AUTHOR'S BIOGRAPHY

Isnugroho was born on March 6, 1955 in Purworejo, Indonesia. He graduated in Civil Engineering, Gadjah Mada University, Yogyakarta, Indonesia in 1979 and continued Post Graduate in Hydraulic, Ecole Nationale des Travaux Publics de l'Etat, Lyon, France, 1985. Began his career in 1978, the author implemented many researches and projects related to water resources management. Having experiences nearly 36 years in water resources management, responsible for Research Activities (Technical and Administration) in River Engineering and Management and up to now he has officiating as an Executive Director of Center for River Basin Organizations and Management (CRBOM). The author also teaches subject related to water resources management in private university.

Born in 63 years ago in Denmark. **Tue Kell Nielsen** has finished his last study as PhD in Technical University of Denmark (Institute of Social Science) and Asian Institute of Technology (School of Management) in 1995. The Author has many experiences on water-related studies and consultancies in Asia since 1982 with long-term assignments, in Cambodia, Bangladesh, Laos and Thailand included Indonesia, working at the regional level, national level, river basin level, province level, etc. At present, He is still working to share knowledge and experiences as Water Resources Management Advisor in Cambodia.

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FUNCTIONAL FRAMEWORKS *for* RIVER BASIN GOVERNANCE

Isnugroho
and
Tue Kell Nielsen

Functional Frameworks for River Basin Governance

Isnugroho and **Tue Kell Nielsen**

RESEARCH CENTER for WATER RESOURCES
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Composer Team:

Author	: Isnugroho Tue Kell Niesen
Editor	: Dennis Von Custodio, ADB Kawasaki Tadashige, JWA Tomonobu Sugiura, ADB
Reviewer	: Slamet Budi Prayitno, Diponegoro University Wouter Lincklaen Arriens, NARBO Senior Advisor
Resources Person	: Tjoek Walujo Subijanto, NARBO Senior Advisor Raymond Valiant Ruritan, PJT 1
Layout	: Galih Hapsoro Ita Bernawati

For a full list of publications please contact:
Center for River Basin Organizations and Management (CRBOM)
Balai Sungai, Pusat Penelitian dan Pengembangan Sumber Daya Air
Jl. Solo – Kartasura, Pabelan, Solo 57162, Jawa Tengah Indonesia
Phone : +62271 719429
Fax : +62271 716406
Website : www.crbom.org
E-mail : info@crbom.org

FOREWORD

Minister of Public Works and Public Housing Republic of Indonesia

Book is a source of knowledge that gives intelligence to the reader. Similar to the science and technology, technology products will be able to give a solution to realize the development of civil construction.

In accordance with the national long-term development plan (RPJPN) 2005-2015, the science and technology is one of essential element to help resolve a various problems in development.

One of disseminations method which is used by the Agency for Research and Development Ministry of Public Works and Public Housing to promote technology products is through a book. It is very useful for infrastructure development in the future.

My high appreciation for publishing a book of science and technology entitled "*Functional Frameworks for River Basin Governance*".

Hopefully the publication of this book can be a reference for readers which will assist them solving problems related to the field of Public Works and Public Housing, with intelligent of science and technology and considering the values of local wisdom so that the provision of infrastructure and management of Public Works and Public Housing in the future will be more reliable and sustainable.

I hope this book could be improved a new knowledge and technology for the future of our nation. Together we build the nation.

Jakarta, November 2014

DR. Ir. M. Basuki Hadimuljono, MSc

FOREWORD

Director General of Agency for Research and Development Ministry of Public Works, Republic of Indonesia

Ministry of Public Works and Public Housing is a unit which is established to provide infrastructures and settlements which are needed and feasible for the people. In order for the success and acceptance of the development has a high value, then the role of the people's involvement in development need to be improved. The patterns of people's involvement must be programmed in any development activities, starting from the planning, construction, and evaluation. The technological innovation studies, conducted by the Research Agency Ministry of Public Works and Public Housing, serves as a basis for implementation of development or scientific backbone, which is intended for the availability of infrastructure and settlements, with guaranteed in quality and reliability, friendly environment and sustainable, all of which is called the integrated development pattern.

The book's of Functional Frameworks for River Basin Governance presented by Research Center for Water Resources, Agency for Research and Development is one of the efforts to realize the ideals of the Ministry of Public Works and Public Housing for the nation and the state. This book is about the different type of river basin governance including the strengths and weaknesses so that it can be used as reference on choosing appropriate type of river basin governance.

Not be denied, this book still has shortage. However, we hope that this book is able to provide enlightenment and become one of the troubleshooting solutions which are often encountered by stakeholders, especially in the planning, construction, and evaluation of infrastructure development of Public Works and Settlement.

Thank you we convey to the resource persons for any given input so that the book could be published. For researchers and engineers which in order to enhance the capabilities, to produce other books, and as one of the efforts in educating the nation.

Jakarta, November 2014

Ir. Waskito Pandu, MSc

FOREWORD

Director of Research Center for Water Resources
Agency for Research and Development
Ministry of Public Works, Republic of

The Integrated Water Resources Management (IWRM) process is imperative in this connection, with its inter-sector perspective, its emphasis on balancing the diverse present and future needs of water, its orientation towards the 'triple bottom line' (social, economic and environment).

In the past decade, most countries in Asia have already adopted national water policies that advocate IWRM based on the river basins. Similarly, as in Indonesia, with the enactment of Law No.7 year 2004 on Water Resources, management of water resources in the river basin that includes water conservation, water utilization and water-induced disaster management carried by the river basin management organization and called the Balai Wilayah Sungai / Balai Besar Wilayah Sungai. The government of Indonesia has then established 33 River Basin Organization belonged to the Central government and 2 corporate RBOs, namely Perum Jasa Tirta (PJT 1 and PJT 2).

River basin organizations (RBOs) in Asia are acting now to prepare their river basins for a future that is characterized by unprecedented urbanization and land-use change, increasing water scarcity and competition, more frequent extreme events, and the need to adapt to greater climate variability and change.

These preparations require a high degree of technical capacity coupled with more authority to manage the process of integrated water resources management in the basin, with the participation of public and private stakeholders and civil society.

To perform these tasks competently, RBOs need to attract highly skilled professionals who can analyze complex scenarios with the help of advanced models and data collection, and cut through that complexity to advise decision-makers on clear policies and targets supported by comprehensive investment programs.

To meet these unprecedented challenges, governments in Asia now have a wider range of choices of governance models for basin management than before. In addition to government RBOs operating within constraints of the government system, the first corporate and quasi-corporate RBOs in Asia

are already delivering encouraging results, supported by governments that have demonstrated strategic foresight.

The Network of Asian River Basin Organizations (NARBO) is well placed to share these experiences with governments in Asia that are still looking for appropriate types of RBOs to deliver the expected results in a framework of good water governance.

This book is written by Messrs Isnugroho and Tue Kell Nielsen, explaining about the different models of RBOs operating in the region, including their strengths and weaknesses and possible combinations. The book is expected to be used as a reference in choosing the appropriate type of River Basin governance in the region.

Bandung, November 2014

Dr. Ir. Suprapto, M.Eng

FOREWORD

NARBO CHAIRPERSON

Asia is a continent rich in water resources. However, because Asia has the highest population density, many countries in the continent are struggling to achieve water security against a backdrop of too much water, too little water and too dirty water. It was with this in mind that the Network of Asian River Basin Organizations (NARBO) was set up in 2004 with the goal of helping these countries to better manage their water resources through the establishment of River Basin Organizations (RBOs).

RBOs in Asia are acting now to prepare their river basins for a future that is characterized by unprecedented urbanization and land-use change, increasing water scarcity and competition, more frequent extreme events, and the need to adapt to greater climate variability and change.

These preparations require a high degree of technical capacity coupled with more authority to manage the process of integrated water resources management in the basin, with the participation of public and private stakeholders and civil society and adopting a multi-disciplinary approach that balances a triple bottom line of economic, social and environmental outcomes. At the same time, RBOs need to attract highly skilled professionals who can analyze complex scenarios with the help of data collection and advanced models, and cut through that complexity to advise decision-makers on clear policies and targets supported by comprehensive investment programs.

To meet these unprecedented challenges, governments in Asia now have a wider range of choices of governance models for basin management than before. In addition to public RBOs operating within constraints of the government system, the first corporate and quasi-corporate RBOs in Asia are already delivering encouraging results, supported by governments that have demonstrated strategic foresight.

NARBO in collaboration with the Center for River Basin Organizations and Management (CRBOM) and the Asian Development Bank (ADB) have organized a number of forums and seminars to collate the rich experiences from NARBO member organizations in managing river basins across Asia. This book is a commendable effort to put into print the experiences of the

different models of RBOs operating in the region, including their strengths and weaknesses and possible combinations.

I would like to thank CRBOM and the authors, Messrs Isnugroho and Tue Kell Nielsen, for their work in publishing this book which could serve as a reference for governments in Asia that are still looking for the appropriate types of RBOs to deliver the desired results within a framework of good water governance.

Dr. Keizrul bin Abdullah

Acknowledgement

The authors are grateful for guidance, information and contributions from many practitioners in countries across the region, including Wouter T. Lincklaen Arriëns, Budi S. Prayitno, Ian Makin, Dennis Von Custodio, Fahmi Hidayat, Koichi Takano, Raymond Valiant and Tjoek Walujo Subijanto.

Observations and suggestions have been extracted from many presentations and papers produced since 2009 in connection with ADB's Regional Technical Assistance 6470: '*Managing Water in Asia's River Basins: Charting Progress and Facilitating Investments'.*

A draft version was discussed at a International Seminar on Corporate River Basin Organizations in Asia, held by Network of Asian River Basin Organizations (NARBO) in Selorejo Resort, near Malang, East Java, on 23-24 June 2011. The event was attended by 67 participants - water management champions, decision-makers, academics, discussion leaders and resource persons - from Bangladesh, China, India, Indonesia, Japan, Laos, Malaysia, Philippines, Spain, Sri Lanka, Thailand, Uzbekistan and Viet Nam, with institutional representatives from ADB, ADB Institute, Asia-Pacific Water Forum, CRBOM, UN-ESCAP, JICA, NARBO and Japan Water Agency (JWA). The participants exchanged experience, observations and ideas that have been carried forward to the paper.

Contents

Summary

Many new, significant challenges – and many new and equally significant opportunities – are enhancing the need for basin-level governance: Water security, food security, and water-dependent livelihoods must be supported by unprecedented background of urbanizations and new lifestyles, not to speak of a changing climate.
This requires far-reaching decisions, timely implementation and (often substantial) investments in water supply and sewage infrastructure; irrigation; storage capacity; flood protection; and morphological management. Such decisions have particular inter-sector implications, increasing the importance of basin-level dialogue and coordination to share a finite amount of water, supplies and services, achieve effective management of the aquatic environment, and to develop the required knowledge-base.

Basin organizations are characterized by their mandate; authority; and capacity to meet the needs of the stakeholders in the basin. To be effective, the RBO must have a suitable harmony between these three dimensions.

A distinction can be made between three types of RBO:

- The **council** (or committee), often with governmental and non-governmental representatives;
- The **public RBO**, which is an integrated part of the government system; and
- The **corporate RBO**, owned by the state but with the some degree of autonomy and the status of a legal entity.

These types may in fact operate side by side, and support each other, as convincingly demonstrated in examples in Indonesia and the Philippines.

The following strengths of these three types are recognized:

- The council (or committee) is established to expand and support inter-agency coordination and stakeholder collaboration, and generally has strengths in the processes of facilitation and conflict resolution. Its performance is related to its ability to foster joint, broadly accepted recommendations. If it performs well it can have a high degree of informal authority, for example in connection with water allocation.
- The public RBO, being an integrated part of the government system, has a strong legitimacy, which is important if the RBO is involved in

water-allocation, regulation and enforcement. If institutionally housed in a ministry, it will be in a good position to liaise with that ministry in connection with policy formulation and planning, but may be somewhat more distant from other ministries and agencies.

- The strengths of the corporate RBO are derived from its autonomy and revenue generating ability. Provided that it is in a position to implement its own plans and development initiatives (within its mandate and financial capacity), it is able to respond faster to needs and opportunities. Also, it can feature a relative strengthening of the basin-level perspective as compared with the public RBO (where funds are allocated in a broader perspective).

How should governments determine which RBO model is appropriate? The type of RBO must be appropriate for the stage of development in the basin, and reflect the mandate it is to be assigned, and the related authority and capacity it is to be allowed to develop:

- Strategic planning and scoping suggests an advisory council type of RBO (with broad participation but no formal authority) may be appropriate. Such a body can also provide valuable guidance on water allocation.
- Water allocation, regulation, (and perhaps enforcement) may indicate a public type of RBO (with high degree of formal authority).
- Supplies, services and infrastructural development may indicate a corporate type of RBO (with high capacity to make and implement decisions and collect service charges from users).

Some overarching conditions for successful RBO performance are shared by all three types. These are somewhat related:

- Political support and commitment;
- Good relations with water users and other stakeholders; and
- Good leadership and human resources.

Acronyms and Abbreviations

BBWS-BS: Balai Besar Wilayah Sungai Bengawan Solo (River Basin Development Agency, under Ministry of Public Works, Indonesia)

BPRBC: Bang Pakong River Basin Committee (Thailand)

CRBOM: Center for River Basin Organizations and Management (Solo, Central Java)

CWC: Central Water Commission (India)

DVC: Damodar Valley Corporation

DVRCC: Damodar Valley Reservoir Regulation Committee

GCG: Good corporate governance

IWRM: Integrated water resources management

JWA: Japan Water Agency

K-water: Korea Water Resources Corporation

LLDA: Laguna Lake Development Authority (Philippines)

LUAS: Lembaga Urus Air Selangor (same as SWMA), (Malaysia)

MASL: Mahaweli Authority of Sri Lanka

MDBA: Murray-Darling Basin Authority (Australia)

MRC: Mekong River Commission

NARBO: Network of Asian River Basin Organizations

OECD: Organization for Economic Co-operation and Development

PJT1: Perum Jasa Tirta 1 (Jasa Tirta1 Public Corporation) (The Brantas and Bengawan Solo River Basin Management Agency) (Indonesia)

PJT2: Perum Jasa Tirta 2 (Indonesia)

PPWSA: Phnom Penh Water Supply Authority

RBO: River Basin Organization

RRBO: Red-Thai Binh River Basin Organization (Viet Nam)

SWMA: Selangor Water Management Authority (same as LUAS) (Malaysia)

SOE: State-owned enterprise

TKPSDA: Tim Koordinasi Pengelolaan Sumber Daya Air, Bengawan Solo Water Council (Indonesia)

TVA: Tennessee Valley Authority (USA)

YRCC: Yellow River Conservancy Commission (People's Republic of China)

Applied Terminology

The following terminology is used in this paper. Several terms can have a more precise meaning, perhaps defined by law, which can vary from one country to another.

Authority: *Formal authority* is the power assigned (by law, decree or statute) to the RBO about which decisions it can make and implement - for example related to water allocation, fees and licenses. *Informal authority* is the respect and confidence it enjoys from decision-makers, water users and other stakeholders, and the general public, as a basis for their support.

Corporate RBO: RBO with the status of a corporation (or a *'business'),* owned by the state, and responsible to the state for its activities, but otherwise operating as an independent (and financially autonomous) legal entity.

Corporation: An organization registered as a legal entity in accordance with national law and operating as a business.

Integrated Water Resources Management, IWRM (according to Global Water Partnership): *'A process that promotes the coordinated development and management of water, land and related resources in order to maximize economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems and the environment'.* IWRM was instituted in Agenda 21 at the Earth Summit in Rio de Janeiro in 1992 [1]. IWRM aims at 3 balances: (i) A balanced water allocation within the basin (upstream/downstream, rural/urban, etc.); (ii) balance between the various in-stream and off-stream demands (including households, food production, other production, hydropower, inland fisheries, navigation, tourism, aquatic habitats, etc.); and (iii) balance between present and future needs (in terms of water security, water-related risks and environmental quality).

Legal entity (or juridical entity, or juristic person): A person or a body (such as a company or corporation) that can make legal agreements, own (and borrow) financial assets, generate and allocate revenues, employ staff, pay taxes, and be liable for its actions. Details vary according to national law.

Liability: Legal responsibility (and an obligation to compensate) for example for financial losses, damages to human health or welfare, or adverse

1 Also known as the United Nations Conference on Environment and Development (UNCED) - a global milestone event, with participation by 172 governments (including 108 heads of state or government), and some 2,400 NGOs

environmental impacts caused by a legal entity. *Limited liability* is confined to the value of the assets of that entity. Details vary according to national law.

Non-profit organizations: Actually, these will often try to make a profit - only it is not paid to the owners, but retained for consolidation and expansion. Depending on national law, non-profit organizations can enjoy some privileges, such as tax exemption.

Mandate: A set of tasks (to be undertaken by an RBO) (such as for example, from case to case, water allocation, basin-level development planning, supply of water and sanitation, sewage disposal permits, hydropower generation, flood management, monitoring, and others).

Performance (of an RBO): The degree to which an RBO achieves results in accordance with its mandate, functions, and key performance indicators; or *'its ability to do what it is expected to do.'*

Performance benchmarking (of an RBO): A structured evaluation of its performance relative to *'best practices',* or relative to the organization's declared performance goals, considering its stated responsibilities and operation.

Private: Belonging to one or several individual persons (shareholders or partners or a family, or simply individual owners).

Public RBO: An RBO with the status of an entity of the executive branch of the government, formed by law or by decree, staffed with government employees, and often placed within a ministry.

Quasi-corporate RBO: A public RBO with some features of a corporate RBO (for example with respect to autonomous decision-making, and/or staff employment, and/or generating a direct revenue stream).

Regulation (at the basin level) can from case to case cover water allocation within the basin (including operation of weirs and reservoirs); permits to withdraw surface water or groundwater; sewage discharge permits; hydropower concessions; sand mining licenses; land use; permits for physical interventions such as bridges, embankments and dikes; and related dispute resolution.

River basin: The drainage basin of a river; the area from which the surface runoff flows via the river to the sea. A *river basin district* can include several river basins, along with adjacent areas that discharge directly to the sea.

River basin organization (or RBO): An organization that undertakes some water-related tasks within a river basin or a river basin district. Tasks such as water-sharing/water allocation, flood management, and management of the aquatic environment, must by necessity consider the river basin level. Several other tasks, such as water supplies and

water-related development planning, can benefit from applying a basin-level perspective.

Stakeholder: An organization or an individual that is influenced by a decision, or has an interest in a decision, or is in a position to influence the decision or its implementation.

State Corporation: A corporation (business) owned by the state; same as *state-owned enterprise.*

1. Introduction

The Case for Basin-level IWRM

Many new, significant challenges – and many new and equally significant opportunities – are enhancing the need for basin-level governance: Water security, food security, and water-dependent livelihoods must be supported unprecedented background of urbanizations and new lifestyles, not to speak of a changing climate.

The integrated water resources management (IWRM) process is imperative for access to safe water, food and energy, with its inter-sector perspective, its emphasis on balancing the diverse present and future needs of water, its orientation towards the *'triple bottom line'*,[2] and its active stakeholder participation.[3] The IWRM process provides a shift from fragmented and sector-based project planning to a cross-sectoral, long-term process that is holistic and inclusive.

In the past decade, most countries in Asia have adopted national water policies and legislation that advocate IWRM in river basins. Implementation is evolving towards collaboration between central and local governments, businesses and civil society, activating water-related benefits to serve national and local needs.

The Role of the RBO

An RBO can, from case to case, facilitate and/or implement the various development processes and decisions.

Across Asia, a variety of small and large RBOs are now helping governments and stakeholders to implement IWRM in river basins. Many of the RBOs operate within the structures of regular government departments. In other cases, however, a corporate or quasi-corporate model has been selected, to provide RBOs with greater autonomy in their management, capacity development, and revenue generation.

Decision-makers who are considering how to establish new RBOs or to strengthen existing ones now have a wider choice of models and examples to determine effective solutions that suit the local conditions.

2 The *'triple bottom line'* considers economic, social and environmental benefits

3 *'Stakeholders'* may include organizations or individuals that are influenced by a decision, or has an interest in a decision, or is in a position to influence the decision or its implementation.

This Paper

The present paper has been prepared in support of appropriate choices regarding basin-level governance, based on experience, good practices and observations from Asia and beyond.

2. RBO Models and Characteristics

2.1 Overview: Mandate, Authority and Capacity

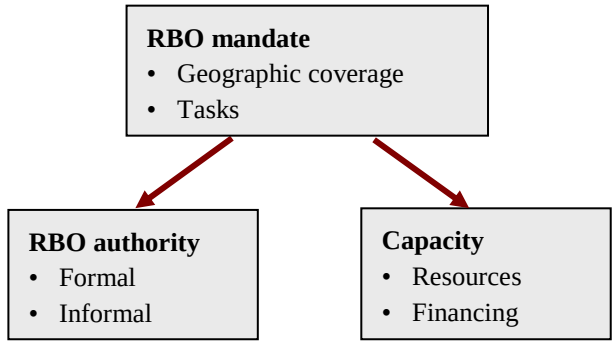
The purpose of an RBO depends on the development stage and management needs in a particular river basin, and on the preferred allocation of management tasks between the RBO and other organizations. As exemplified in Appendix A, an RBO can be involved in regulation; and/or development planning; and/or implementation; and/or various cross-cutting activities.

Broadly, an RBO can be characterized in terms of its

- Mandate;
- Authority (formal and informal); and
- Capacity.

The primary characteristic of an RBO is its mandate – what it is expected to do. Its authority and capacity must be provided accordingly. Otherwise, its performance will be less than wished for. This is illustrated in the figure below.

Figure 1: Mandate, Authority and Capacity



When the agenda for water-related development is changing, the RBO must adapt to new concerns and opportunities. This may well require an upgrading of its mandate, and a consequential upgrading of its authority and capacity.

A distinction is made between *'formal authority'* (the power allocated by the government to the RBO) and *'informal authority'* (the respect and confidence, and hereby support) it enjoys from decision-makers, water

users and other stakeholders. These two characteristics are not directly related.

Formal Authority

Some river basin organizations have a high degree of formal authority, while others do not. In both cases, the organization can hold important responsibilities and can fulfill these responsibilities in a useful and expedient way.

Authority is required, or is at least highly useful, in connection with management tasks such as water-sharing, and implementation and operation of physical infrastructure (such as public water supply, irrigation systems, or structural flood protection).

Generation of authority can be difficult and time-consuming and is not always necessary. This is the case for important management tasks such as water-sharing/ water allocation; development scoping, policy formulation and planning; and inter-sector coordination.

The authority of a basin organization can evolve in the course of time, depending on the need of basin wide management (for example benefit-sharing for large development initiatives) and the physical and institutional context.

Isnugroho (July 2009): Authority and responsibility in river basin management. CRBOM Small Publications Series no. 1

A high degree of *informal authority* is an asset for any RBO. A council or committee, perhaps without much formal authority, cannot operate without it. A government RBO and a corporate RBO might just survive, but will face serious difficulties as soon as it comes to implementation.

Good performance and high informal authority depend on each other and can develop in parallel. The interaction can be supported by a high degree of credibility; a demonstrated ability to provide effective solutions during water shortages; a suitable visibility; and a certain momentum (or progress) of water-related governance and development.

2.2 Three Models: The Council, Public RBO and Corporate RBO

General

RBOs can exist as for example councils; committees; commissions; agencies; authorities; corporations; and water boards. The terminology is not stringently defined, but is related to the status of the RBO. Name shifts from committee to commission to water board to authority indicate a higher degree of formal authority.

RBOs in the Philippines

The Philippines applies five types of RBOs:

Authority (such as the Laguna Lake Development Authority);

Commission (such as the Pasig River Rehabilitation Commission);

Council (such as the Cagayan de Oro River Basin, and Lake Lanao Watershed Protection and Development Councils);

Project Management Office (PMO) (such as the Bicol River Basin PMO, the Cotabato-Agusan River Basin Development PMO and the Cagayan River PMO); and

Inter-agency Committee (such as the Manila Bay River Basin Coordinating Committee and the Mindanao River Basin Task Force).

Candido Cabrido (February 2009): Overview of river basin organizations and water-related agencies in The Philippines. Report prepared under ADB's TA 4552-PHI: Master Plan for the Agusan River Basin Project, Policy Study on River Basin Management in The Philippines

A simplified distinction can be made between three models:

- *The council (or committee)*, providing guidance on for example water-sharing and water-related development. Secretariat functions can be provided externally (for example by a public RBO);
- *The public RBO (or river basin office)*, with the status of a government body, often placed under a ministry, and managed and staffed by government employees; and
- *The corporate RBO*, owned by the state, but operating as an independent legal entity.

Actual RBOs can work somewhat in between these models, or they can operate side by side in the same river basin. Councils (or committees) can have technical and administrative support from a public RBO (or river basin office).

Typical mandates are listed below.

Table 1: Examples of Typical RBO Mandates

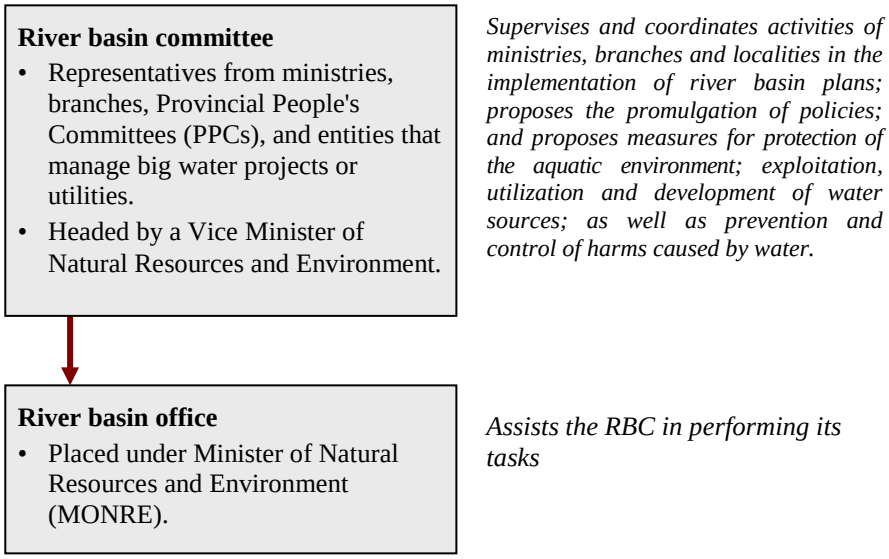
Mandate	***Council***	***Public RBO***	***Corporate RBO***
Guidance			
Development planning, guidance on water-sharing, guidance on regulation	***V***	***V***	***V***
Regulation and enforcement			
Water allocation within the basin (including operation of weirs and reservoirs); permits to withdraw surface water or groundwater; sewage discharge permits; hydropower concessions; sand mining licenses; land use; permits for physical interventions such as bridges, embankments and dikes; related dispute resolution		***V***	
Implementation			
Development planning	***V***	***V***	***V***
Services (flood forecasting, monitoring, surveys, studies, knowledge-sharing)		***V***	***V***
Construction of physical infrastructure: Water supplies (to water utilities, irrigation operators, and/or households and industries), sanitation, sewage treatment, power generation		***V***	***V***
Operation of physical infrastructure, and related cost recovery			***V***

The Council

The council is a body of members that can represent various stakeholders from within and outside the government system, institutional as well as individual. Its tasks can include guidance on basin-level water sharing and coordination of sector planning within the basin.

An illustration of this type of RBO is provided below. The example is from Viet Nam, but similar modalities are applied in Indonesia and Thailand (where they are called committees), and are in preparation in Cambodia and India.

Figure 2: An RBO for a Major River Basin in Viet Nam



Simplified, after Decree 120/2008 (1 December 2008) on River Basin Management
Viet Nam is divided into 8 major and 61 inter-provincial and provincial river basins

The Public RBO

The public RBO is an integrated part of the government system. It may liaise with (or involve) involve a variety of stakeholders, governmental as well as non-governmental, but its authority is a part of the authority of the government.

An IWRM-oriented RBO should be multi-disciplinary (and hereby inter-agency) in its nature, but it is normally placed under the ministry that is in charge of national water resources management.

Its operation can be affected by institutional implications, given that much expertise will be located outside the RBO, and that implementation (and financing) of many development initiatives will best be undertaken by sector agencies other than the mother organization. Needs of institutional bridging can exist in connection with joint management of water quantity and quality (if placed under different ministries); or groundwater and surface water; or irrigation and agriculture.

RBOs placed within the government system are applied in for example Afghanistan, Cambodia, People's Republic of China, Indonesia, Lao PDR, and Malaysia. Sometimes they have a certain operational autonomy.

The Corporate RBO

The corporate RBO is owned by the state but has the status as a legal entity. Hereby, its operation becomes separate from the government system. Subject to government control and agreed statutes, it can make its own decisions. It can manage its own finances, buy and sell, generate and manage its revenue, borrow money, and employ and lay off staff. It is financially autonomous, but not necessarily financially independent, since part of its funding can come from the state, depending on its responsibilities and the scope for cost recovery.

RBOs with varying degrees of operational and financial autonomy are found in the People's Republic of China, Indonesia, Japan, Korea, Malaysia, Nepal, Pakistan, The Philippines, and Sri Lanka.

2.3 RBO Characteristics

Overview

A comparison between the different RBOs is made in the following table.

Table 2: Comparison between Different Types of RBO

	Council	***Public RBO***	***Corporate RBO***
Ownership	Autonomous; reporting to a ministry	The state	The state
Governing board	None	Single ministry	Representatives of several ministries
Legal basis	Law and ministerial decree	Law and ministerial decree	Government regulation; formal registration
Operation	Based on specific assignment of the ministry	Based on specific assignment of the ministry, dependent on the government	Based on specific bylaws; independent from the government system; flexible mobilization of resources

	Council	***Public RBO***	***Corporate RBO***
Management	Council head, serving as a facilitator	Government bureaucratic approach, mostly hierarchical in decision making, non flexible system of management, physical project focus	CEO-style director with high autonomy, responsible to the governing board or shareholders, tailor-made management systems, costumer focus, quick response to new challenges and opportunities
Staff	No staff; secretariat services provided by the government	Government employees, centralized salaries and in line to the government terms of conditions.	Employed directly, independent on capacity and HRD; own salaries and benefits system (talent based human resources management and performance based salary system)
Budget	Governmental funding, approved by parliament, consistent with government budgeting rules, limited flexibility	Governmental funding, approved by parliament, consistent with government budgeting rules, limited flexibility	Prepared autonomously, approved by the ministry, flexibility in utilization in line with general policy and rules, approved by the board
Financing	Revenue solely from governmental funding	Revenue solely from governmental funding	Revenue from operation (user fees); government transfers; performance contracts; loans; bonds; grants

Adapted after Tjoek Walujo Subijanto (March2011): Towards excellence in river basin organization (RBO) Performance: The case of PJT1, Indonesia. Slide presentation at International Seminar on River Basin Management, Vientiane

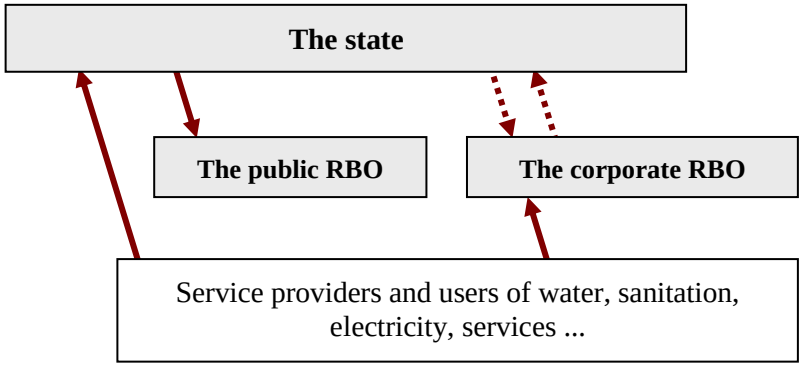
Financing

Revenue streams for a public and corporate RBO are illustrated below. They can from case to case include taxes (including green taxes); fees (water, sewage disposal, electricity, various services and resource utilization); and subsidies and cross-subsidies. Payments from the state to the corporate RBO can be linked to actual public services, such as flood protection and morphological management of the river network. The

corporate RBO may share a part of its revenue with the state, for example if it manages a large hydropower potential.

Apart from cash flows, the state can support the corporate RBO by loan guarantees.

Figure 3: Revenue Streams for a Public and a Corporate RBO



Organizational Culture

There are important *cultural differences* between a public agency and a corporation.

The ultimate (and highly important) purpose of the former is to serve the minister in fulfilling his or her responsibilities. This implies a top-down delegation of authority, responsibilities and tasks, and a high degree of predictability. The need of transparency indicates rule-based decisions.

The ultimate (and equally important) purpose of the corporation (as a business) is to serve the customer (or beneficiary), which indicates some element of bottom-up influence and ad-hoc decisions, suited for a specific context.

The typical career in the government system is life-long, based on *'universal'* (and hereby general) qualification criteria, developed during regular rotations between different postings, for example within a ministry. This is a good thing for the ministry (and the national level of management), but can cause some disruptions at the basin level, for example if several key staff members are rotated at the same time.

In comparison, the corporation can employ people for shorter periods than a lifetime, but it can also retain key staff in the same positions if so desired. Notably, it can maintain a dual-track career pattern for generalists

(including managers) and specialists (or *'experts')*, which is not so easy within the government system. Promotion, remuneration and other incentives can be based on performance, rather than seniority.

Regulation and Implementation

Basin-level regulation can from case to case cover for example water allocation within the basin (including operation of weirs and reservoirs); permits to withdraw surface water or groundwater; sewage discharge permits; hydropower concessions; sand mining licenses; land use; permits for physical interventions such as bridges, embankments and dikes; and related dispute resolution.

An institutional segregation of regulation and implementation can prevent actual or perceived conflicts of interest. Also, the two functions can require different expertise, capacity and perspectives.

Regulation (and enforcement) may conveniently be undertaken by a public body with a clear legal mandate. Some regulation can be done at the national level, while others (including water allocation) are best done at the basin level. Enforcement can formally take place at the basin level or the national level, but must build on basin-level monitoring and cause-effect relationships.

3. Strengths and Weaknesses of Existing Types of RBOs in Asia

3.1 Overview

The strengths and weaknesses of an RBO must be considered in relation to its mandate - which, in turn, must reflect the hydrological, geographic, socio-economic, institutional and political context in which the RBO operates.

3.2 The Council, the Public RBO and the Corporate RBO

The Council

The strength of the council type of RBO is related to its purpose: To serve as a platform for collaboration between (governmental and non-governmental) stakeholders that represent a broad range of interests in water-related management and development.

When it works well, this can add a substantial value to development planning, not to speak of the subsequent implementation. Depending on its membership, a functional water council can provide

- Knowledge and ground-trusting about water-related concerns and development needs;
- Smooth interfacing of planning at different levels (national, province, river basin) for different sectors;
- Sector expertise, thematic expertise and local expertise;
- Other expertise, including experience from elsewhere and technological innovation, and
- the private sector perspective, with its own development agenda (and financing options) that can be complementary to the public sector, and providing ground-trusting to initiatives that are oriented towards economic development and livelihoods.

Furthermore, a water council is in a position to make valuable recommendations on water allocation - always a potentially sensitive issue - whereby it can take a heavy load off the shoulders of the decision-makers. [4]

4 This is exemplified by the Bengawan Solo Water Council. Refer to Budi, S Prayitno (March 2011): The importance of shared values. CRBOM Small Publications Series no. 33, Center for River Basin Organizations and Management, Solo, Central Java

The strengths depend on the ability to make timely and appropriate decisions, and to the confidence (or informal authority) the body enjoys from the various stakeholders.

The Public RBO

Being a part of the executive branch of the government system, the public RBO is covered by the governmental routines, not only for resource allocation and inter-agency relations, but also for national policy formulation and development planning.

In principle, at least, this would assure good links between the national and the basin level of management, for example in connection with investment planning. Such links are important for assuring consistency between the management levels. In reality, however, interaction between two agencies, perhaps under different ministries, can be quite distant.

One particularly strength of the public RBO is its legal authority. It is in a position to implement policies and plans that require regulation, for example of surface water and groundwater withdrawals, or sewage discharges.

Enforcement of regulation also requires a clear legal authority (but does not necessarily need to take place at the basin level).

The Corporate RBO

What are the particular strengths of a corporate type RBO? PJT1 (Indonesia) has experienced benefits as listed below.

Particular Benefits of a Corporate Status, as Experienced by PJT1

i Flexible mobilization of resources;

ii quick response to new challenges and opportunities;

ii free to implement its own, tailor-made management systems; and

iv free to implement required capacity development and human resources development.

Source: Tjoek Walujo Subijanto, personal communication

There are three distinct features of the corporate RBO:

- ***Performance focus:*** The public corporation has particular strengths in terms of for example formal status; governance; human resources, technological development; organizational adaptation; cost recovery; and financial efficiency. This was demonstrated in Indonesia, where the two corporate type RBOs were top-rated in a recent national RBO performance benchmarking (see Section 4.3

below). Among the reasons is a better ***ability to adapt*** to new needs and new knowledge. It is easier for a public corporation to re-define responsibilities, hire new staff, or create a new department if the need arises

- ***Implementation of decisions:*** Once an investment (or other development) need has been identified as useful, it can be promoted by in-house capacity, rather than by some line agency (or agencies) that can be external to the RBO that has raised the need. Subject to satisfactory financial feasibility and acceptable impacts, the investment can be financed in different ways, including loans - separate from a lengthy public investment planning procedure

- ***Integration of basin management:*** Development initiatives can be promoted as entities, rather than being split into different sector components as a practical precondition for promotion by line agencies during their (sector-based) investment planning. This reduces the need of an inter-agency synchronization of priorities, and allows for investment priorities being made in an integrated perspective rather than as a combination of segregated sector priorities.

The Road on the Flood Embankment (Example from Cambodia)

A corporate RBO can plan its investments separate from the public investment planning with its various *'filters'*.

Some of these filters are *'cost-cutting'*, with the (useful) purpose of adjusting the national budget to an affordable level.

Another filter is the ministerial development plans, which by their nature are sector-oriented. Cross-sector development initiatives (suggested for example at the basin level) may, possibly, be split into sector components to ease their way through the planning cycle, because it is difficult for one ministry to promote suggestions that extend beyond its mandate.

For example, the promotion of a proposed road on a flood embankment may be much more complex than the separate promotion of a road and a flood embankment, if these two developments are managed by separate ministries. Multi-sector initiatives require synchronization, and the decision process becomes more long-winded: A top priority to one ministry may well be a secondary priority to another ministry.

Similarly, the procedures become much more complex for development initiatives that involve more than one province. This is of some significance in connection with water-related development, because the administrative borders seldom reflect the hydrological (catchments) boundaries.

(Based on Cambo WP (September 2007): IWRM in Cambodia - where are we, and where do we want to go? Discussion paper prepared by Cambodia Water Partnership and Cambodia National Mekong Committee

3.3 Discussion: Strengths and Constraints to Operation

Strengths and constraints can be independent on the type of RBO, or they can be related to it in some way. For the models outlined above, the following aspects apply:

- The *council or committee* is established for the sake of inter-agency coordination and stakeholder collaboration, and has its strengths accordingly. Its value is related to its ability to make joint, broadly accepted recommendations. If it performs well it can have a high informal authority, for example in connection with water allocation and development planning.

- The *public RBO*, being an integrated part of the government system, has a strong legitimacy, which plays a role if it is involved in water-sharing, regulation and enforcement. If placed under a ministry, it will be in a good position to liaise with that ministry in connection with policy formulation and planning. At the same time, inter-ministerial relations can be indirect and perhaps somewhat remote, which can be an impediment to multi-sector (IWRM-based) water resources management. *'Water does not fit under one roof, and turf battles are a fact of life'*.[5] An important aspect is that development investments must be channeled through the public (government or de-central) investment planning procedure, which can be time-consuming and subject to various filters.

- The strengths of the *corporate RBOs* are derived from its autonomy, which can vary from case to case, depending on the adequacy of its financing and on the actual involvement of the state in its day-to-day operation. To the extent that it is in a position to implement its own plans and development initiatives (within its mandate and financial capacity), it is able to respond faster to needs and opportunities. Also, it can provide a relative strengthening of the basin-level perspective as compared with the public RBO (where funds are allocated in a broader perspective).

In general, constraints to operation can exist on the day the RBO was formed, or they can emerge in the course of time. Inherent constraints can be for example

5 Arriëns, Wouter Lincklaen (September2010): Improving water governance in the Asia-Pacific Region: Why it matters. Article published on ADB's Water for All website: http://www.adb.org/water/

- Overlap of mandate between the RBO and existing agencies, or an incomplete transfer of mandate when the RBO was formed (for example if a responsibility is relocated without the supporting expertise and capacity). This can happen if some tasks (perhaps flood management? or irrigation services?) are well undertaken by existing agencies but are shifted to a new RBO, perhaps under a different ministry;
- The absence of a water law that defines water as a public good (preventing orderly water-sharing);
- Institutional barriers - for example if different ministries are responsible for irrigation and agriculture, or for surface water and groundwater;
- Rapid and forced staff rotation between a (public) RBO and its sister agencies (according to government practice) (whereas a gradual and voluntary staff rotation is an advantage);
- Imperfect interaction with the water users and/or the private sector and/or the academic society and/or the NGO community; or
- If the RBO is assigned tasks that can be difficult to combine, such as regulation and implementation, or structural development and environmental preservation.

Constraints that develop over time can occur, for example:

- If funding becomes inadequate;
- If the political support becomes inadequate;
- If the confidence of decision-makers, water users and other stakeholders for some reason becomes inadequate (for example in connection with a serious and unusual water shortage);
- If council members or board members for some reason become unable to agree on important negotiated decisions (perhaps in connection with reallocating a finite amount of water or distribution of finite funding);
- If basin-level, inter-sector (IWRM-based) development planning does not link up with national or province-level sector planning; or
- If the mandate of an RBO simply *'outgrows'* its authority and capacity, so that it is no longer in a good position to perform according to expectations.

Some of these constraints can be mitigated by IWRM principles, such as balancing immediate and long-term benefits, and active stakeholder participation.

4. Application and Performance of Corporate and Quasi-Corporate RBOs

4.1 Example: PJT1, Indonesia

www.jasatirta1.co.id

PerumJasaTirta1 (PJT1) was formed in 1990 as one of two such organizations in Indonesia. As a public corporation, PJT1 is expected to implement in balance between healthy corporate principles and accountability public services norms, supported by stakeholders and shareholders.[6][7]

PJT1 operates within the Brantas and the Bengawan Solo Basins, which, between them, have an area of 27,900 km^2 and a population of more than 31 million people.

Figure 4: Location of the Solo and Brantas Basins

Responsibilities include

- Water allocation and drought management, as agreed with the Basin Water Resources Management Committee (or *'Water Council'*[8]);
- Flood control, flood forecasting and flood warning;

6 Entire section quoted from Fahmi Hidayat (September 2009): The planning spiral of Brantas River Basin. CRBOM Small Publications Series no. 8, Center for River Basin Organizations and Management, Solo, Central Java

7 Indonesia has one more similar RBO, PJT2, covering the Citarum Basin

8 The Water Council is an advisory body with 32 governmental and 32 non-governmental stakeholder representatives. PJT1 is a member. Among other tasks, it prepares a recommendation on annual water allocation for the consideration and approval by the Minister of Public Works

- Watershed management;
- Recommendations to the regulator on water licensing;
- Water quality monitoring;
- Provision of recommendations to the regulator for wastewater disposal;
- Preventive maintenance and minor rehabilitation of infrastructure;
- Sediment removal in reservoirs and channels;
- Monitoring and control of sand mining; and
- Land use planning (especially around reservoirs and river corridors); related recommendations to the regulator on licensing of river corridor utilization; and related monitoring.

Funding is provided in three ways:

- Beneficiaries pay for water services, rendered in form of a water service fee (except farmers);
- Polluters are obliged to pay pollution fee and tax (not yet implemented but legal background is being drafted); and
- The government pays (principally through the BBWS)[9] for social services such as flood control, water quality control and water resources conservation

PJT1 applies quality management according to ISO 9001 (since 1997 for the Brantas Basin and since 2009 for the Bengawan Solo Basin), as well as accreditation of its laboratories by international standards.

In a recent national benchmarking, PJT1 was ranked as the best performing RBO among the 7 participating organizations. The benchmarking applied indicators covering mission; stakeholder relations; learning and growth; internal business processes; and finance.

4.2 Other Examples

Some examples, in alphabetical order:

[9] BBWS-BS: Balai Besar Wilayah Sungai Bengawan Solo (River Basin Development Agency, under Ministry of Public Works)

Damodar Valley Corporation (DVC) [10]

DVC came into existence in July 1948 by an act of the Constituent Assembly, along the lines of the Tennessee Valley Authority, USA. The overall objectives of DVC are the promotion and operation of schemes for irrigation and drainage; water supply; generation, transmission and distribution of electrical energy (both hydropower and thermal); flood control; navigation; forestation and soil erosion; etc. The DVC has been self-sufficient and self-sustaining.

The integrated operation of all structures is done by the Damodar Valley Reservoir Regulation Committee (DVRRC) headed by Member (River Management), Central Water Commission (CWC), with representatives each from DVC and the states of Jharkhand and West Bengal. The main functions of DVRRC are to discuss and lay down the principles for smooth and effective regulation of the reservoirs. The stakeholders/users are involved only indirectly in the work of the Committee, since its composition includes only the government department's representatives who get the brief from the public representatives (Members of Parliament and local politicians) and attend the meetings of the DVRRC. The conflicts amongst the states & DVC as well as between the interests of flood control, irrigation and power sectors are resolved by the DVRRC by holding its meeting 3 to 4 times in a year.

East Water, Thailand

www.eastwater.com

East Water or Eastern Water Resources Development and Management PCL were founded in 1992. In 1997, it was listed as a shareholding company on the Stock Exchange of Thailand, with owners including government agencies and private shareholders: Provincial Waterworks Authority, Industrial Estate Authority of Thailand, financial institutes in Thailand and overseas, Electricity Generating Public Company Limited, and the public. [11]

East Water undertakes raw water storage and allocation for consumption, tourism and industries in the provinces of Chachoengsao, Chon Buri and Rayong, including the industries of the Eastern Seaboard.

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10 Ganesh Pangare, T K Nielsen, Anjali Mohan Bhatia and Ian W Makin (August 2009): Innovations and advances in basin management in Asia. Discussion paper presented at ADB's 'Eye on Asia' event at the World Water Week, Stockholm

11 Entire section based on the East Water website, www.eastwater.com, accessed in May 2014

Water treatment and distribution to rural and urban households are undertaken by a subsidiary, Universal Utilities Co. Ltd., established in 1998.

Japan Water Agency (JWA)

www.water.go.jp

JWA was established by law in 2003 as an incorporated administrative agency under Ministry of Land, Infrastructure, Transport and Tourism. Hereby, JWA replaced the Water Resources Development Public Corporation (WARDEC) that was established in 1962. [12]

JWA undertakes water resources management in 7 river basins (Tone, Ara, Toyo, Kiso, Yodo, Yoshino and Chikugo). Tasks include domestic, industrial and agricultural water supplies, flood control, and aquatic environment. Infrastructural facilities include reservoirs and canals.

JWA constructs and operates dams, estuary barrages, facilities for lake and marsh development, and canals, supplying raw water to other entities, such as utilities, that distribute it to end users.

The performance of water and sanitation facilities is routinely monitored by benchmarking according to national practices. JWA's headquarters were ISO certified in 2004 as the first national incorporated administrative agency engaged in public works.

Its human resources development involves capacity building (including on-the-job training) and staff exchange, with around 70 staffs presently seconded to JWA from the national government, and around 90 staffs seconded from JWA to national and local government bodies. [13]

JWA is active in international knowledge-sharing and technical assistance. It collaborates with ADB and NARBO (for example by hosting the headquarters of the NARBO secretariat), and provides expertise to other countries in many ways, including twinning arrangements with similar organizations (such as PJT1 and PJT2 in Indonesia).

12 Entire section based on the JWA website: www.water.go.jp, accessed in April 2011

13 Kawano, Katsuaki (June 2011): Advanced features of JWA as an RBO. Presented at the NARBO International Seminar on Corporate RBOs in Asia, Selorejo Resort, East Java, Indonesia

K-Water

www.kwater.or.kr

K-water (or Korea Water Resources Corporation) was founded in 1967 under its original name of Korea Water Resources Development Corporation. [14]

The corporation covers 5 river basins: Han, Geum, Seomjin, Nakdong, and Yeongsan. It has built and is operating 15 multipurpose dams and the Nakdonggang estuary barrage. 5 new dams are under construction. It supplies some 10 billion m3 of water per year (including groundwater and desalinated seawater). It is comprehensively involved in flood management, as well as land reclamation and land development, particularly for industrial complexes. It operates 116 sewage treatment facilities, with 11 completed since 2001, and 19 more under construction.

K-water is building the World's largest (550 kWh/year) tidal power plant at Sihwa Lake, and is piloting renewable energy where feasible throughout its operation.

K-water exports its competence, with services ranging from pre-feasibility studies to a Build-Own-Operate-Transfer (BOOT) hydropower scheme (in Pakistan). Its reference list includes activities in Afghanistan, Bangladesh, Cambodia, People's Republic of China, India, Indonesia, Iraq, Laos, Mongolia, Nepal, Pakistan, Philippines, Sri Lanka, and Viet Nam, as well as Africa and South America.

K-water implemented ISO certification in 1996 as the first Korean public corporation. It holds A-level credit ratings (by Moody's and Standard & Poor's) and an AA level in national customer satisfaction for public corporations.

Laguna Lake Development Authority (LLDA)

www.llda.gov.ph

Laguna Lake, near Manila, is an extraordinary natural and socio-economic system. The lake is connected with Manila Bay by Pasig River, which reverses its flow in the dry season, letting some saline water into the lake. This is important for the fisheries yield. The broad banks of the lake are intensely cultivated in a part of the year and are inundated in the wet season.

14 Entire section based on the K-water website: www.kwater.or.kr, accessed in April 2011

LLDA undertakes sustainable, IWRM-based development of the Laguna de Bay Basin. [15]

LLDA was established by law in 1966 as a quasi-government agency with regulatory and proprietary functions. Its powers and functions were strengthened by decrees in 1975 and 1983 to include environmental protection and jurisdiction over the lake basin's surface water. In 1993, the administrative supervision of LLDA was transferred from the Office of the President to the Department of Environment and Natural Resources (DENR).

A broad master plan for resource-based development of the basin was prepared in 1995.

Today, the management is promoting a shift from a regulatory agency to a market- and client-driven development agency.

Its services include regulation, monitoring and development, with responsibilities for land development permits, sewage discharge permits, shore-land leases, fish pens and fish cages, barge and tugboat operation, environmental monitoring, and environmental impact assessment of new developments.

Councils have been applied since 1999 to for the sake of stakeholder participation and community involvement, to ensure that restoration efforts are sustained. Between them, they cover all of the Laguna Lake sub-basins. [16]

One important task is sustained information, education, communication and motivation campaigns among the residents of communities located adjacent to the various rivers and creeks. This allows for engaging stakeholders to support the restoration efforts.

Community participation and involvement in all aspects in project planning and implementation is seen as crucial to the success of a project. Different national agencies and industries are involved as partners.

In 2010, the Civil Service Commission conducted a report card survey according to the 2007 Anti-Red Tape Act (ARTA) (promoting customer-

15 The remainder of this section is based on the LLDA website: www.llda.gov.ph, accessed in April 2011

16 This and the two following paragraphs quoted from Buena, Catherine L (June 2011): Managing of Laguna de Bay - the LLDA experience. Presented at the NARBO International Seminar on Corporate RBOs in Asia, Selorejo Resort, East Java, Indonesia

friendly procedures and practices). LLDA was rated *'very good'* (and no. 2 of 8 participating agencies).

Murray-Darling Basin Authority (MDBA)

www.mdba.gov.au

MDBA was formed in 2007 under the federal Water Act, replacing the Murray-Darling Basin Commission (MDBC), which was established in 1988. Hereby, the MDBC was taken over by the federal government in order to strengthen its authority within inter-state water-sharing, in response to a lengthy and severe drought that had endangered the national water security. MDBA is located in Canberra and reports to the Minister of Environment.

Its origin is based on a delicate water-sharing dialogue that goes back for more than a century. The Murray-Darling Basin Agreement was signed in 1992 and promulgated in 1993, replacing the River Murray Waters Agreement from 1915 (and amended in 1987). The mandate of MDBA is laid down in the 2007 Water Act, amended in 2008.

The Murray-Darling basin (1,061,469 km2) covers parts of the Capital Territory, New South Wales, Queensland, South Australia, and Victoria. The basin is water-poor but is intensely cultivated and irrigated.

One of the main tasks of MDBA is to prepare a basin plan for withdrawals of groundwater and surface water. MDBA is also involved in policy advice, monitoring, and knowledge-building. Much of the water-related development is managed at the state level or the federate (or central government, or Commonwealth government) level.

PJT2, Indonesia[17][18]

The Jatiluhur Multipurpose Project was implemented in the Citarum Basin in 1956-1967. Its first stage provided flood control, irrigation for 240,000 ha, 188 MW of hydropower generation capacity, and raw water supply for households and industries.

After finishing the Ir. H. Djuanda dam and the related water infrastructure in 1967, the government established the state-owned company Jatiluhur to undertake operation and maintenance financed directly by the

17 Herman Idrus (June 2011): Lessons learned from JasaTirta2. Presented at the NARBO International Seminar on Corporate RBOs in Asia, Selorejo Resort, East Java, Indonesia

18 Djajadiredja, Eddy A (June 2011): Learning from leadership experience. Presented at the 1st NARBO IWRM Executive Retreat on Leadership in River Basins, Malang, Indonesia

beneficiaries. In 1970, the company became Jatiluhur Authority Public Corporation, which then became PJT2 in 1999. Its mandate was adjusted in 2010.

The Citarum Basin is in a strategic position to support the development of West Java. It has a large addition potential for water supplies for industrial and urban development in the region. Establishing this full supply potential will require an improved operational management for the already existing facilities. This involves an improved accounting of water demands and water availability, measures to improve and safeguard water quality, an adapted monitoring system, and appropriate conveyance systems. At the same time, there is a call for demand management measures for efficient resource use.

Tennessee Valley Authority (TVA)

www.tva.org

TVA was formed under President Roosevelt in 1933 in connection with his *'New Deal'* program for recovery from the Great Depression. It is a federally owned corporation. Shaped around the Tennessee River, it covers most of Tennessee and parts of Alabama, Georgia, Kentucky, Mississippi, North Carolina and Virginia.

From the onset, TVA had a sharp focus on regional socio-economic development, rather than water-sharing and regulation. Its aim was pursued via hydropower production, together with flood control and navigation, as well as agricultural development. Its power production capacity was strongly expanded during the 2nd World War.

Today, the Authority is financially self-supporting. It operates 29 hydroelectric dams and one pumped-storage plant, as well as 11 coal-fired and 8 combustion-turbine sites, 3 nuclear plants, 16 solar power sites, a 2 MW wind power site, and one 4 MW plant fuelled by methane from sewage treatment. There are 34 flood control dams, and a 1,045 km waterway on the Tennessee River.

TVA has an ombudsman[19] and its own police force.

Yellow River Conservancy Commission (YRCC)

www.yellowriver.gov.cn

19 Ombudsman: An independent official responsible for investigations of complaints

The 5,500 km Yellow River got its name from its large amounts of suspended sediments. The river has been shaped accordingly; it has changed its course several times in recent history, and some of its sections are elevated above the surrounding land. The basin has a history of disastrous floods. Pollution is a major issue, and in dry periods, the river flow does not reach the sea.

The 752,000 km2 basin has an irrigated area of 7.3 million km2 and an installed hydropower capacity of 9,000 MW.

A basin management plan, the first such plan in People's Republic of China, was passed in 1955 by the second session of the first National People's Congress.

The basin is managed by YRCC, an agency under Ministry of Water Resources. It undertakes water resources management; flood control and drought mitigation; soil conservation and morphological management; and environmental management; including related infrastructural planning, development, implementation and operation. It operates two separate research and development organizations: Institute of Hydraulic Survey, Programming and Designing (operating as a state corporation); and Center for Hydro-informatics in River Basins (CHIRB), a member of the Asia-Pacific Water Forum's network of regional water knowledge hubs. Another state corporation under YRCC is the Yellow River Mingzhu (Holding) Co. Ltd. (which manages the Sanmenxia Multipurpose Project).

In 2010, YRCC received the Lee Kuan Yew Water Prize. Mr. Tan Gee Paw, Chairman of the Nominating Committee, explained that the award *'celebrates the outstanding achievements of YRCC in integrated river basin management that is unrivalled in scale. In rejuvenating the Yellow River and managing floods, YRCC has brought about widespread and sustainable social, economic and environmental benefits to over one hundred million people'*.

Utilities

Quite often, water supplies, sewage disposal and hydropower production are provided by corporate type organizations. They are characterized by

- Well-defined and important tasks (like supply of water to a town);
- Dependency on facilities and physical infrastructure (like treatment plants and distribution networks) that represent large investments and a continuous need of operation and maintenance; and
- A unique revenue stream (like water fees paid by the users).

They are not necessarily linked to the basin level.

A few examples:

Malaysia's Water Corporations

www.span.gov.my

Malaysia has a tradition for corporate-type water management. This has contributed to broad access to safe water at affordable tariffs. A reform in 2006 established an autonomous regulatory agency (Suruhanjaya Perkhidmatan Air Negara, SPAN), an asset holding company, and commercialized state water companies that have to reach certain key performance indicators that will be monitored by the regulatory agency. [20]

Service provision is clearly separated between water supply on the one hand and sanitation on the other hand. Since the 2006 reforms all water supply assets in peninsular Malaysia are owned by a holding company called Pengurusan Aset Air Berhad (PAAB). They are then leased back to public operators (mostly State Water Companies) as well as private operators. All operators have to be licensed by SPAN and have to achieve certain performance indicators specified in the licenses.

Cost recovery remains incomplete, and water losses are higher than could be wished for.

Several private operators hold concessions for water treatment plants. They are usually not directly in touch with customers, but they sell treated water in bulk to water distribution companies: [21]

- The Johor Bahru Water Treatment Plant (1992)
- The Kota Kinabalu Water Supply Project (1993)
- The Sandakan and Tawau Water Supply Project (1993)
- The Southern Water Corporation Johor Concession covering the districts Muar, Batu Pahat, Segamat and Kluang in Johor state (1994)
- The Langkawi Water Project covering the group of islands of the same name in Pengan state (1996)

20 Sources: Wikipedia (accessed in May 2014); and the SPAN website, www.span.gov.my (accessed in May 2014)

21 Source: Wikipedia, quoting the World Bank Group - Private Participation in Infrastructure Database: Datasets for Malaysia and water (data by December 2010)

- The Johor Water Supply (2000)
- The Kuala Jelai Phase I and Phase II Water Treatment Plants in Negeri Sembilan (2003)
- Perbadanan Bekalan Air Pulau Pinang Sdn Bhd (PBAPP), a private company supplying the entire state of Penang

Some of these contracts were awarded after competitive bidding, such as the Johor Bahru water treatment plant, while others were awarded after direct negotiations, such as the Semangar water treatment plant.

PBAPP

In Penang state, water is supplied by Perbadanan Bekalan Air Pulau Pinang Sdn Bhd (PBAPP), a 100% subsidiary of PBA Holdings Bhd, a company traded on the stock exchange. PBAPP is among the most successful privatized water companies in the country, both in terms of its annual profits as well as its key performance indicators and its commitments towards corporate social responsibility. Its partnership with Water Watch Penang [an NGO] in the area of awareness, education and conservation testifies to its commitment towards social as well as environmental responsibility. Due to its success, PBAPP has been quoted both by government, NGOs as well as global water players as the "benchmark" for water companies.

Source: Chan Ngai Weng (March 2007): The Perbadanan Bekalan Air Pulau Pinang Sdn Bhd (PBAPP): A good example of Corporate Social Responsibility of a private water company in Malaysia. International forum on "Water Environmental Governance in Asia" held in Bangkok by The Water Environment Partnership in Asia (WEPA)

Phnom Penh Water Supply Authority (PPWSA)

www.ppwsa.com.kh

The history of PPWSA dates back to before the Khmer Rouge period (1975-79), under which it deteriorated entirely.

In 1997, PPWSA was granted autonomous status with independent management. Political support for the reform process came with the Prime Minister giving full support, and available funds – in the form of grants and loans from various multi-lateral agencies – created the enabling environment. Peace and stability within the country also helped PPWSA. A skilled set of enthusiastic employees and a leader with vision and a focused commitment helped to change the functioning of PPWSA, leading

to improved service provision for all consumers across the social spectrum.[22]

A reform process initiated in 1993 has dramatically improved performance, for example in terms of production capacity (from 65,000 m3/day in 1993 to 300,000 m3/day in 2009); number of connections (from 26,881 in 1993 to 191,092 in 2009); staff per 1,000 connections (from 22 in 1993 to 3.2 in 2009); non-revenue water (from 72 percent in 1993 to 5.9 percent in 2009); metered connections (from 12 percent in 1993 to 100 percent in 2009); bills paid (from 48 percent in 1993 to 99.9 percent in 2009); and return on revenue (from nil in 1993 to 27 percent in 2009).

PPWSA was awarded the ADB Water Price in 2004 and the Stockholm Industry Water Award in 2010. The organization was privatized (as a publicly traded shareholding company) in 2013.

Water Corporation (West Australia)

www.watercorporation.com.au

The Water Corporation was established in 1996, replacing the state's Water Authority to provide a more business-focused organization and to separate the user and regulatory functions of water allocation. The new Water Corporation saw a cultural shift to more robust planning and development. It had a more commercially focused Board with commercial and professional directors charged with driving the Corporation to achieve defined strategies and goals.[23]

It is one of several similar organizations servicing other parts of Australia. It is owned by the Western Australian Government, with the Minister for Water as the sole shareholder. Most profits are returned to the government as a dividend to contribute to the development of the State.[24]

With some 3,000 employees, the Corporation supplies water to nearly 2 million people (including Perth) over an area of 2.5 million km2. Also, it provides wastewater disposal and drainage. It operates 33,000km of water mains and 15,000km of sewer mains. The Corporation manages 110 dams

22 This and the following paragraph quoted from Binayak Das, Ek Sonn Chan, Chea Visoth, Ganesh Pangare, and Robin Simpson (2010): Sharing the reforms process. Mekong Water Dialogue Publication No. 4, Gland, Switzerland: IUCN

23 Wikipedia, accessed in April 2011

24 Entire section extracted from the Water Corporation's website: www.watercorporation.com.au, accessed in April 2011

and weirs and 259 water treatment plants. The 130,000 m3/day Perth Seawater Desalination Plant was commissioned in 2006.

4.3 Discussion: RBO Performance

General

The performance of an RBO is related to its mandate and requires a suitable harmony between mandate, authority and capacity.

The performance can be influenced by factors such as

- The time horizon for decisions, including political decisions and investment planning;
- Performance orientation;
- Risk adverseness;
- Incentives, motivation factors;
- Attitude to innovation and to organizational adaptation;
- Hierarchy (or *'power distance');* allocation of formal and informal authority within the organization;
- Dispute resolution capacity - internal and external;
- Attitude to external knowledge-sharing and collaboration, as compared with expectations; and
- Attitude to internal knowledge-sharing and collaboration.

Performance Assessment

A structured and transparent performance assessment can be made by benchmarking relative to *'best practices'*, considering its stated responsibilities and operation.[25]

25 This and the following paragraph quoted from Sungguh, Harry M (December2009): RBO benchmarking. CRBOM Small Publications Series no. 15, Center for River Basin Organizations and Management, Solo, Central Java

RBO Benchmarking

At the initiative of NARBO, a benchmarking exercise was conducted in 2006-08 for 10 Asian RBOs - one in Sri Lanka, one in The Philippines, one in Viet Nam, and seven in Indonesia.

The benchmarking was conducted with participation by external peers, for the sake of consistency and knowledge-sharing. The results illustrate the differences between the RBOs and provide guidance for performance upgrading in the course of time.

Benchmarking is now applied as a standard practice for Indonesian RBOs. The approach is presently being consolidated and streamlined for applications elsewhere in Asia.

Source: Sungguh, Harry M (December 2009): RBO benchmarking. CRBOM Small Publications Series no. 15, Center for River Basin Organizations and Management, Solo, Central Java

Benchmarking can guide development and consolidation of IWRM-based river basin management in general and RBO performance in particular, in pursuit of social, economic and environmental benefits. Also, a benchmarking can facilitate a structured sharing of experience and inspiration between participating RBOs.

Benchmarking routines have been developed by NARBO. The concept is oriented towards *'delivery of safe and reliable water supplies and services within an IWRM approach'*.[26]

It comprises two steps: (i) A self-assessment and, (ii) a review by external peers certified by NARBO. The peer review relays experience from elsewhere and provides inspiration for streamlining.

It applies a hierarchy of key performance areas and indicators, as illustrated in the following figure.

26 ADB (April2009): RBO benchmarking program. Main completion report prepared under RETA 6351: Process development for preparing and implementing IWRM Plans, by DHV, The Netherlands, in association with WL/Delft Hydraulics, The Netherlands and PT Mitra Lingkungan Dutaconsult, Indonesia

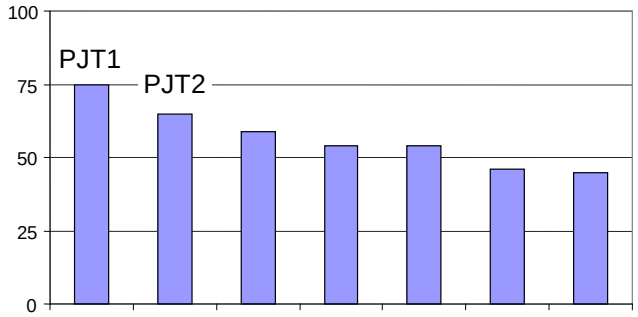
Figure 5: Key Performance Areas and Indicators in the NARBO Benchmarking

	II Stakeholders 1 Customer involvement 2 Customer feedback 3 Environmental conditions 4 Basin livelihoods	
IV Internal business processes 1 Planning 2 Water allocation 3 Data sharing	**I Mission** 1 RBO status 2 RBO governance	**III Learning and growth** 1 Human resources development 2 Technical development 3 Organization development
	V Finance 1 Cost recovery 2 Financial efficiency	

Source: Sungguh, Harry M (December 2009): NARBO performance benchmarking service. Presentation at NARBO's 6th IWRM training, Da Nang, Viet Nam

The figure below shows an example (from Indonesia) of a performance benchmarking exercise using this approach. It is seen that the two corporate type RBOs received a high rating.

Figure 6: Results of the 1st NARBO Performance Benchmarking of Indonesian RBOs (2008-09)



Source: Fahmi Hidayat (September 2009): The planning spiral of Brantas River Basin. CRBOM Small Publications Series no. 8, Center for River Basin Organizations and Management, Solo, Central Java

In this pilot application, the corporate RBOs scored above average for all key performance areas, as shown in the table below.

Table 3: NARBO Pilot Benchmarking in Indonesia (2009)

Key performance area	**Number of indicators**	**Rating** *(percent of over-all)*	
		Corporate	*All*
Mission	2	118	100
Stakeholders	4	124	100
Learning and growth	3	118	100
Internal business processes	3	115	100
Finance	2	192	100
Over-all	14	126	100

Data from ADB (April 2009): RBO benchmarking program. Main completion report prepared under RETA 6351: Process development for preparing and implementing IWRM Plans, by DHV, The Netherlands, in association with WL/Delft Hydraulics, The Netherlands and PT Mitra Lingkungan Dutaconsult, Indonesia

A benchmarking exercise can develop internal and external relations at the same time. Internal relations, in terms of commitment and collaboration, can be strengthened by the formulation of goals and indicators, and an open and inclusive self-assessment process, hereby contributing to an

improved institutional efficiency. This will, at the same time, develop the external relations, as reflected by performance and responsiveness. [27]

Changes induced by a benchmarking can, from case to case, be a matter of fine-tuning, or a comprehensive overhaul, involving national policy formulation and legislation.

Drawing on experience from PJT1, adjustments and adaptation options can include

- Strategic planning in support of present or desired future core competencies;
- Stakeholder feedback for guidance of governance and institutional development;
- Knowledge base development, including (but not limited to) data collection, data management and information systems, and related dissemination;
- Streamlined collaboration with government agencies NGOs and communities;
- Public relations and awareness-building;
- Human resources management;
- Responsiveness in service delivery;
- Technological adaptation and innovation;
- Various kinds of performance monitoring;
- Management of occupational health and safety;
- Full or partial cost recovery;
- Implementation of various enforcement measures; and
- General quality management with audits.

27 The remaining part of Section 4.3 is quoted from Sungguh, Harry M (December 2009): RBO benchmarking. CRBOM Small Publications Series no. 15, Center for River Basin Organizations and Management, Solo, Central Java

5. Which RBO Model is Appropriate?

5.1 General

A major consideration in this connection is whether the RBO is to serve as an advisory body or whether it is to be involved in regulation, implementation, and/or operation:

- *An advisory body* can do a useful work without any formal authority and perhaps with a small external secretariat.
- *Regulation and enforcement* require a strong formal authority.
- *Implementation and/or operation* require a strong formal authority and a strong capacity, and are supported by a certain measure of autonomy.

5.2 Preconditions for Successful Operation

General

Many preconditions for successful operation are shared between the different types of RBO. They include:

- ***Political support and commitment:*** Here, the corporation is mainly in need of strategic (over-all, long-term) support, while the government organization may be in need of strategic as well as operational, *day-to-day* support
- ***Good relations with stakeholders*** are required by any type of RBO, for many reasons. This is the case for institutional stakeholders, such as sector all agencies, and non-governmental organizations and individuals. Confidence and respect from stakeholders (and the general public) are preconditions for support to those many decisions that do not allow for complete consensus around the table. Apart from active dialogue, good relations can be supported in many ways, including a shared vision for the basin, and a clear mission for the RBO.
- ***Good leadership*** is also required for any type of RBO. The head of a council must build confidence among the council members and facilitate agreed decisions. The head of a public RBO must assure liaison within the government system, often across sectors. The corporation is headed by a director with a high autonomy, who must have a particular ability to make timely decisions and generate internal and external support to their implementation. There is a related need of a particular accountability. This can be supported by

a strong corporate culture (based on a clear mission) and team spirit, and a high level of internal communication, so that people know not only what they are doing but also why they are doing it.

The Significance of Political Support

The benefits of the corporate RBO are related to its partial independence from the government system. Still, any RBO, irrespective of its status, is in need of political support.

In the case of a corporate RBO, the balance between government control and independence is important. The government provides legitimacy and over-all directions, but can leave the operation to the corporation. A comprehensive day-to-day involvement would blur the distinction between the public and the corporate RBO, and would reduce the intended particular benefits of the latter - including the benefit of independent, external performance supervision by the state.

The statutes of the corporate RBO are issued by the government. They will define its mandate (often, for an RBO, including a geographic delineation), the related authority, relations with various government bodies, and the flow of revenue. The RBOs investment planning, covering major financial obligations would need endorsement from the state, as it is the case for private corporations that require endorsement from its owners.

The involvement by the state in the operation of the corporate RBO can take place via a governing board (of external directors) with representatives from the government. This can support a clear delineation of tasks and responsibilities. [28]

The Significance of Capacity and Orientation

In-house managerial capacity and technical expertise are major assets of a corporate RBO, and the value of such capacity is often a major incentive to choose this type of RBO in the first place.

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28 Please refer to OECD (May 2010): Policy brief on corporate governance of state-owned enterprises in Asia - recommendations for reform. Policy brief prepared by Network on Corporate Governance of State-Owned Enterprises in Asia, for a discussion, with examples from many Asian countries. Recommendations on the responsibilities of the board are made by OECD (April2005): OECD guidelines on corporate governance of state-owned enterprises. Observations on the role of the board are made by Hashim Mohammed (May 2010): SOE governance reforms in Malaysia: Experiences, insights & prospects. 5th meeting of the OECD Network on Corporate Governance of State-Owned Enterprises in Asia, Kuala Lumpur, and by Qin Yongfa (May 2010): Reform and corporate governance of SOEs in China. 5th meeting of the OECD Network on Corporate Governance of State-Owned Enterprises in Asia, Kuala Lumpur

A corporate RBO must have ***a certain size*** to activate its potential benefits. These are related to its independence, but this will not emerge unless a *'critical mass'* is available for operation - otherwise the organization will remain dependent on external capacity for its management, decision-making, expertise and financing. As one yardstick, the capacity should be adequate for managing the implementation of large investment projects.

Another measure in support of the independency of a corporate RBO is ***a separate source of income*** that can contribute visibly to its cost recovery. The cost recovery does not need to be complete, however. The state can compensate for social services (such as flood protection in Indonesia and urban drainage in Japan).

A clear mission, mainstreamed into the operation, is not only as a beacon for team performance, but also as an external signal of the identity and purpose (and social significance) of the corporation.

Example: Vision for the Citarum River Basin for 2021

'The government and communities working together for clean, healthy and productive catchments and rivers, bringing sustainable benefits to all people of the Citarum River Basin.'

Source: Sri Hernowo M. (July 2009): Roadmaps for river basin development. CRBOM Small Publications Series no. 3, Center for River Basin Organizations and Management, Solo, Central Java

Respect and confidence from users and external partners, as well as the general public, can support the operation of a corporate RBO (as it is the case for other types of RBOs). This, in turn, can be supported by openness (ready access to information, knowledge-sharing and dialogue). A bit of promotion can be helpful. Accordingly, all organizations listed as examples in this paper have nice websites with various information about themselves and their useful work. Several have various outreach activities for social interaction, perhaps even full-blown Corporate Social Responsibility (CSR) programs, and external professional networking and liaison.

The Significance of Good Corporate Governance

The governance of RBOs must be oriented towards maintaining a balance between financial sustainability, social benefits and environmental quality - the *'triple bottom line'* at the basin level of management.

PJT1 implements good corporate governance (GCG) as follows: [29]

GCG principles (TARIF)

T: Transparency
A: Accountability
R: Responsibility
I: Independency
F: Fairness

GCG aspects

- Rights and responsibilities of shareholders and/or the state
- GCG policy
- GCG implementation
- Disclosure
- Commitment

Good corporate governance can strengthen the informal authority of the organization, as well as its credit rating (where this is relevant).

5.3 Financing of the RBO

Given the need to balance the RBO's mandate and capacity, financing of its operation becomes a precondition for successful operation.

A water council needs, as a minimum, secretariat services and funds for operation: Meetings, studies and dissemination.

The public RBO covers its expenses via the government budget (national or de-central), according to procedures applied by the government system, normally involving a staff allocation, an annual budget for routine operation, and additional dedicated budgets for non-routine activities.

The corporate RBO has more diverse sources of income. PJT1 combines the Beneficiaries Pay Principle (for hydropower, raw water for industry and drinking water), the Polluter Pays Principle (under preparation); and the Government Obligation Principle (for irrigation and flood control). PJT1 offers consulting services, rental of construction machinery and laboratory analyses on a commercial basis (and operates the Selorejo

29 Tjoek Walujo Subijanto (April 2009): Brantas river basin organization and management. CRBOM Launch Workshop, Center for River Basin Organizations and Management, Solo, Central Java

Resort in East Java, used for tourism and recreation, courses and seminars). [30]

Similarly, JWA practices full cost recovery for water supplies and sewage disposal (via tariffs), while urban drainage and storm-water disposal are considered public services. [31]

5.4 Discussion: Criteria for Selecting an Appropriate RBO

The Mandate

The type of RBO must reflect its mandate and the related authority and capacity.

The mandate, in turn, must reflect needs and opportunities in the river basin. This is the starting point for selecting an appropriate RBO:

- Emphasis on strategic planning and scoping may indicate an advisory council type of RBO (with broad participation but no formal authority).
- Emphasis on water allocation and regulation (and perhaps enforcement) may indicate a public type of RBO.
- Emphasis on supplies, services and infrastructural development may indicate a corporate type of RBO.

This does not need to be a case of either-or. The Bengawan Solo Basin in Indonesia has three RBOs, one of each type, and each with clear mandates - and working well together. [32] A separation of water allocation (by the public RBO) and operation (by the corporate RBO, PJT1) has advantages when the water availability is less than the demand, so that decisions on water allocation becomes of particular importance to the water users. The Council maintains stakeholder liaison in connection with water-sharing and development priorities.

30 Ir. Harianto (June 2011): Learning from RBO champions: Jasa Tirta I Public Corporation. Presented at the NARBO International Seminar on Corporate RBOs in Asia, Selorejo Resort, East Java, Indonesia

31 Kawano, Katsuaki (June 2011): Advanced features of JWA as an RBO. Presented at the NARBO International Seminar on Corporate RBOs in Asia, Selorejo Resort, East Java, Indonesia

32 For an introduction to the Bengawan Solo Water Council, please refer to Sudarsono (September 2009): The Bengawan Solo Water Council - providing insight and directions. CRBOM Small Publications Series no. 5

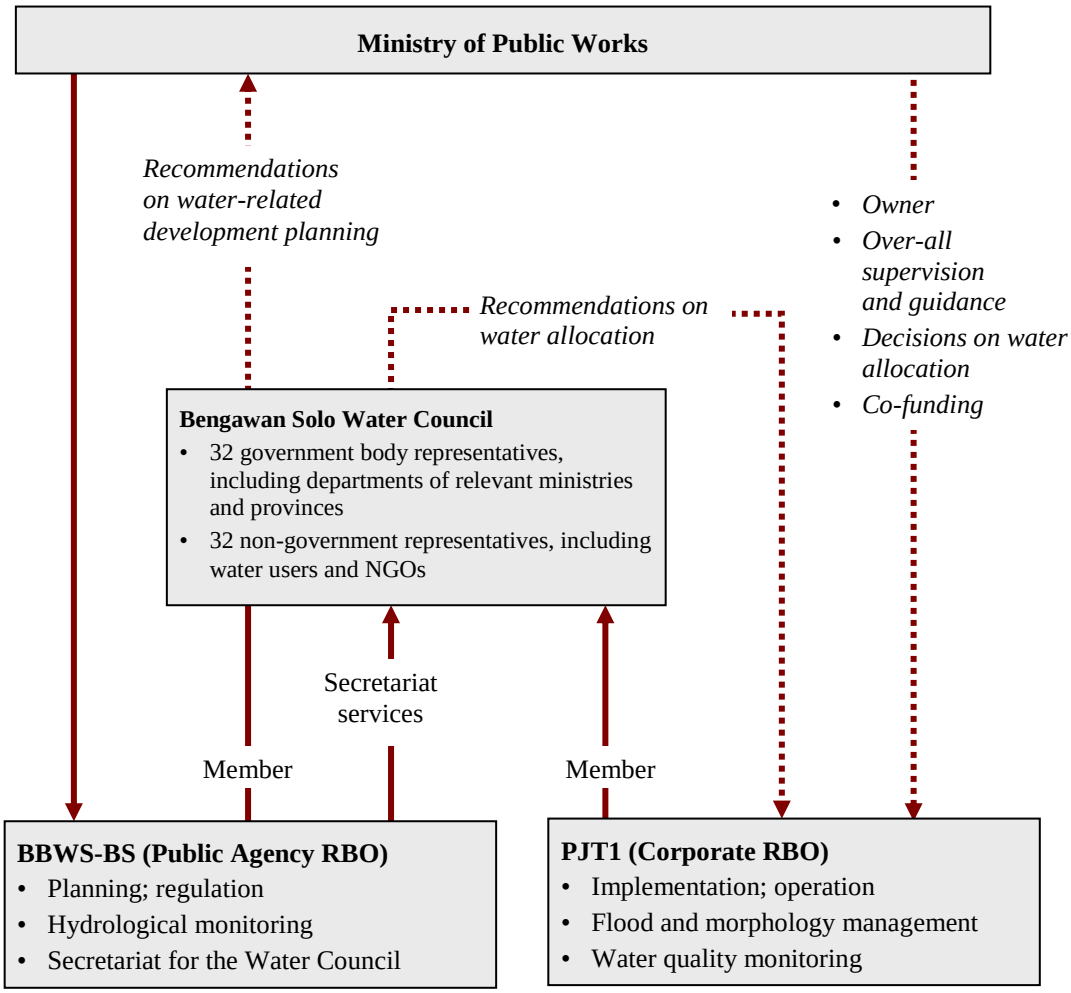
From Plan to Implementation

Depending on its mandate, an RBO may not only be involved in identification of development needs, but also (in some role or another) in supporting or conducting the actual implementation of such development needs. The basin level of management is different from the national and province level of management. Interaction between these levels is a precondition for actually achieving an intended, beneficial development.

This indicates a good measure of autonomy, as provided by the corporate RBO, as well as functional relations with the national planning agency, which, in principle, can be established for any type of RBO.

An appropriate RBO, if involved in development planning, will have such features.

Figure 7: RBOs for the Bengawan Solo Basin, Indonesia

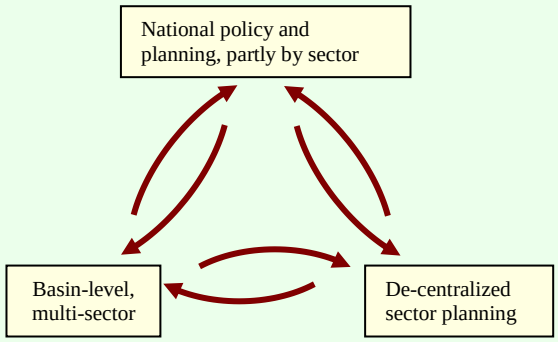


Indonesia divides its river basins into international ones; inter-province ones; strategic ones; and regency/city river basins. They are, from case to case, managed by corporate RBOs; central government RBOs; provincial government RBOs; regency/municipal water resources services; and water councils. One RBO (for example PJT1) can cover several river basins, and one river basin can be covered by several RBOs (as in the example above).

Basin-Level Planning

Basin-level planning must be consistent with national development policies and planning, for the sake of legitimacy, and to facilitate implementation.

This does not mean that basin-level planning should passively reflect national policies. Rather, in the medium and long term, a mutual convergence can be aimed at, with basin-level planning feeding into the national level, just as it is the case for de-central sector planning. This is illustrated in the figure below. An important contribution by the integrated basin-level planning is to add value to the thematic sector planning.



Some countries apply strategic, national social and economic development plans - sometimes formulated as successive 5-years plans. These plans serve as the framework for annual public investment plans, which, in turn, provide the framework for annual de-central (province level) investment plans. The purpose is to maintain a sense of direction, while, at the same time, keep an eye on the allocation of finite national finances. One practical implication is that the process is heavy and time-consuming, with a long way from idea to implementation. Another practicality is that the process tends to proceed sector by sector, due to a strong involvement by sector ministries. The inter-sector coordination is mostly done at the top level, at a late stage, where most of the attention is paid to necessary but sensitive cost-cutting.

Successful IWRM-based basin-level planning must harmonize with the national planning process in order to add value to this process, and also in order to facilitate the required public investments.

Source: ADB and CRBOM (April 2011): Guideline for IWRM-based development roadmaps. Draft, prepared under ADB RETA6470 by Asian Development Bank and Center for River Basin Organizations and Management, Solo, Central Java

Private Sector Liaison

The private sector can contribute significantly at the basin level, both within planning, implementation and operation.

The Role of the Private Sector at the Basin Level

The private sector offers a perspective that in some ways is complementary to the perspective of the public sector, in terms of scoping, time horizon, and financing.

Hereby, the public sector applies a long-term national perspective based on government policies on safe water, sanitation and electricity for households, and water for food security and other production, balanced with environmental quality. The private sector will apply a more confined business-oriented perspective, emphasizing revenue generation (and cost recovery), high water and energy efficiencies, and low commercial risks and uncertainties.

The private sector is in a particular position to contribute to water supplies, sanitation and waste disposal.

In basin-level development planning, the private sector can contribute qualified opinions and guidance about for example water allocation, efficiency improvements, infrastructural development needs, and livelihood generation.

An appropriate RBO will be able to liaise with the private sector, from case to case in terms of knowledge-sharing, dialogue during planning and decision-making, as well as business relations. This requires that its authority and capacity are shaped accordingly. Also, a good informal authority is helpful in this connection.

Re-Allocation of Mandates

As the needs of the basin stakeholders evolve with changing circumstance, the existing institutional landscape must be considered, including the roles of existing agencies and other bodies, in order to determine whether it remains appropriate to the tasks at hand. There may be gaps (for example regarding groundwater management, or disaster preparedness) to close; and there may be a need for better inter-sector (and/or inter-agency) coordination.

A full or partial re-allocation of mandates may be required in connection with institutional reform. If so, it is important that the authority is adjusted accordingly and supported politically.

There will be general policies and preferences to observe, regarding the role of the state and the private sector, and regarding the balance between central and de-central government.

Some thoughts in this connection are shared in the following chapter.

6. The Evolving RBO

6.1 The First Step

The mandate of an RBO can reflect circumstances at the time when it was formed, as much as today's agenda.

Some RBOs were formed upon completion of major development programs (master plans), with the purpose of operation based on contributions from beneficiaries (cost recovery), rather than the state budget. This is the case for Indonesia's PJT1 and PJT2.

The Origin of PJT1

The water infrastructure in the Brantas Basin, East Java, was developed under a sequence of 3 master plans; 1961 - 1973, 1974 - 1985 and 1986 - 2000, with a total investment (1960-2001) of 11 trillion IDR (or around 120 million USD).

After construction, it was necessary to maintain the functioning of the completed infrastructure in order to ensure maximum benefits, to achieve the designated technical life span, and to achieve sustainable development. Adequate operation and maintenance must be conducted by a permanent institution, with professional staff and adequate budget.

PJT1 was formed for this purpose.

Ir. Harianto (June 2011): Learning from RBO champions: JasaTirta1 Public Corporation. Presented at the NARBO International Seminar on Corporate RBOs in Asia, Selorejo Resort, East Java, Indonesia

Other RBOs were established (or upgraded) in response to water shortage and/or urgent water-sharing issues (for example in Thailand), while others were facilitated by development agencies (for example Mekong River Commission, with UNDP serving as an active midwife)[33], with mandates that included water allocation and water-related, IWRM-based development planning.

If an RBO is based on conditions in the past, when it was formed, there may be a scope for aligning its mandate towards present and future needs. This can, from case to case, involve steps from problem-orientation to

[33] Browder, Greg (February 1998): Negotiating an international regime for water allocation in the Mekong River Basin. PhD Thesis, Stanford University

opportunity-orientation; or from planning to implementation; or from development to facilitation; or from service provider to regulator[34].

In this connection, Keizrul Bin Abdullah, Chairperson of NARBO, noted that *'reforms can be easier to implement during a water crisis - but the groundwork must be laid beforehand'*.[35]

6.2 New Concerns and New Opportunities

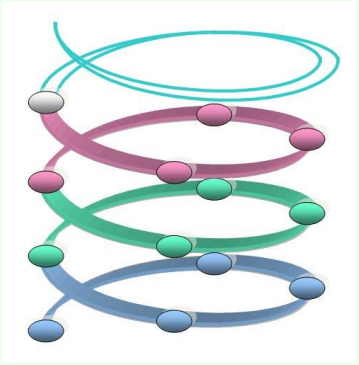
Asian river basins are in a permanent state of development, with new concerns and new opportunities emerging continuously - which is why IWRM must be regarded as a process.

The IWRM Process

The UNESCO-NARBO guidelines for basin-level IWRM illustrate the IWRM process as a spiral.

Each cycle of the spiral proceeds through the following stages:
(1) Recognizing and identifying;
(2) conceptualizing;
(3) coordinating and planning; and
(4) Implementing, monitoring and evaluating.

Reference: UNESCO and NARBO (March 2009): IWRM guidelines at river basin level



Circumstances that affect the agenda for basin-level IWRM include for example [3637]

34 Amron, Mochammad (June 2011): Leadership experience. Presentation at the 1st NARBO IWRM Executive Retreat on Leadership in River Basins, Malang, Indonesia

35 Keizrul Bin Abdullah (June 2011), NARBO International Seminar on Corporate RBOs in Asia, Selorejo Resort, East Java, Indonesia

36 Compiled from Ganesh Pangare, T K Nielsen, Anjali Mohan Bhatia and Ian W Makin (August 2009): Innovations and advances in basin management in Asia. Discussion paper presented at ADB's 'Eye on Asia' event at the World Water Week, Stockholm; Pham Phuoc Toan (March2011): Adaptive water-sharing in the Vu Gia-Thu Bon Basin. CRBOM Small Publications Series no. 32, Center for River Basin Organizations and Management, Solo, Central Java; and Watt Botkosal (June2011): Water security, food security and livelihoods in Cambodia and the Lower Mekong Basin. Conference on The New Politics of Water: "Water security and economic growth in emerging economies", Chatham House, London

- Water resources approaching full utilization, and perhaps a related need of a partial re-allocation from rural to urban water uses, and from agriculture to other sectors; creating a need of stronger regulation, enforcement and dispute resolution;
- Increased (national or global) demand of food, electricity and bio-fuel;
- Continued rapid urbanization, with a consequential need for raw water re-allocation;
- Increased generation of sewage and solid waste, increasing use of agro-chemicals, and increasing significance of spills, affecting the quality of surface water and groundwater;
- Increased significance (occurrence as well as impacts) of weather irregularities and climate change; [38]
- intensified land use (including mountainous headwater areas), affecting the environment in general and aquatic habitats in particular;
- Lower trade barriers (as promoted by many international and regional organizations, not to speak of the Asian *'noodle bowl'* of bilateral trade agreements, and its *'porous borders');*
- Large national and international land concessions for industrial farming, often introducing new crops, new production technology, and perhaps competition for land and water;
- New technology and new knowledge, for example related to efficiency of water-dependent production systems, waste disposal, bio-fuel production, or satellite-based flood forecasting; and/or
- New national policies on de-centralization/de-concentration, disclosure, and public participation.

37 See also Pichai Uamturapojn (May 2012): Organizational resilience: Adaptation to changes for RBOs. CRBOM Small Publications Series no. 44, Center for River Basin Organizations and Management, Solo, Central Java

38 Rahardjanto (March2011): Climate change: The basin-level perspective. International Seminar on Climate Change: Environment Insight for Climate Change Mitigation, Solo

River Basin Policy

River basin policy provides a shared sense of direction and a tool for progress monitoring. A policy can be problem-oriented or development-oriented, or a combination. This distinction, however, is not important - all can be useful.

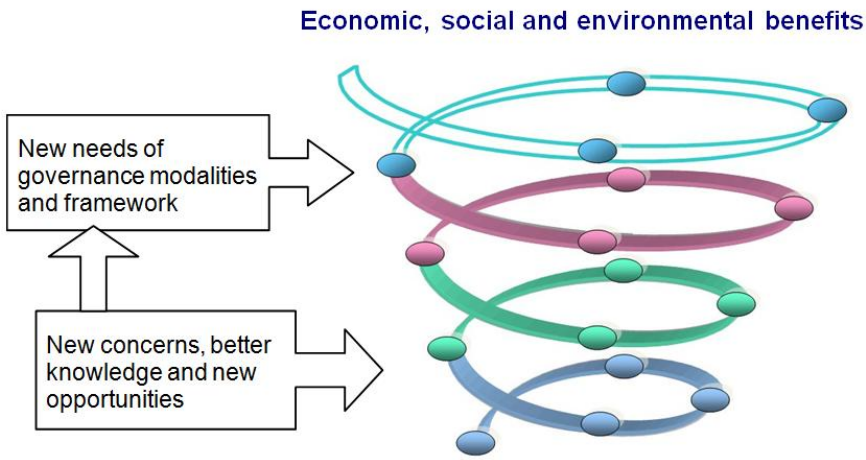
Problem-oriented (or 'responsive') policies will normally take their starting point in the basin *'as it is'*. They may build on problem tree/log-frame analysis or *'hot spot'* analysis. They have a shorter time horizon - in principle, if not in practice - and can address important aspects such as for example poverty alleviation; the Millennium Development Goals; environmental conservation; disaster risk; and climate change resilience.

Development-oriented (or 'pro-active') policies are less linked to present conditions and trends, and take a perspective of the basin *'as it could be'*. They may build on scenario analysis. They have a longer time horizon and can address attractive opportunities such as for example production efficiency development and diversification; livelihood generation; tourism development; hydropower development; and pro-active environmental management.

Ganesh Pangare, T K Nielsen, Anjali Mohan Bhatia and Ian W Makin (August 2009): Innovations and advances in basin management in Asia. Discussion paper presented at ADB's 'Eye on Asia' event at the World Water Week, Stockholm

The evolving agenda imposes new requirements on basin-level governance, to be accommodated within the IWRM process, as illustrated in the figure below.

Figure 8: The IWRM Process and the Evolving RBO



6.3 Responsive Basin-Level Governance

The various drivers of change represent threats as well as opportunities. Achievement of a prosperous and healthy river basin requires prudent and responsive basin-level governance, maintaining a clear sense of direction.

Guiding Vision for Water Security

Societies can enjoy water security when they successfully manage their water resources and services to

- satisfy household water and sanitation needs in all communities;
- support productive economies in agriculture and industry;
- develop vibrant, livable cities and towns;
- restore healthy rivers and ecosystems; and
- build resilient communities that can adapt to change.

Improving water governance cuts across these key dimensions.

Asian Water Development Outlook Team, 2009, quoted in Arriëns, Wouter Lincklaen (September 2010): Improving water governance in the Asia-Pacific Region: Why it matters. Article published on ADB's Water for All website: http://www.adb.org/water/

Basin-level governance is inter-disciplinary in its character. A range of sectors must contribute resources and knowledge. They can share over-all intent, but can perhaps be influenced by separate, specific perspectives and practicalities. A bright opportunity or some urgent need can relate to one sector, while, at the same time, represent indirect opportunities or constraints in other sectors.

This is why the IWRM process is valuable. It does not replace the indispensable sector expertise, but adds coordination and harmony.

This must be supported by the institutional set-up for basin-level development. Responsive governance must keep an eye on modalities and framework, and provide for adaptation when the need arises.

6.4 Institutional Adaptation

Many of the new challenges require far-reaching decisions and timely implementation (as well as comprehensive investments) within for example water supply and sewage infrastructure; irrigation; storage capacity; flood protection; and morphological management. Such decisions have particular inter-sector implications, increasing the need of basin-level dialogue and coordination.

This can cause a need of changing the RBO's mandate, and, in consequence, its authority and its capacity related to sharing a finite amount of water, supplies and services, management of the aquatic environment, and the knowledge-base.

This, in turn, will affect the appropriate status of the RBO, often in the direction of a stronger orientation towards implementation (as illustrated by many examples provided in Chapter 4). In the process, the consistency must be maintained between mandate, authority and capacity.

7. Conclusion

Good water resources management is a precondition for water security, food security, livelihoods, and a healthy environment. Basin-level governance can provide substantial economic, social and environmental benefits.

The RBO is an important platform for basin-level governance. To assure that it performs according to expectations, a balance must be maintained between its mandate (geographic coverage and tasks), its authority, and its capacity (resources and financing).

The type of RBO must reflect its mandate and the related authority and capacity. The mandate, in turn, must reflect needs and opportunities in the river basin. This is the starting point for selecting an appropriate RBO: [39]

- Emphasis on strategic planning and scoping may indicate an advisory council type of RBO (with broad participation but no formal authority).
- Emphasis on water allocation and regulation (and perhaps enforcement) may indicate a public type of RBO.
- Emphasis on supplies, services and infrastructural development may indicate a corporate type of RBO.

This does not need to be a case of either-or. The Bengawan Solo Basin in Indonesia has three RBOs, one of each type, and each with clear mandates - and working well together. A separation of water allocation (by the public RBO) and operation (by the corporate RBO) has advantages in the frequent case when the water availability is less than the demand, so that decisions on water allocation become of particular importance to the water users.

'Informal authority' is the respect and confidence, and hereby support the RBO enjoys from decision-makers, water users and other stakeholders. A high informal authority is an overruling asset for any RBO. A council or committee, perhaps without much formal authority, cannot operate without it. A government RBO and a corporate RBO might just survive, but will face serious difficulties as soon as it comes to implementation.

39 Fahmi Hidayat and Raymond Valiant (October 2011): The case for the corporate RBO. CRBOM Small Publications Series no. 42

Secrets of Successful RBOs

At a NARBO seminar in June 2011, RBO champions from Indonesia, Japan, the Philippines and Sri Lanka shared their *'secrets'*. These included, in random order,

- Political support;
- Good stakeholder relations; and
- Good leadership.

Between them, they may provide a necessary and sufficient basis for successful operation.

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Appendix A: Examples of Tasks of an RBO

Listed in random order:

Regulation

- Water allocation, dispute resolution
- Regulation, licensing, enforcement (surface water, groundwater, sewage disposal, land use) [40]

Development Planning

- Water-related development: Scoping, inter-agency coordination
- Strategic planning, master planning, roadmaps, integrated or by sector
- Mountainous headwater areas (land use, livelihoods)
- Flood and drought preparedness, climate change preparedness

Implementation

- Supplies: Raw water, treated water, sewage, electricity
- Implementation and maintenance of water-related infrastructure
- Operation of reservoirs
- Hydropower generation
- Morphological management, erosion, siltation
- Flood and drought preparedness, including flood forecasting services

Cross-Cutting Activities

- IWRM process facilitation - including basin-level and inter-basin dialogue and coordination
- Awareness-building
- Basin-level monitoring and knowledge base
- Management of water quality and aquatic habitats

40 Bird, Jeremy, Wouter Lincklaen Arriëns and Dennis Von Custodio (2009): Water rights and water allocation - issues and challenges for Asia. ADB Water for All Series no. 17; list the following possible roles of an RBO in relation to licensing: Planner; adviser; coordinator; licensing authority; developer; operator; monitor; arbitrator; and enforcer

Appendix B: RBO Characteristics

Based on Isnugroho (July 2009), in turn based on Paul Taylor (July 2009)

The following characteristics may apply from case to case.

One extreme does not need to be *'better'* than or *'preferable'* to the other extreme - that depends on the legal and institutional context (whether tasks are already well undertaken by bodies other than the RBO), as well as the geography and the development agenda of the river basin

Most RBOs will be somewhere in between the extremes.

Mandate

One territory - within one province in one country	.....	Multiple territories, covering parts of several provinces or several countries
Single sector (such as raw water allocation)	.....	Multi-sector (IWRM-based); for example covering raw water allocation, irrigation, hydropower, flood and drought management, land management, waste and wastewater disposal, aquatic environment, navigation, inland fisheries, water-related tourism
Central, for example placed under a ministry	.....	De-central, for example based under a province, or independent/semi-autonomous
Focused, top-down decision-making, implementing government polices and plans	.....	Broad, bottom-up decision-making, with strong and continuous stakeholder involvement, consensus-oriented
Involved in development scoping and guidance	.....	Involved in development scoping as well as implementation and operation
Involved in (or responsible for) water-sharing, water-related dispute settlement, environmental regulation, and/or enforcement	.....	Not involved such tasks

Authority

High formal authority; autonomous decision-making capacity; involved in regulation and/or implementation and/or operation and maintenance	.....	Low formal authority; providing guidance, recommendations, policy support, preparation program; decision-making, implementation and operation undertaken by other bodies
High informal authority; enjoying respect from policy-makers, other external decision-makers and stakeholders, and the general public	.....	Low informal authority; networking and knowledge-sharing; perhaps in some cases less *'visible'* to policy-makers and/or the general public

Capacity

Commercial model (including state corporations); direct revenue generation, employees recruited directly; often involved in (raw) water supplies and perhaps sanitation	.....	Non-commercial model; ordinary public administrative body at state or province level; funded by a national or province budget; employees allocated within the public administrative system or assigned on an ad hoc basis from the public sector
Big; large budget, large staff, in-house expertise and knowledge-base	.....	Small; low budget, small staff, building on external expertise, data and knowledge
High capacity to make and implement decisions	.....	Decisions made partly or entirely outside the RBO; the RBO producing suggestions to other bodies

Appendix C: RBO Profiles

C.1 Bang Pakong River Basin Committee (BPRBC), Thailand

RBO type	Council
Year established	2001
Basis of existence	Regulation of the Prime Minister's Office on National Water Resource Management (2007)
Under which agency	None; reporting to Department of Water Resources (DWR) under Ministry of Natural Resources and Environment (MoNRE)and the National Water Resources Committee
Basins covered	Prachinburi River Basin and Bang Pakong River Basin. (Around 2 million people, 18,500 km^2)
Functions	BPRBC has 16 members representing government bodies and 13 members representing non-government bodies (by 2010). It is responsible for • Recommendations to the National Water Resources Committee on policies, planning, and guidelines for dispute resolution; • Guidance on water allocation between domestic uses, agriculture and industries; and • Recommendations on water-related development.
Head	Chairperson
No. of staff	None; secretariat services provided by the regional DWR office
Funding sources	Government budget (via DWR, under MoNRE)
Sources of information	1) Molle, François (Mar 10): The Bang Pakong River Basin Committee - analysis and summary of experience; with contributions from Thippawal Srijantr and Parichart Promchote; published by Institute de Recherche pour le Développement and FAO 2) Dueñas, Christina (Apr 07): Driving change - the Bang Pakong River Basin Committee experience. Published on the ADB Water for All website

River basin management in Thailand

Water resources development plans and policies are directed by the National Water Resources Committee (NWRC), which has representatives from line ministries and government agencies.

Decentralization policies were introduced with the 7th National Economic and Social Development Plan (1992-96), and the river basin approach was introduced in the 8th NESDB (1997-2001). Drawing on experience from the Chao Phraya Basin Management Committee (1996), a total of 25 river basin committees have been established. These are coordinative bodies, with a participatory orientation, without heavy involvement in implementation.

Appointed by the NWRC, the RBCs are 'soft' agencies (without implementing authority), responsible for:

1 Formulation of water resources development policies, strategies and plans
2 Formulation of the annual integrated water resources development plan
3 Facilitation of the planning process and mediation of conflicts
4 Informing the public on IWRM and promotion of IWRM

Each RBC has 35 - 40 members from four groups of stakeholders:

1 Concerned government agencies
2 Water users, including agriculture, industry, business, and local administration
3 Academic institutions, national experts, and national trainers/mentors
4 Non-governmental organizations

Ganesh Pangare, T K Nielsen, Anjali Mohan Bhatia and Ian W Makin (August 2009): Innovations and advances in basin management in Asia. Discussion paper presented at ADB's 'Eye on Asia' event at the World Water Week, Stockholm

C.2 Bengawan Solo Water Council (TKPSDA), Indonesia

RBO type	Council
Year established	2009
Basis of existence	Law on water resources (2004) Presidential Decree 12/2008 Decree from the Minister of Public Works 247/2009
Under which agency	None; but reporting to Ministry of Public Works
Basins covered	Bengawan Solo Basin, Central and East Java, and some minor adjacent river basins (16 million people, 16,100 km^2)

Vision	To ensure the right and proper public work infrastructure services in water resources in the basin of Bengawan Solo for maintaining water resources conservation, and to ensure productive and sustainable life for people who live in the Bengawan Solo Basin
Functions	TKPSDA has 32 members representing government bodies (including the ministerial river basin development agency (Balai Besar Wilayah Sungai Bengawan Solo, BBWS-BS, and PJT1), and 32 members representing non-government bodies. It is responsible for • Recommendations on water sharing within the basin; and • Recommendations on water-related development, including strategic planning and master planning, emphasizing water conservation, water utilization; and water-related disaster preparedness
Head	Chairperson (rotated annually between Central and East Java)
No. of staff	None; secretariat services provided by BBWS-BS
Funding sources	Government budget (via Ministry of Public Works)
Sources of information	1) Sudarsono (Sep 09): The Bengawan Solo Water Council - providing insight and directions. CRBOM Small Publications Series no. 5, Center for River Basin Organizations and Management, Solo, Central Java 2) Budi, S. Prayitno (March2011): The importance of shared values. CRBOM Small Publications Series no. 33, Center for River Basin Organizations and Management, Solo, Central Java

C.3 Japan Water Agency (JWA)

RBO type	Incorporated administrative agency
Year established	1961
Basis of existence	Water Resources Development Public Corporation Law of 1961 Japan Water Agency Law of 2002 (established JWA in October 2003)
Under which agency	Ministry of Land, Infrastructure and Transport Ministry of Health, Labor and Welfare Ministry of Agriculture, Forestry and Fisheries

	Ministry of Economy, Trade and Industry Ministry of Finance
Basins covered	7 river systems: Tone, Ara, Toyo, Kiso, Yodo, Yoshino, and Chikugo
Vision	Provide stable supply of safe, quality water at a reasonable price
Mission	Carry out administrative tasks and projects, where implementation should ensure public benefits such as stable public life and social and economic activities
Functions	Based on the Basic Plan for Water Resources Development for each of the 7 river systems: • Constructs, operates, manages, and rehabilitates dams, estuary barrages, facilities for lake and marsh development, and canals • Secures water for domestic, industrial and agricultural uses, flood control, and maintaining and improving normal functions of the river
Head	President
No. of staff	1,579 (as of 2008)
Funding sources	Projects are funded using government grants and subsidies, as well as payments from beneficiary charges and loans
Sources of information	1) JWA website: http://www.water.go.jp 2) NARBO Annual Reports 2006 and 2008 3) Outline of Japan Water Agency (publication)

C.4 Korea Water Resources Corporation (K-water)

RBO Type	Corporation
Year established	1967
Basis of existence	Korea Water Resources Development Corporation (1967) Korea Water Resources Corporation (1988 to present)
Under which agency	Ministry of Land, Transport and Maritime Affairs Ministry of Strategy and Finance
Basins covered	5 river basins: Han, Geum, Seomjin, Nakdong, and Yeongsan

Vision	The world's best water service company (Global Best on 3 Water+)[41]
Mission	Make a happier world with water
Functions	• Management and construction of water resources facilities • Management and construction of multi-regional water supply system • Construction of industrial complexes and new cities • Technological assistance, research and development, and education about water supply systems
Head	President
No. of staff	3,900+ (as of 2009)
Funding sources	Revenues from operations Contributions from government
Sources of information	1) K-water website: http://english.kwater.or.kr/ 2) Water, Nature and People – KOWACO (publication)

C.5 Laguna Lake Development Authority (LLDA), Philippines

RBO type	Authority
Year established	1966
Basis of existence	Republic Act 4850 0f 1966 (as amended) Presidential Decree 813 of 1975 Executive Order 927 of 1983 Republic Act 9275 (Clean Water Act) of 2004
Under which agency	Department of Environment and Natural Resources
Basin covered	Laguna Lake and environs
Vision	Sustainable Development for a Laguna Lake; That continuously nourishes life and brings prosperity to the country;

[41] *'3Water+'* refers to the materialization of the corporation's three strategic directions: (i) public service (to expand public service), (ii) growth (to realize continuous growth), and (iii) efficiency (to secure global competitiveness), with a water logo consisting of three colors; green, blue and white. *'3Water+'* expresses the corporation's commitment to faithfully accomplish its founding goals and vision by establishing and promoting strategies that correspond with the values pursued by the nation in the area of water resources management.

	That is sustainably managed and developed for the benefit of the present and future generations; That is recognized and supported by the global community; With people working together in harmony to maintain the integrity of its ecosystem
Mission	To be a self-sufficient and highly dynamic IWRM authority, globally known and recognized, with competent and professional personnel who take the lead towards the sustainable development of the Laguna Lake basin
Functions	An independent multi-agency/sectoral policy-making body with policy and planning, regulatory, management and developmental functions: • Promote and accelerate the development and balanced growth of the Laguna Lake area and the surrounding provinces, cities and towns. • Manage and control the environment • Preserve the quality of human life and ecological systems, and prevent undue ecological disturbances, deterioration and pollution (Presidential Decree 813 of 1975) • Exercise regulatory, quasi-judicial functions in environment management. (Executive Order 927 of 1983) LLDA's Board of Directors is empowered to approve the annual work programs and corporate operating budgets
Head	General Manager
No. of staff	390 (as of 2007)
Funding sources	• Operation is fully supported through internally generated funds primarily from the exercise of its development and regulatory functions (recovers 90% of operational costs from water users) • Own revenues (regulatory fees, administrative fees, pollution charges, resource user fees (fish cage and water abstraction) • Utilizes own revenues resources for environment and development programs and projects, without the need to go to Congress for budget allocation

- Financial independence has enabled LLDA to mobilize sustainable financing and set up Project Development Fund and Environmental Trust Fund.

Sources of information

1) Reports on LLDA's Performance Bench-marking and Peer Review, ADB and IWMI, 2007
2) LLDA website: http://www.llda.gov.ph/

The Philippine National IWRM Framework Plan (2007)

This plan provides directions for mainstreaming IWRM and for preparation of river basin plans. It covers

1 Protection and regulation for water security and ecosystem health:
Efficient and ecologically sustainable water allocation
Groundwater management and aquifer protection
Clean and healthy water
Risk management (water related disasters and climate change)

2 Water availability and services for present and future needs:
Water conservation/stewardship
Water use efficiency
Access to affordable and responsive water supply and sanitation

3 Effectiveness, accountability, and synergy among institutions and stakeholders:
Participatory water governance and supportive enabling environment
Knowledge management and IWRM capacity-building

4 Innovative responses to future challenges:
New pathways to water resource management
Water sensitive design
Water rights trading

Tuddao Jr., Vicente B. (November 2009): Framework planning for basin-level management - the Philippine approach. CRBOM Small Publications Series no. 12, Center for River Basin Organizations and Management, Solo, Central Java

C.6 Mahaweli Authority of Sri Lanka (MASL)

RBO type	Authority
Year established	1977
Basis of existence	Parliament Act
Under which agency	Ministry of Agricultural and Agrarian Services Development

Basins covered	Mahaweli Ganga Basin is the largest in Sri Lanka, covering 10,300 km^2, or 16 percent of the country's land area, with a population of around 2.8 million people, or 15 percent of the country's population MASL operates in the Mahaweli basin as well as several other hydrological connected river basins and special areas, covering 25,600 km^2, or 39 percent of the country's land area
Vision	Prosperous society and healthy ecosystem in the Mahaweli region
Mission	Improvement of human life in the Mahaweli impacted areas
Functions	• Water resources management and development in Mahaweli or any other rivers for irrigation and hydro-power generation (construction of dams and reservoirs, trans-basin diversion canals and tunnels) • Provision of irrigation water, water allocation, flood control and management, operation and maintenance of large dams and reservoirs • Township development (settler services for development of irrigation settlements, land administration, agricultural production and extension, community services, human resources development, employment opportunities, shelter for population) MASL has a high degree of autonomy which permits independent decision making.
Head	Director General
No. of staff	4,670 staffs in 14 site offices located in ten districts (as of 2008)
Funding sources	• Water resources development: Government and donor agencies • O&M costs: Government and water users • Rehabilitation of irrigation programs: Part of costs (up to 10-20%) is borne by the farmers, depending on the work nature. In many instances water users contribute in kind (labor force) in rehabilitation, and O&M of irrigation canals at tertiary level • Construction of water supply projects: Part of the cost covered by water user beneficiaries

Sources of information

1) Study on the Performance and Capacity of National River Basin Organizations: Mahaweli Authority of Sri Lanka (MASL), 1 June 2007
   Dr. M.I.M. Mowjood and Dr. M.M.M. Najim, Department of Agricultural Engineering, University of Peradeniya
   Eng. Mr. J.A.S.A. Jayasinghe, River Basin Planning and Management Division, MASL
   Eng H.H.P Premakumara, Kalaoya Basin, MASL
2) MASL website: http://www.mahaweli.gov.lk/
3) NARBO Annual Report 2006 and 2008
4) Sudharma Elakanda (December 2010): Resource-based development: Experience from Mahaweli. CRBOM Small Publications Series no. 26, Center for River Basin Organizations and Management, Solo, Central Java

C.7 Mekong River Commission (MRC)

RBO type	Inter-governmental body
Year established	1995 (replacing the Mekong River Committee, established in 1957)
Basis of existence	Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin, entered between Cambodia, Laos, Thailand and Viet Nam on 5 April 1995
Under which agency	None; governed by a Council with one minister-level representative from each member country
Basins covered	The Lower Mekong Basin (the parts of the basin located in the member countries) (609,000 km^2, some 85 million people
Vision for the basin	An economically prosperous, socially just and environmentally sound Mekong River Basin
Vision for MRC	A world class, financially secure, international river basin organization serving the Mekong countries to achieve the basin vision
Mission for MRC	To promote and coordinate sustainable management and development of water and related resources for the countries' mutual benefit and the people's well-being

Functions	• *'To cooperate in all fields of sustainable development, utilization, management and conservation of the water and related resources ... including, but not limited to irrigation, hydropower, navigation, flood control, fisheries, timber floating, recreation and tourism, in a manner to optimize the multiple-use and mutual benefits of all riparian's and to minimize the harmful effects that might result from natural occurrences and man-made activities'*
	• Guidance and/or approval of major water uses, inter-basin and intra-basin diversions, and maintenance of flows
	• Policy advise, knowledge base and decision-support related to water-related development and environmental management
	• Basin-level development planning
	• Operational flood forecasting
	• Liaison with upstream riparian's (People's Republic of China and Myanmar)
Head	(of the MRC): Council Chairperson (rotated annually between the member countries)
	(of the MRC Secretariat): Chief Executive Officer
No. of staff	(of the MRC Secretariat): 157 (by end of 2009)
Funding sources	• Donors and development partners (94 percent in 2009)
	• Contributions from member countries (6 percent in 2009)
Sources of information	1) The 1995 Mekong Agreement
	2) www.mrcmekong.org
	3) MRC Annual Report 2009

C.8. Perum JasaTirta1 (PJT1), Indonesia

RBO type	Public corporation
Year established	1990
Basis of existence	Regulation No. 5 of 1990
Under which agency	Ministry of Public Works

Basins covered	Brantas and Solo River Basins, which, between them, have an area of 27,900 km^2 and a population of more than 31 million people
Vision	To be one of the best RBOs in Asia-Pacific by 2025
Mission	Carry out activities in the field of water resources management and water supply systems and sanitation according to government assignment satisfying all stakeholders based on sound corporate principles and accountability
Functions	Main business activities: • Raw water services for domestic, industry, agriculture, flushing, ports, power plants, and other water needs; • Electricity supply to electric companies; • Generation and transmission of hydroelectric power, drinking water, consulting services in the field of water resources, rental of large equipment, and water quality laboratory services; and • Operation and maintenance, and rehabilitation of irrigation infrastructure.
Head	President Director
No. of staff	632 (as of December 2008)
Funding sources	• Water users (hydropower and raw water user fees) • Government • Services (tourism, land leasing, heavy equipment, consulting, laboratory)
Sources of information	1) PJT1 website: http://www.jasatirta1.co.id/ 2) NARBO Annual Reports, 2006 and 2008 3) Tjoek Walujo Subijanto (Dec 10): Moving our RBOs to the next level. CRBOM Small Publications Series no. 30, Center for River Basin Organizations and Management, Solo, Central Java, and JasaTirta1 Public Corporation, Malang, East Java

C.9. Perum JasaTirta2 (PJT2), Indonesia

RBO type	Public corporation
Year established	1999

Basis of existence	Perum Otorita Jatiluhur was established in line with Government Regulation 20 year 1970, as amended with GR 35 /1980 and GR 42/1990 With the issue of GR 13/1998 regarding public corporation, PJT2 was named as such in line with GR 94/ 1999
Under which agency	Ministry of Finance Ministry of Public Works Ministry of State-owned Companies
Basins covered	Citarum River Basin and part of Ciliwung – Cisadane River Basin which covers 12,000 km^2 and 2 provinces
Vision	To be a well known lead and high quality company in water management and water resources providing water service for various needs, and contributing to national food sufficiency
Mission	(1) To supply raw water for drinking water, electric generation, agriculture, tourism, flushing, industry, etc (2) To maintain food sufficiency by supplying water with effort to preserve the environment (3) To maximize profit and to foster benefits based on business principles
Functions	PJT2 provides public services and simultaneously gains profit based on company management principles. Main tasks: • develop, maintain, and rehabilitate infrastructures for irrigation and electric power • manage water resources and electric power • manage the river basin: protection, development and use
Head	President Director
No. of staff	1,406 (as of December 2008)
Funding sources	Recovers 100% of operational costs from water users (hydropower and raw water user fees; except from farmers), from government, and from other services (tourism, land leasing, sand mining, heavy equipment, laboratory and engineering consultancy)

Sources of information	1) Reports on PJT2's Performance Benchmarking and Peer Review, ADB and IWMI, 2007 2) PJT2 website: http://www.jasatirta2.co.id 3) NARBO Annual Report s, 2006 and 2008 4) PJT2 brochure

C.10 Red-Thai Binh River Basin Organization (RRBO), Viet Nam

RBO type	River basin planning and management board
Year established	2001
Basis of existence	Decision No. 39/2001 by Ministry of Agriculture and Rural Development
Under which agency	Ministry of Agriculture and Rural Development
Basins covered	The Red-Thai Binh River Basin in Viet Nam territory covers 26 provinces, with an estimated population of 28 million (as of 2002). It comprises 5 sub-basins: Thao, Da, Lo, Upper Thai Binh, and Red-Thai Binh Delta
Mission	Manage Red-Thai Binh river basin towards the objectives of socio-economic development and environment protection
Functions	RRBO undertakes water resources planning and management in the Red- river basin in conformity with Article 64 of the Law on Water Resources of 1998, as follows: • Formulate, submit for approval and supervise Red-Thai Binh river basin planning; • Coordinate with ministerial, sectoral and local agencies on water resources baseline investigation, inventory, and formulation; and • Recommend solutions for water disputes. The Secretariat of the RRBO is based at the Institute of Water Resources Planning.
Head	Chairman (Vice Minister of Agriculture and Rural Development)
No. of staff	50 (as of 2006)
Funding sources	Operation of RRBO is funded from the state budget.

Operation funds are generally limited and are just enough for basic activities carried out by the RRBO, such as field trips, workshops, newsletters, and website update.

Sources of information

1) Reports on Red RBO's Performance Benchmarking and Peer Review, ADB and IWMI, 2007
2) RRBO website: http://www.rrbo.org.vn
3) NARBO Annual Report 2006
4) RRBO newsletters, 2005 and 2008

C.11. Selangor Water Management Authority (SWMA), Malaysia[42]

RBO type Incorporated administrative agency

Year established 1999

Basis of existence Selangor Water Management Authority Enactment 1999 pursuant to the approval of the Selangor State Legislative Assembly on 9 April 1999

Under which agency State Government of Selangor

Basins covered

1. Selangor River Basin
2. Klang River Basin
3. Langat River Basin
4. Sepang River Basin
5. Bernam River Basin
6. Tengi River Basin
7. Buluh River Basin

Vision To be the excellent world class Integrated Water Resources Management (IWRM) organization to complement with the vision of Selangor as a developed state

Mission Preserving and improving the quality of water resources and river basin, and contributing towards its sustainable development and holistic management

Functions

i. To ensures manageable and sustainable conditions of water resources and environment;
ii. To undertake planning, research, facilitation, coordination, operation, enforcement supervision on

[42] or Lembaga Urus Air Selangor (LUAS)

water resources and environment in the context of IWRM;

iii. To provide an environment for the development, utilization and management of water resources that is conducive for public and private sector participation; and

iv. To promote public awareness and participation importance of water resources.

Head	Executive Director
No. of staff	87 (as of 2011)
Funding sources	Licensing activities and Grant from State Government. By 2011, the annual budget is RM 4.2 million (USD 1.1 million)
Source of information	SWMA (2011)

C.12. Yellow River Conservancy Commission (YRCC), People's Republic of China

RBO type *Public agency*

Year established	*1946*
Basis of existence	*(1) State Document No. 87, 1998* *(2)* (Flood Control Law (1977) (3) Water Law (2002) (replacing a previous water law from 1988)
Under which agency	Ministry of Water Resources The Yellow River Basin Water Resources Protection Bureau (under YRCC) is a joint body of Ministry of Water Resources and State Environmental Protection Administration
Basins covered	Yellow River Basin (742,000 km^2); inland river basins in Xinjiang, Qinghai, Gansu and Inner Mongolia
Functions	• Raw water allocation for towns, rural areas, irrigation and hydropower • Flood control and drought mitigation • Water and soil conservation • Management of river morphology, floods, and soil erosion

	• Related infrastructural planning, development, implementation and operation • Environmental management related to water and
Land use	
	• Various services and supplies provided by around 20 subsidiaries (bureaus and enterprises), such as • Yellow River Mingzhu (Holding) Co. Ltd. (Management Bureau of Sanmenxia Multipurpose Project); • Institute of Hydraulic Survey, Programming and Designing; and • Center for Hydro-informatics in River Basins (CHIRB), a member of the APWF network of regional water knowledge hubs.
Head	Director
No. of staff	28,000 (as of 2003)
Funding sources	State budget
Sources of information	www.yellowriver.gov.cn www.apwf-knowledgehubs.net

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