and entrusted them to 10 Regional Water Authorities (RWA's). The goals were to integrate water management, to meet water needs with greater efficiency, and to better administer all water resources.

The establishment of ten Regional Water Authorities brought England and Wales to new approach in managing water management from administrative boundaries toward geographically basin boundaries. It also significant shift of management responsibility away from local government and toward a technocratic management style (Synnott, 1995 in Buller, 1996). Buller (1996) point out that era as attempt of England and Wales to concentrate regulatory and management function into the hands of fewer centralized body and to emphasize the importance of large basin river rather than individual section of river as the basic unit of water management.

However, it also triggered some criticisms because of dual role of Regional Water Authorities. The criticism emerged based on the dual role of authorities on hand as regulation enforcer and the other hand as service-provider (Johnson and Handmer, 2002). Moreover it was reported that authorities was under-investment to minimize public sector borrowing for macro economic. Finally it had resulted to poor performance of authorities in maintaining water quality both through tap-water and river (Kinnersley, 1994 in Johnson and Handmer, 2002).

New elected Conservative government in 1979 started to its long campaign for executive efficiency in public life. It also abolished the National Water Council, and thinking that RWAs were now sufficiently competent to manage water-related activities alone (Newson, 1992).

In July 1989, Parliament passed a new water bill which resulted in the privatization of the ten regional water authorities by the end of 1989. The privatization under the conservative government reflected the belief that the financial needs of the regional water authorities for major investment to repair replaced capital works would be best met through the private sector. The commitment to the watershed focus was reaffirmed and not altered.

New legislation was passed in 1995 which further affirms this commitment to water management on a watershed basis. This new legislation replaces the National River Authority which was created by the privatization Bill in 1989 with a new governmental organization to integrate and combine air/land/water protection within a single unit. The result of this most recent legislation will be to strengthen comprehensive water management at the watershed basis as established in 1974. Accordingly, the watershed focus for comprehensive water planning and management has been well established for more than twenty years and is being maintained into the future.

The evolution of river basin organization also mean shift in risk and liability over very important three decades from Water Resources Act 1963, Water Act 1973, and Water Act 1989. Johnson and Handmer (2002) summary the institutional change toward risk and liability in this Table below:

Table 1. Institutional Change, Risk and Liability in UK

No.	Institutional framework	Stakeholders	Risk and liability
1.	Public control with localized decision making (1963 Water Resources Act	River Authorities	Regulation, Water resources
		Local Authorities	Supply and sewerage operating Failures, Design and construction
		Private Companies	Supply operating failures, Design and construction
		Water Resources Board	Political and legal

No.	Institutional framework	Stakeholders	Risk and liability
2.	Public control and centralised decision making (1973 Water Act)	Regional Water Authorities	Operating failure, Regulation, Design and construction, Environment, Supply security, Water quality
		Private Companies	Supply security, Supply operating failures, Design and construction
		Central Government	Political and legal, Standard setting
3.	Privatised framework (1989 Water Act)	Private Companies	Water quality, Supply security, Environment, Operating failure, Design and construction, Market risks, Legal, Financial, Regulatory
		Central Government	Political and legal, Standards
		DEFRA	Standard setting, Regulation
		NRA/EA	Environment, Supply and demand, Regulation
		DWI	Water quality standards and Enforcement, Regulation
		OFWAT	Financial, Supply security standards, Regulation
		EU	Define levels of risk and establish standards
		Shareholders	Share value

Source : Johnson & Handmer (2002)

3.1.2 Current River Basin Organization

There are eight river basin throughout England and Wales, namely, Anglian, Midlands, North East, North West, South West, Southern, Thames, and Wales. All river basin river basins are under authority of Environment Agency. This agency was established based on the Environment Act 1995 and became fully operational on 1 April 1996. It took over the function of National River Authority, Her Majesty's Inspectorate of Pollution and Waste regulation authorities.

The Agency is a Non-Departmental Public Body (NDPB) of the Department for Environment, Food and Rural Affairs (DEFRA) and an Assembly Sponsored Public Body of the National Assembly for Wales. The Agency's principal aim is to protect and enhance the environment and in doing so to make a contribution towards the

objective of achieving sustainable development. In support of this aim, the Agency has a broad range of functions which include: Integrated pollution prevention and control, Integrated pollution control, Radioactive substances regulation, Waste management, Water quality, Land quality, Water resources, Flood risk management, Navigation, Conservation, Recreation, and Fisheries.

Each Region has three main statutory committees as follow: Regional Flood Defence Committee (RFDC), Regional Fisheries, Ecology & Recreation Advisory Committee (RFERAC), and Regional Environment Protection Advisory Committee (REPAC).

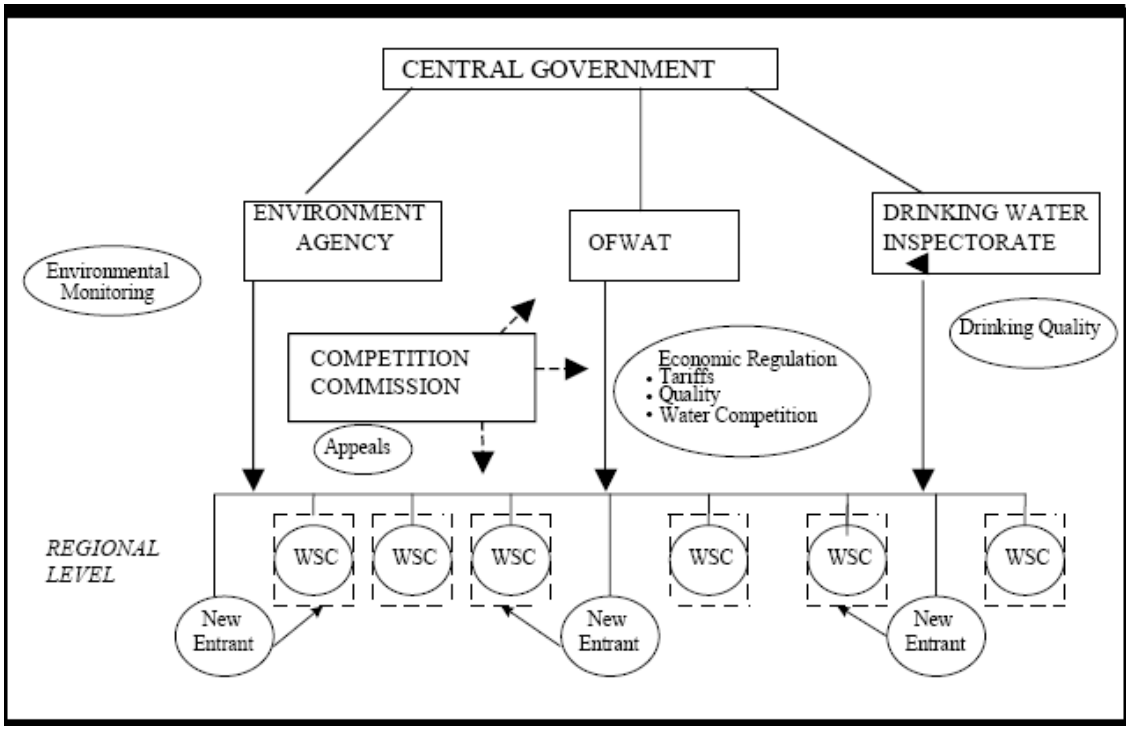

Figure 2. Institutional Framework of Water in UK
Source : DEFRA (2004)

Summerton (1998) summarize other agencies involved in water management in England and Wales as follow:

1. Drinking Water Inspectorate is part of the Department of the Environment, Transport and the Regions and its legal status is as technical assessors acting on

behalf of the Secretary of State. The Inspectorate examines each water company annually as to the quality of their systems for ensuring that wholesome water (i.e. water at least conforming to the regulatory requirements as to quality) is provided to customers. The Inspectorate also receives and reports annually on all the operational data of each company and is entitled where necessary to require remedial action by any company that is not in some respect meeting the health and safety requirements. That enforcement action could require the companies to incur extra capital or operating expenditure to deal with the problem.

2. Another regulatory agency whose authority in economic regulation of the private service providers is Office of Water Services, (OFWAT). The agency has powers to limit the prices of the private water suppliers and to oblige them to carry out their responsibilities efficiently.
3. Operator in provision of water and waste water services is the responsibility of private companies. These companies may be distinguished from other private companies in that they have a range of duties laid down in the statute law relating to water and waste water services and they are subject to a more or less close supervision by the Director General of Water Services and his office. They operate under a licence issued by the Director General, a licence which may be removed from them if they are not performing their responsibilities satisfactorily (there are provisions for the transfer of their assets on appropriate terms to a successor licensee in that event).

Coordination between Environmental Agency and other agencies in water management in UK is performed in such way as follow (DEFRA, 2002):

1. *Regulated organizations (*charge-payers): EA ensure that its staff are aware of the published Code of Practice on the exercise of its regulatory responsibilities, and implement its principles in their work. It should monitor compliance with the Code, and have arrangements for reviewing complaints of non-compliance.
2. *Other enforcement agencies:* EA work closely with other enforcement agencies (including *Local Authorities, the Health and Safety Executive, the Maritime and*

Coastguard Agency, English Nature, the Food Standards Agency, the Countryside Council for Wales, the Welsh Development Agency, the Scottish Environment Protection Agency, and the Northern Ireland Environment and Heritage Service) to minimize and eliminate duplication and conflict in applying legislation, guidance and standards. If there are overlapping responsibilities, the Agency will consult other agencies on proposed actions or statements, other than in exceptional circumstances such as an emergency.

3. *Other bodies with responsibilities for protection of public health***,** including the Department of Health, the Health Department of the Assembly Government, the National Health Service, the Drinking Water Inspectorate, and local authority Environmental Health Departments.
4. *Bodies dealing with accidents and emergencies:* The Agency liaise and establish effective working relationships with other bodies dealing with accidents and emergencies, including those responsible for emergency planning in central and local government, the Assembly Government, the Department of Transport, Local Government and the Regions and the emergency services.
5. *Its Regional Flood Defence Committees*: The Agency's regional flood defence committees are responsible for carrying out all of the Agency's flood defence functions, other than the issuing of levies, making drainage charges or borrowing money.
6. *Its Regional Advisory Committees:* The Agency's regional advisory committees are an important source of local input and of external expertise and challenge.
7. *Regional bodies:* The Agency work closely with English regional bodies, including the regional development agencies and regional chambers, and other organizations with a strategic role at the regional level. The Agency works with regional bodies to produce regional sustainable development frameworks, and contributes to regional planning guidance and regional development agencies.
8. *Local authorities* are key partners in areas such as flood defence, planning and development control, control of air pollution, and waste issues. The Agency is a statutory consultee in relation to planning and development control issues. The

Agency should work in partnership with local authorities as they develop their community strategies (local sustainable development strategies).

To finance its operation Environment Agency charge any water user in England and Wales as follow:

1. Charges for abstraction and discharges to statutory water undertakers (water services) and other 'users' who engage in either private supply or self-services involving abstraction and discharging (agriculture, industry, power generation)
2. Pollution incident and cost recovery charges (PICR) as levied by the EA and pollution fines as imposed by the courts. These can apply to a variety of users when 'polluting' –including industry, agriculture and potentially households although the latter is less likely (mostly small scale pollution which would be difficult to source accurately).
3. License fees from anglers (statutory requirement for recreational fishing)

However The Environment Agency is still partly funded (about 27% of total resources) by Government grants from the Department for Environment Food & Rural Affairs (Defra) and the National Assembly for Wales (NAW) (DEFRA, 2004).

3.2 United States of America (USA)

3.2.1 Evolution of River Basin Organization

The first river basin organization in USA is Mississippi River Commission. It was created in 1879 as the response to repeated flooding which couldn't be handled with local authorities. Started by survey of federal government in 1851 and resulted in suggestion that two issue (flood control and navigation) was interrelated water management problem (Petersen, 1984 in Thompson, 1999). Mississippi River Commission was responsible in developing plans for navigation and flood control.

In 1902 Congress created the Reclamation Service (renamed the Bureau of Reclamation in 1923) and authorized the Secretary of Interior by *Reclamation Act* to

construct irrigation projects, reservoirs, and diversion canals in 17 the western states and territories. Its mission was soon extended to hydropower facilities. By 1906 the Reclamation Service had started project in 15 states for irrigation of 2.5 million acres (Thompson, 1999)

The function of Corps of Engineer and Bureau of Reclamation continue to overlap when Congress authorized the US Army Corps of Engineers to complete comprehensive river basin studies based on 308 Act (called 308 Reports) throughout the US in 1925. This study has special view to coordinate development of navigation, flood control, irrigation, and power production. Later these reports contributed to a series of river basin commission's establishment.

President Roosevelt and Congress passed the *TVA Act* in 1933 to manage water resources and provide energy in the Alabama, Georgia, North Carolina, Tennessee, and Virginia portions of the Tennessee River watershed. Under the TVA Act of 1933, the Tennessee Valley Authority (TVA) has statutory authority to manage the multi state basin of the river and tributaries for flood control, power production, and navigation

In 1965 Congress passed the Water Resources Planning Act. The Act authorized the creation of federal-state river basin commission and created Water Resources Council (WRC). The WRC consist of Secretary of Agriculture, Army, Health, Education and Welfare, Interior, and Chairman of Federal Power Commissions. The WRC has task to advise the president at the highest level on water resources matters. Unfortunately it was dissolved in 1982.

The first environmental legislation in 1948 was followed by National Environmental Policy Act of 1969 which requires an environmental impact statement (EIS) for federal actions that affect the quality of the human environment. NEPA also created the Council on Environmental Quality which was put under presidential

jurisdiction. This also was followed by the establishment of Environmental Protection Agency in 1970 as guardian of environment. The willingness to protect environment pollution pushed Congress to pass

3.2.2 Current River Basin Organization

Each river basin organization in USA do not have similar authority in term of field related to water resources such as flood protection, water quality, etc. It is also different in authority whether as regulator, operator or regulator and operator as well. Wolff (2004) describe it as follow :

> " The Tennessee Valley Authority created in 1933 by the US Congress as a public corporation governing this hydrologically defined area, has a mandate that is far broader than water management. The Delaware and Susquehana River Basin Commissions (DRBC and SRBC, respectively) are the only other entities in the US with wide regulatory authority over their respective river basins. Yet the Susquehana Commission's authority does not seem to have been fully utilized. The DRBC has authority to includes regulations affecting extraction for water supply, discharges for water quality, and land use practices affecting runoff management and flood control. In contrast, the SRBC just contains regulations only for extraction of water, although the legal compact creating it grants wider regulatory powers. The DRBC and SRBC are two of seven interstate agreements approved by the US Congress. Two others, the Interstate Environmental Commission and the Ohio River Valley Water Sanitation Commission, have regulatory authority over water quality but not other aspects of water management within their territories. They are functional organization (FS) organizations working on water pollution at the watershed scale, which allows them to capture economies of scale, but they are not full RBM agencies with a mandate to identify or capture economies of scope. Three more federally approved interstate entities, the Interstate Commission on the Potomac River the Great Lakes Commission and the New England Interstate Water Pollution Control Commission have little or no regulatory power. They coordinate voluntary action and encourage collaboration across state (or international) boundaries. The Commission on the Potomac River and the Great Lakes Commission cover hydrologically defined areas (the Potomac River watershed, and the Great Lakes Basin), whereas the New England Commission covers a politically defined, seven state region. The work of the New England Commission is restricted to pollution control. Other river

basins in the US are sometimes partially managed at the river basin scale. For example, water rights, flood control, and hydroelectric power production are regulated on the Colorado and Columbia Rivers by the US Department of the Interior and the Colombia River Treaty Organization. Comprehensive flood control planning for much of the Mississippi River Basin is performed under the direction of the Mississippi River Commission composed of representatives from several federal agencies "

Table 2. US River Basin Organization, Members and Function

No.	River Basin Organization	Members	Function
1	Tennessee Valley Authority (1933)	Federal Government	Drinking Water Protection, Stream Restoration, Flood control, Wetlands, Water Quality, Water Quantity, Fish and Wildlife, Recreation
2	Delaware River Basin Commission (DRBC) (1961)	Federal/Interstate : United States, Delaware, New Jersey, New York, Pennsylvania	Drinking Water Protection, Stream Restoration, Flood control, Wetlands, Water Quality, Water Quantity, Fish and Wildlife, Recreation
3.	Susquehanna River Basin Commission (SRBC) (1971)	Federal/Interstate : United States, Maryland, New York, Pennsylvania	Drinking Water Protection, Flood control, Wetlands, Water Quality, Water Quantity, Fish and Wildlife, Recreation
4	Interstate Commission on the Potomac River Basin (ICPRB) (1940)	Federal/Interstate : United States District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia	Drinking Water Protection, Flood control, Water Quality, Water Quantity, Fish and Wildlife, Recreation
5	Interstate Environmental Commission (IEC) (1936)	Interstate Only : Connecticut, New Jersey, New York	Drinking Water Protection, Stream Restoration, Flood control, Wetlands, Water Quality, Water Quantity, Fish and Wildlife, Recreation

No.	River Basin Organization	Members	Function
6	New England Interstate Water Pollution Control Commission (NEIWPCC) (1947)	Interstate Only : Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, Vermont	Drinking Water Protection, Water Quality
7	Ohio River Valley Water Sanitation Commission (ORSANCO) (1948)	Interstate Only : Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, Virginia, West Virginia	Water Quality
8.	Colombia and Colorado River Basin (1922)	US Department of Interior, Colombia River Treaty Organization	Drinking Water Protection, Stream Restoration, Flood control, Wetlands, Water Quality, Fish and Wildlife

Source : Delaware River Basin Commission (2005) in Hooper (2006) and Wolf (2004)

Revenue of River Basin Organization is received from water user (Irrigation, Domestic, Industries/Hydropower). According to International Water Management Institute (2002) in Bandragoda (2006), annual water diversion (%) per different uses in USA is : Irrigation 41,5 %, Domestic 12,1 %, and Industry/Hydropower 46,4%. For example, Tennessee Valley Authority gets 98% of its revenue from hydropower.

There are also institutions at federal level articulating national interest for various functional areas such as flood control, navigation, fish and wildlife protection, and water quality protection. Featherstone (1996) highlight those institutions as follows:

- *US Army Corps of Engineers* which construct, operate, and maintains dams, reservoirs, and other facilities on navigable rivers for flood control, navigation, hydropower, water supply, and other purposes.
- *Bureau of Reclamation* of the Department of Interior constructs, operates, and maintains multiple-purpose dams and irrigation systems in the seventeen western states.

- *Soil Conservation Service* also constructs structural works of improvement.
- *Department of Energy*, under the 1992 Energy Policy Act, is responsible for regulating the performance of plumbing fixtures and fittings to meet water conservation objectives.
- *U.S. Environmental Protection Agency (EPA)* regulates all aspects of water quality.

The *US Army Corps of Engineers*, *Bureau of Reclamation, and Soil Conservation Service* represent federal construction agencies. The other agencies, Department *of Energy, and* U.S. *Environmental Protection Agency (EPA), play* the key role as regulator to establish environment standard. This clear division in water management in US was described by Whipple (1996) that after Clean Water Act 1972, water and related land resources was managed by two completely different systems, planning of water development by federal construction agencies and environmental standard by regulator agencies.

Although EAP doesn't directly managed river basin but its authority to administer and enforce major environmental statues make this agency is very important to ensure water resource sustainability. EPA also can also take over state and local authority in implementing environmental standard if it is deemed to be ineffective.

3.3 Indonesia

3.3.1 Evolution of River Basin Organization

The first history of river basin organization in Indonesia is the establishment of River Basin Authorities in Citarum River Basin, in West Java Province, namely Jatiluhur Corporation, in 1970. It was try to duplicate the successfulness of the Tennessee Valley Authority (TVA) in the United States. This state owned company (BUMN), now known as the Citarum River Basin Management Corporation or Perum Jasa Tirta II (PJT-II), was established to construct and operate the Jatiluhur multipurpose dam, the hydropower plant, the nation's largest irrigation system, supply of raw water to Jakarta , for reservoir fisheries and tourism. In 1990, the development role of the corporation was shifted to a project organization thus leaving PJT-II to

operate, maintain, and manage the entire infrastructure in the Citarum River Basin downstream of the Jatiluhur Reservoir (Ramu, 2003).

On February 12th, 1990 Indonesian Government issued Government Regulation No.5/1990 which established a State-owned Company, namely Jasa Tirta Public Corporation (PJT I) to address water resources management, and facilitates operation, and maintenance of finished structure on Brantas river basin. The finished structure is all water infrastructures (dam) as the result of Master Plan Project. The mission of PJT I was to manage the water resources in Brantas Basin so that they can be optimized in order to promote regional development of the entire nation.

Table 3. Master Plan of Brantas River Basin, its objectives and finished structure

No.	Master Plan	Objectives	Structure Finished
1.	Master Plan I (1961)	Flood control	Sutami Dam (1970)
		Irrigation	Selorejo Dam (1973)
		Hydro-power development	New Lengkong Dam (1973)
		Water supply (domestic & industry)	- Porong river improvement (1973) - Lahor Dam (1977)
2.	Master Plan II (1973)	- Irrigation - Flood Control	Brantas middle reaches river improvement (1977)
		Hydro-power development	Wlingi Dam (1977)
		Water supply (domestic and industrial)	- New Gunungsari Dam (1981) - Bening Dam (1982)
			- Lodoyo Dam (1983) - Tulungagung Drainage (1987) - Sengguruh Dam (1989)
3.	Master Plan III (1985)	Water supply (domestic and industrial)	Brantas middle reaches rehabilitation (1990)
		- Irrigation - Hydro-power - Flood control	- Tulungagung hydropower (1990) - Jatimlerek rubber dam (1992) - Wlingi dam rehabilitation (1993) - Menturus rubber dam (1993) - Porong river rehabilitation (1993) - Surabaya flood control (1995) - Wonorejo Dam (2000)
4.	Master Plan IV (1998)	Water resources onservation and management	Integrated Watershed Management

Source : Usman (2000)

In 1994, World Bank funded project called *Java Irrigation and Water Management Project* whose objectives was establishing river basin management institutions. There were five river basin pilot project at that time: Cilujung Ciliman, Cimanuk Cisanggrung, Jratun Seluna, Progo-Opak-Oyo, and Sampean. The project was performed by ad-hoc Task Force on Water Resource Management.

To settle this task force, Ministry of Home Affair issued Ministerial Decree No. 176 in 1996 about Guidelines in Establishing Water Resource Management Agency (PSDA). This decree created 30 agencies in 5 provinces. In 2001, Indonesian government got grant-aid from Dutch Government to create 18 other Water Resources Management Agencies out of Java Island.

Table 4. The Number of Water Resources Management Agency each Province Based on Ministerial Decree No. 176/1996

No	Province	Number of Water Resource Management Agency (PSDA)
1.	West Java	5
2.	Central Java	6
3.	Special Region of Yogyakarta	2
4.	East Java	9
5.	East Sumatra	5

Source : Ministry of Public Work, Indonesia (2002)

Table 5. The Number of Water Resources Management Agency created in 2001

No	Province	Number of Water Resource Management Agency (PSDA)
1.	East Sumatra	7
2.	West Sumatra	2
3.	South Sumatra	2
4.	Lampung	2
5.	South Sulawesi	3
6	East Nusa Tenggara	2

Source : Ministry of Public Work, Indonesia (2002)

Another important aspect of the new act was the establishment of National Resources Council replacing Coordination Team based on Presidential Decree No. 123/2001. The member of the Water Resources Council will be composed of

representation of government and non-government elements. Establishment of the National Water Resources Council is under authority of President, whereas on provincial level is done by Governor. In local level (district or municipality), Head of District or Mayor can establish a district/municipal Water Resources Coordination Body.

At the national level, Water Resources Council has the function as follow:

- to coordinate the formulation of water resources management
- to conduct internal and external consultation with all parties in government as well as non-government to achieve integrated policy and conflict resolution inter sector and inter area of government administrative of water resources management
- to give consideration to the president on water resources management.

3.3.2 Current River Basin Organization

As explained in the previous Chapter, river basins in Indonesia are divided into two main groups, developed river basin and less developed river basin. In developed river basin, River Basin Corporation play the role as manager and Balai PSDA play its role in less developed basin.

In *developed river basin*, the authority to manage falls to River Basin Corporation (PJT). River Basin Corporation as state-owned corporation is under central government authority through Ministry of Public Work (MPW) and State Ministry of Enterprise. This corporation has functions to manage water quantity, water quality, conservation, and maintenance of water resources infrastructure. PJT provides bulk water supply for irrigation systems, raw water for municipal and industrial use, water supply for hydropower plants, manages sand mining services, develops and operates tourism facilities on land and reservoirs under its control in its working area, and carries out consulting services. However, there is also Balai PSDA in developed river basin as territories of River Basin Corporation. They were

established to operate, maintain and manage the infrastructure and the water resources in the rivers that are not under the jurisdiction of PJT. These rivers include the 2nd, 3rd and 4th Order Rivers without major infrastructure or major water benefits with the exception of irrigation. Major infrastructure is managed by the PJT, so the Balai PSDA manage the smaller size irrigation infrastructure. These agencies are the lowest level provincial agency for advice and implementation of regulatory decisions (abstraction licensing, effluent discharge licensing, flood plain use, etc.) (Ramu, 2003).

Because River Basin Corporation is included as state-owned corporation, it has to be self-financing corporation. It receives its revenue primarily from water supply and water supply for hydropower generation. It doesn't receive revenue from irrigation bulk water supply.

In *less developed river basin*, the authority fall completely to Balai PSDA. As Technical Management Unit of Provincial Water Resource Agency (Dinas Pengairan), this agency is under authority of Provincial government. Based on Ministerial Decree of Home Affair No. 176/1996, the main functions of PSDA are irrigation management inter-district, providing bulk water for any purposes (agriculture, industry, tourism, drinking water, hydropower, port, etc), river management, (Lake, Dam, Ponds) Management, Flood and drought mitigation, marsh management, water pollution control, delta, estuary and shore protection. If the irrigation system is only on district scale, the authority is under District Public Work Agency. PSDA also play coordination system in provincial level because it becomes secretariat of Provincial Water Resource Committee (PTPA).

In cost recovery or financing, River Basin Corporation as state-owned corporation, it has to be self-financing corporation. It receives its revenue primarily from water supply and water supply for hydropower generation. It doesn't receive revenue from irrigation bulk water supply. In addition water user from irrigation gets biggest proportion than the other water user (domestic, industry/hydropower).

According to International Water Management Institute (2002) in Bandragoda (2006), annual water diversion (%) per different uses in Indonesia: Irrigation 93,5 %, Domestic 4,8,1 %, and Industry/Hydropower 5,7. Another river basin organization, Balai PSDA is fully financed by central government and provincial government.

Coordination scheme of water management still follows previous Act. Although Water Resources Act 2004 has been enacted, government regulation to apply that act is yet to be released. Recently the national coordination scheme of water management is conducted by national coordination team. This team is created by Presidential Decree No. 123/2001. Coordination team is headed by Coordinator Minister of Economy with several ministers as its members (State Minister of National Development Planning/Head of National Development Planning Agency, Minister of Public Work, Minister of Home Affairs, Minister of Agriculture, Minister of Forestry, Minister of Transportation, Minister of Mining and Energy, Minister of Marine and Fisheries, Minister of Health, Minister Industry and Trade, Minister of Finance, and State Minister of Environment. This team is helped by two secretaries: Deputy of Infrastructure from National Development Planning Agency and Director General of Water Resources from Ministry of Public Work. This decree also gives authority for governor to establish coordination team in provincial level and mayor in local level.

In provincial level, coordination team is called Provincial Water Resource Committee (PTPA) with PSDA Office as its secretariat. The Provincial Water Resources Coordination Committee (PTPA) set up in 1994 provides the policy direction for the basin water resource development and management. In district level, coordination is called District Water Resource Council (KTPA).

In basin level there is Basin Water Resources Committee (PPTPA). The administrative head of the regency (Vice Governor) is the designated chairman of

the PPTPA and members are drawn from the various provincial agencies in the basin and from the district government. There are currently no NGOs or direct beneficiaries on the committee.

There are also role of central government agencies on river basin management :

1. The Ministry of Public Works (MPW), manages the fifteen strategic and/or trans-provincial river basins and give Governor the authority to issue the licenses under MPW oversight in these basins.
2. The Ministry of Finance provides fiscal oversight of basin management for strategic basins.
3. The Ministry of Mining and Energy is responsible for the administration of groundwater resources.
4. The Ministry of Forestry has regulatory responsibility for issues concerning deforestation
5. The State Ministry of Environment has a regulatory responsibility in matters of pollution control and water quality management.

Construction authority of water infrastructure is also divided in three tier level. It is under national government (Ministry of Public Work) for dam development and irrigation system locating in inter-provinces area. It is under provincial authority (Provincial Public Work) if the basin or irrigation system lay in inter-district area. It is under local authority if the irrigation system lay only in district area.

As basin is divided into three zones, up-stream, and middle and down stream area, there is a different schema of financing and agency responsible for it. In up-stream area the project is performed by Ministry of Forestry with the objective to rehabilitate critical up-land and minimize land erosion by building terrace. This project is conducted by cooperation with Provincial and Local Forestry Agencies. In middle and down-stream area, the project is directed to increase agricultural

productivity by developing irrigation network. This entire project is funded by national government budget (APBN).

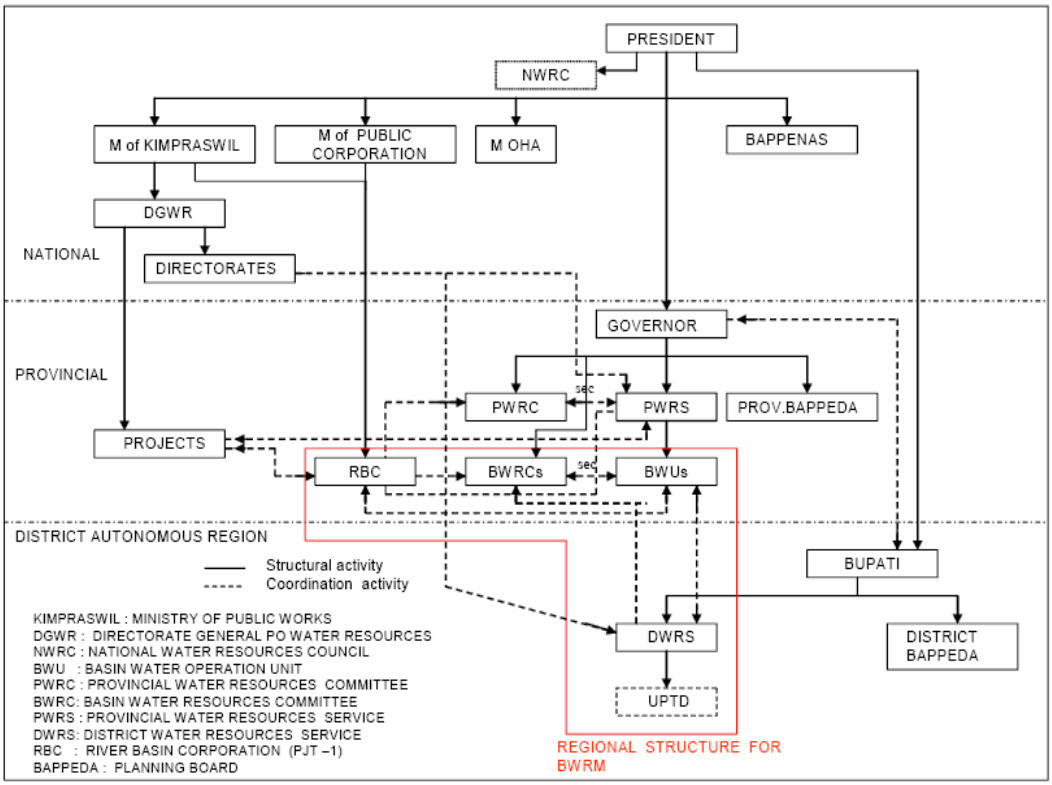

Figure 5. River Basin Organization on Developed River Basin (PJT I and PJT II)
Source : Ramu (2003)

3.4 Concluding Remark

Three countries, UK, USA, and Indonesia have different institutions responsible for river basin management. It also has different in degree of function, authority, number stakeholder involved. The difference has to be understood as how each country try to implement integrated river basin management approach adjusted with each social, economic, and political context. As conclusion of this chapter, following table summarize each countries condition.

Table 6. River Basin Organization in UK, USA, and Indonesia

Aspects	United Kingdom	USA	Indonesia
River Basin Organization	Environment Agency	Authority (TVA), Commissions	River Basin Corporation (PJT I & PJT II) and Balai PSDA
Boundaries	Hydrological	Hydrological, except New England Commission	Hydrological on PJT, and administrative on Balai PSDA
Authority	Central Government	Federal on TVA, Federal & State in Commission	Central Government in River Basin Corporation (PJT), Provincial Government in Balai PSDA
Function	Integrated pollution control, radioactive substances, regulation, waste management, water quality, land quality, water resources, flood risk management, navigation, conservation, recreation, and fisheries.	Varies from complete function in TVA and Delaware Commission : Drinking Water Protection, Stream Restoration, Flood control, Wetlands, Water Quality, Water Quantity, Fish and Wildlife, Recreation, and just Water Quality in Ohio River Basin Commision	Irrigation Management inter-district; Water Quantity; River management; Lake, Dam, Ponds Management; Flood and Drought mitigation; Marsh management; Water pollution control; Delta, estuary and shore protection
Portion Water Allocation	Industry & Domestic > Irrigation	Industry and Irrigation	Irrigation > water supply + hydropower
Evolution of Institutional Configuration	Local authorities → Central government → Privatization	Infrastructure Development → Establishment of RBO → Environmental Awareness	Central government → Local Community + Private + NGO
External Influence	European Union (EU)	No	Donor agencies (WB, ADB, USAID)
Coordination	- No national body of coordination since the abolishment of National Water Council in 1979 - Informal coordination	- No national body of coordination since the abolishment of National Water Council in 1979 - Informal coordination - Duplicating authorities	- Coordination Team at national level will be replaced by WRC - PTPA at Provincial level - PPTPA at Basin Level

Chapter 4
Comparative Analysis

This chapter will discuss some important element on institutional arrangement on integrated river basin management based on case study from United Kingdom, United States of America, and Indonesia. The elements are main issue in water management, decentralization, coordination, and integration. The last part is lesson learns from practical experience in UK and USA for Indonesia's condition.

4.1 Evolution of River Basin Organization

Evolution of basin organization in three countries varies based on social and political circumstance at that time. It makes each water management fragmented by period of time.

- UK water management is divided into three phase of development based on its dominant role. *The first phase* is water management before 1974 in which local government played significant role in water supply and sewage treatment by local agencies. Their strong role in water management was strengthened by their existence in 29 river authorities which created by Water Resources Act 1963. The responsibilities of he authorities were protecting water resources such as land drainage, fisheries, the prevention of pollution, and the issuances of permit to withdraw water. Later, the authorities was given other responsibilities concerning providing data related to water resources for local authorities, national government ministries, and public (Kromm, 1985). We can conclude that in this period of time local government played operator role in water supply and sewage treatment as well as regulatory role in River Authorities. The *second phase* is 1974-1989 of centralization in which the role of local government was diminished and shift to central government. This process was triggered by reorganization of local authorities which reduce the number of local authorities

in 1974. This local authority's reorganization was followed by water sector. Water Act 1973 created 10 Regional Water Authorities (RWAs) in England and Wales and replaced 29 river authorities, 160 water supplies undertaking managed by local authorities, and about 1300 sewage treatment and disposal unit. Government saw that water supply and sewage treatment were not locally offered public service, but they have to be managed and sold by efficient multipurpose regional monopolies (Kromm, 1985). The RWAs became responsible for water resources and supply, sewerage and sewage disposal, prevention of pollution, cleaning up of the country's river and estuaries, protection and development of salmon and freshwater fisheries, the recreation and amenity use of the water space, and navigation (Okun, 1977, in Castro et *al*, 2003). *The last phase* is the privatization of the ten regional water authorities by the end of 1989. This phase was triggered by two reasons, (1) Water Act 1983 which made the British Water Industry less a public service and more a business, (2) New conservative government objective to meet EU water standard in limited government financial capacity. This privatization transferred water supply and sewerage treatment to 10 Water Service Companies which replaces RWAs. Other duties previously in the hands of the RWAs like pollution control, water resources management, fisheries, flood protection were entrusted to a newly created public body, the National Rivers Authority (NRA).

- Water management in USA lasted in several period of time with different emphasizes. Unlike UK which emphasize to the shift of local to central interest an finally to privatization, evolution in USA emphasize on stage in building settled water management configuration. By 1930 USA experienced era of building dam, canal and irrigation network by creating US Army Corp of Engineer in 1802 to create canal for navigation and Bureau Reclamation in 1902 to build irrigation project in 17 western states. After infrastructure had been completed, USA entered period of formation of several river basin organization to implement integrated river basin management approach either in the form of authority type (TVA in 1933) or Inter-state/Federal-state Commission especially

in 1940s and 1960s after Water Resources Planning Act 1965 enacted. The 1960s actually the period in which there was a shifting from creation of river basin organization and water resources development to environmental protection. The act enacted in this period reflected great concern to environmental degradation in USA. Started by Wild and Scenic River Act 1968 and National Environmental Policy Act (NEPA) in 1969 by which every activities in project water management has to be assessed through Environmental Impact Assessment (EIS). This period reached the ultimate apex with the formation of Environment Protection Agency in 1970. This agency played a similar role as National River Authority in UK (later become Environmental Agency) in the term of guardian of environment.

- Water management in Indonesia is divided mainly into two main era, centralization and decentralization era. Centralization era lasted from Independency in 1945 till 2000 in which all law put responsibilities full on central government. In this period of time Indonesian Government just passed one act concerning water, Water Resources Act No.11/1974. Although there were many governments regulation related to water but they are translation of Water Resources Act. The establishment of River Basin Organization of two main river basin, Citarum 1974 and Brantas in 1990 is still under central government management. In which central government role through Public Work Ministry was very dominant both in financing and staffing. January 1st, 2000 Indonesian Government enacted Decentralization Act 22/1999 later revised by Law No.32/2004 giving large authority to regional and local government in many task include water management. The new Water Resources Act No.7/2004 was fully inspired by decentralization spirit in which role of local interest is more accommodated. The new act is significantly different from previous one, Water Resources Act 1974, in some respect: giving opportunity for private sector to participate in water supply with water commercial right, establishment Water Resources Council in every tiers of government (central, provincial, and local), and giving significant role to Water User Association (WUAs) in operating and

managing (O & M) small irrigation network. The content of new act to give more 'space' to private sector in providing water supply was negatively responded by NGO concerning water and environment. They worried that water resources become economic good and fully managed by private sector and the poor could not afford it anymore. The limited-privatization case of Jakarta Water Supply (PAM Jaya) to foreign companies give clear reason by which water price rose significantly and was not affordable anymore for the poor.

The evolution of institutional configuration in UK and Indonesia has similar emphasize in which there is a shift between local and central government. Unlike UK and Indonesia, USA faced different shape of institutional configuration. There was no shift from state to federal government or vice-versa, instead, they collaborated to emerge from period of 'building canal' until environmental protection era. It can be understood because USA as federal government built by several stated. So that states government has strong bargaining position toward federal government.

4.2 Type of River Basin Organization

Type of river basin organization is uniform in UK (Environment Agency), two type in Indonesia, and varies in USA. The uniform organization in UK reflects type of unitary state in which role of central government is stronger than local government compared to federal government in USA. Central government and Parliament have absolute power to reduce role of local authorities in any sector if service in national level considered efficient. Like UK, Indonesia also as unitary state in which role of central government is very significant. Although Balai PSDA as river basin organization in less developed basin fall under provincial government authority, biggest portion of fund come from central government. In contrast, USA as federal state has balance power between federal government and state government. Most of river basin organization was created based on agreement between federal and states, except Tennessee Valley Authority (TVA). TVA is one of river basin authority in USA fully managed by Federal Government.

4.3 Coordination Aspect

Coordination aspect of three countries varies based the existence of formally coordination institutions on national level. Before 1979, UK had National Water Council as formally national coordination body. As Conservative government elected in 1979, the National Water Council was abolished with consideration that Regional River Authorities was competent to manage all water-related activities alone. After that year RWAs replaced by National River Authority after privatization in 1989 and become Environmental Agency in 1995 performed informal coordination with other agencies and local authorities to perform it function. Because there are clear division in responsibility and authority among agencies, there is no problem emerging from lack of coordination.

Similar to UK, since the Water Resources Council was abolished in 1985, USA faced the problem of coordination. The lack of coordination can be seen in the battle not only between federal agencies and the states but also between federal agencies an another one which having similar interest for example US Army Corps of Engineer and Bureau of Reclamation in construction dam. That is why Rogers in Whipple (1996) proposed the creation of President's Water Council as a successor of former Water Resources Council to handle lack of coordination with objective to formulate a coordinated approach to water resources nationally and to supervise the federal contribution to that effort. He also proposed reorganization of water institutions under policies of the council as follow:

> " (1) All health-related research, standard setting, and regulation by EPA would moved to the Department of Health and Human Service; (2) The Army Corp of Engineers and the TVA would be eased out of resource development and become service and maintenance organization; (3) The Bureau of Reclamation would operate and maintain its existing facilities and try to establish a mission of environmental management in the western states; (4) The EPA would become literally an environmental protection agency with focus on maintaining the ambient environmental and ecosystem; (5) A new federal water resources planning and management agency would be created in

the Interior Department; (6) The Soil Conservation Service would be restricted to soil conservation and agricultural run-off problems. "

Similar to Rogger's recommendation, Featherstone (1996) also suggest improving coordination of water resources planning and management at federal level. Beside creation of new Water Resource Council, he suggests federal government to encourage additional federal-interstate compact and other institutional arrangement at regional level.

Indonesia formally has no problem concerning coordination on water resources management because there is institution arranging on it. At national level, there is Coordination Team headed by Coordinator Minister of Economy. . And there is Provincial Water Resource Committee (PTPA) at provincial level and District Water Resource Council (KTPA) at district. Even at basin level there is Basin Water Resources Committee (PPTPA). The new act of Water Resources No. 11/2004 will strengthen the coordination scheme by creating Water Resources Council at every level of government. The new council is significantly different from the previous one because it incorporates non-governmental agency interest.

UK and USA did not have formal coordination institution on national level since it was abolished in 1979 and 1985. UK didn't face the problem concerning coordination because there are no duplications in each agency's function as it happen in USA. Meanwhile Indonesia would strengthen national coordination institutions from Coordination Team based on Ministrial Decree toward National Water Resource Council based new Water Resources Act.

4.3 Integration Aspect

Since coordination aspect respect on relation between agencies related to water resources management, integration aspects refers integration inside environmental aspect (water quality, water supply, pollution control, flood protection, and forestry)

and integration between environmental and economics aspect (hydropower and water pricing) (Newson, 1992 and Hooper, 1995)

The three countries vary in integration of water-related field in its river basin organization. UK shows as the first integrated river basin management by RWAs in 1974, National River Authorities in 1989 and Environmental Agency (EA) in 1995 until now. This agency cover broad functions: pollution prevention and control, radioactive substances regulation, waste management, water quality, land quality, water resources, flood risk management, navigation, conservation, recreation, and fisheries. This function can be conducted because EA has three committee on it : Regional River Committee, Regional Fisheries Committee, and Regional Flood Defence Committee. The agency performs not only responsible for managing river basin in a broad term but also responsible for issuing and monitoring environmental standard for water supply and sewage treatment companies. This agency also played role as "Guardian of the Water Environment in England and Wales. Newson (1992) described how powerful this agency as 'police' in UK river by bringing 500 prosecutions to court by January 1990 using Control of Pollution Act 1974. In USA integrated river basin management has been long implemented by river basin organization either by river basin commission or in the form of authority like Tennessee Valley Authority (TVA). However, degree of integration varies in each river basin organization. The TVA Authority has more integrated function than the other comprises flood protection, water quality, navigation and hydropower. As the contrast The New England Commision is restricted to pollution control. The variation on degree of integration in rive basin management is determined by federal-states agreement. In USA, the role of states government is as strong as federal government in all aspect especially in states boundaries including water resources management. Unlike Enviromental Agency in UK which play also as regulator of environment standard, the role of guardian of environment in USA conducted by Environmental Protection Agency (EPA). This agency has mandate to administer and enforce a range of major environmental statues, and in certain

circumstances can administer and enforce state and local environmental laws (Thompson, 1996). Indonesia has implemented integrated river basin management and establish river basin organization either in developed river basin and under developed river basin. In developed river basin, two River basin Authority : Brantas River Basin Corporation (Perum Jasa Tirta I) and Citarum River Basin Corporation (Perum Jasa Tirta II) has broad function related to water resources management such as managing water supply allocation, water quality, flood control, river environmental management and water resources infrastructure. The remaining secondary, tertiary, quaternary rivers are maintained by the province through Balai PSDA. It also participates in promoting water based tourism. In less developed river basin, it was under authority of Basin Management Unit (Balai PSDA) to implement water resources management with river basin concepts. The responsibilities and function of Balai PSDA comprise management of water allocation, river, reservoirs, lake and pools, flood control and drought handling, in stream pollution control, river mouth maintenance, and inter-districts irrigation system. The function and responsibilities of two river basin corporation (PJT I and PJT II) and Balai PSDA is similarly integrated. The differences of its form of management lies on the 'employer' in which two form of management is responsible for. Two river basin corporations (PJT I and PJT II) are responsible to central government through Ministry of State Enterprise because they are state-owned companies. Whereas Balai PSDA is responsible to Governor since it is Technical Implementation Unit of Provincial Government.

Above description shows that UK has strong degree of integration of water-related activities in river basin organization through Environmental Agency and it is implemented uniformly throughout England and Wales. Indonesia also has similar degree of integration with two type of river basin organization. Meanwhile, river basin organization in USA varies in term of integration of water-related activities. It depend on each type of organization whether authority (TVA) or commissions. However, each commission has different degree of integration on water-related

activities. From three countries, Environmental Agency in UK is the strongest river basin organization not only as 'manager' of water resource management in broad term but also has regulator of environmental standard.

4.4 Cost Recovery

It is perceived an increasing need for any government, but especially for governments of developing countries, is to recover the costs of service of water resources management (Jasper, 2003). In term of charging to water user, three countries have different way. Environment Agency charge stake holder which abstract ground water (industry, agriculture, household, ad industry). It also charges polluter and activities of fishing. The deficit to finance operation cost is fully covered by central government through Department of Environment, Food and Rural Affairs (DEFRA). In USA, revenue from water user received from hydropower (biggest portion in TVA), industry, domestic and agriculture with proportion 46.4 %; 12.1%; 41.5%. Although agriculture sector use water quite significant, it pay some money to get water. In addition, as developed countries, UK and USA doesn't face financial limitation compare to developing countries. On the other hand, Indonesia face financial capacity for water management sector. That is why the plan of Indonesian government to establish new River Basin Corporation (PJT) can be understood to make self-financing river basin organization. Unfortunately, existing River Basin Authority faces problem in generating revenue. Most of water user (bulk water) is agriculture sector, which is not charged. Based on percentage diversion of water user, agriculture sector in Indonesia consume 93.5% total water, compare to domestic 3,3 % and industries 2,7 %. The dominance of agriculture sector become on of factor by which reform process run slow in Asia (Bandaragoda, 2006).

4.6 Lesson Learn

From description on water management especially in river basin level in UK and USA some positive aspect can be drawn from its original issue, evolution

configuration, coordination and integration aspect. As described in previous chapter that developed-country model of river basin organization can not be directly replicated in developing countries without consideration. It can be understood because there are significant differences in characteristic of nature, demography, land use, and political setting.

The first positives aspect of water management in UK comes from the evolution of institutional configuration. Apart from criticism over privatization in 1989, Conservative government had prepared this process since they won general election in 1979. Indonesia have to prepare enough time if would like to privities its water supply. The second one is, hydrological boundaries of water supply and sewage treatment companies. In Indonesia, water supply and sewage treatment service offered by local authorities and administrative boundaries. Shifting from administrative boundaries to hydrological boundaries will ease river basin authority allocates raw water. But on the other hand, this shift will change ownership of agency from single local government to two or more local government. The third one is river basin organization in UK has high degree of integration among water-related activities. As explained in the previous chapter, Environment Agency has function to exercise *integrated pollution prevention and control, radioactive substances regulation, waste management, water quality, land quality, water resources, flood risk management, navigation, conservation, recreation, and fisheries*. Beside, this agency also played a regulatory role in administers and empower environmental standard in UK. Indonesia can adopt this high degree of integration for river basin organization. Instead creating new institutions Indonesia can improve existing river basin organization either Balai PSDA in less-developed river basin and River Basin Corporation (PJT I and PJT II) in developed river basin. High integration in aspect can be translated in Indonesian case by merging water-related activities function with other activities in up-stream area. Until now Ministry of Forestry has Technical Management Unit concerning river basin management (BP DAS), which located in every river basin throughout Indonesia and has function in land rehabilitation and

soil conservation. Since its function directly influence water quantity to river flow, it would be better if this agency merge with existing river basin organization either Balai PSDA or River Basin Corporation. The second adjustment is about river basin organization in less developed basin (Balai PSDA). Because river basin boundaries almost never coincide with administrative boundaries, Balai PSDA should be improved its boundaries to hydrological boundaries. As the result Balai PSDA could not be under Provincial Government authority anymore. From USA experience, the positive aspect can be drawn is the role of Environmental Protection Agency (EPA) in water-related activities. This agency can take over environmental programs in local level if it is considered ineffective. In order to protect environmental quality, Indonesia can adopt this aspect by improving existing governmental agencies responsible to environmental protection.

Chapter 5
Conclusion and Recommendation

5.1 Conclusion

Institutional arrangement is absolute prerequisite to implement integrated river basin management approach. Legal aspect on water sector and institution responsible to river basin management (River Basin Organization) is the heart of institutional arrangement. Type of River Basin Organization varies in every countries influenced by social, economic, and political contexts. This research strengthens previous studies that conclude integration and coordination is the critical aspect in successfully implementing integrated river basin management approach. Understanding contexts lead to carefully lesson learns process.

UK experienced complete evolution in water resources management from 1800s until now. Significant role of local authorities before 1974 shifts to central government thorough the establishment of Regional Water Authorities. This process also triggered by reorganization of local authorities to the fewer structures in number. The influence of Conservative government, obligation to meet EU standard on water quality, and limited financial capacity of government at the same time lead to privatization process on water authorities in 1989. Privatization which was criticized in the beginning became media to achieved recently ultimate development of water management. Unlike UK, development of water management in USA was significantly influenced by the effort to deal with any limitation. The arid area in the west resulted from less precipitation lead to reclamation era in the term of building irrigation network. Scarcity of land transportation pushes development of canal. Two original issue on water management guided US water management history collaborated with equal power between federal and states government entered the era of establishment water-related agencies including river basin level. The

abolishment of national water council and duplicating task of several governmental agencies become unsolved problem on US water management.

Indonesia combined two type of water management evolution of UK and USA although having different original water issue. Abundant precipitation and economic base on agriculture lead to irrigation as main issue. Evolution of water management happened in two dimensions simultaneously. In one side the there was a gradual shift of central government role toward participation of local interest (local authorities and local community) even private involvement. On the other there was process of building water-related infrastructure in the first step and followed by institutional development particularly on basin level. As other developing countries, Indonesia was influenced by external factor (donor agencies) in reforming its water sector. The decentralization phase after 2000 accelerated government to reform water sector. The dualism authority in managing river basin and agriculture sector as biggest water user reflects reformation in water sector faced the significant challenge.

The some aspects of water management both in UK and in USA can be drawn as lesson to be carefully used and implemented in Indonesia. High degree of integration and clear division of agencies' role in river basin management in UK can be taken as positive aspect. UK and USA also give lesson of strong recognition on environmental protection. As Environmental Agency in UK and EPA in USA play significant role as environmental guardian.

5.2 Recommendation

High integration should be translated into reorganization of river basin organization. Instead of creating new river basin organization, improving responsibility and authority would lead to better performance. As government concern to reform water sector, acceleration to implement "one basin one management" is needed. The existing donor-supported river basin organization,

Water Resources Unit (Balai PSDA), does not represent the principle of integrated river basin organization since its boundaries follow administrative boundaries. It might be done only for river basin in one province. Moreover, its existence in developed basin leads to duplication of authority. Government has to choose one of the type or river basin organization. Integration should also leads to strong coordination or formal coordination with authority in up-stream area since Technical Implementation Unit office of Ministry of Forestry is responsible to land rehabilitation and soil conservation in upstream area. Integration also has to be translated by considering formation water supply company and sewage treatment with hydrological boundaries as environmental benefit is obviously recognized.

Strong environmental regulator or environmental guardian could be implemented by empowering Regional Agency on Environmental Impact Protections (BAPEDALDA) or Ministry of Environment with broad responsibility and authority. The strong of environmental institution will ensure implementation of integrated river basin management in Indonesia.

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