



RETA 6470:

**Managing water in Asia's river basins:
Charting progress and facilitating investment
(Financed by the Japan Special Fund)**

Interim report
Rev 1

December 2009

Asian Development Bank

Updates

- 0 1st draft for internal circulation
 - 0a Minor cosmetic changes of no significance
 - 0b Incorporation of all comments received by 31 Dec 09
Some changes in Appendix G
- 1 Same as 0b

Summary

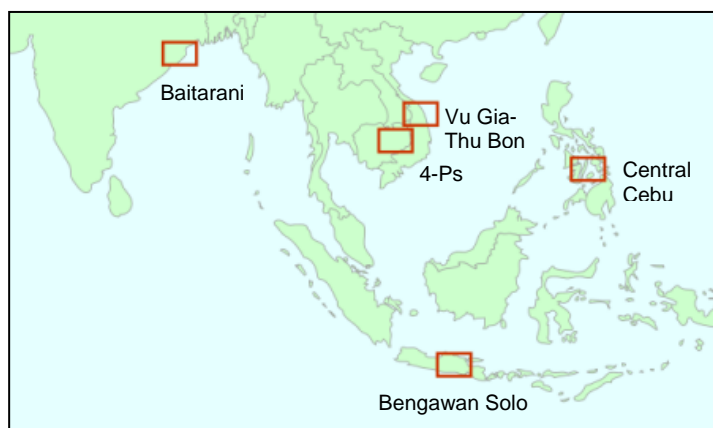
RETA 6470, *'Managing Water in Asia's River Basins: Charting Progress and Facilitating Investment'* is implemented by ADB as a part of the work programme of the Network of Asian River Basin Organizations (NARBO).

A close dialogue is maintained with partners, including various river basin organizations and involved agencies; Asia-Pacific Water Forum (APWF) and Japan Water Forum; as well as parallel development initiatives by ADB, JICA, and others. Particular synergies are pursued with *'Center for River Basin Organizations and Management (CRBOM)'*, established by Ministry of Public Works, Indonesia, as a member of the network of regional knowledge hubs within the APWF framework.

Over a period of two years (2009 and 2010), the project will compile a regional overview of IWRM in river basins; assist Asian river basin organizations with preparing action-oriented river basin investment roadmaps; and provide or facilitate related capacity-building. Activities include country assessments, support to strengthening of river basin organizations, and roadmap advisory services for water-related development initiatives.

Pilot implementation takes place in five basins. They are located in northeast Cambodia (the 4-Ps area of Prek Preah, Prek Krieng, Prek Kampi, and Prek Te); India (the Baitarani Basin in Orissa); Indonesia (Bengawan Solo Basin in Central Java); the Philippines (Central Cebu), and Viet Nam (the Vu Gia-Thu Bon Basin).

The present interim report describes progress by end of 2009 and an outlook of the year to come.



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Acronyms and abbreviations

APWF:	Asia-Pacific Water Forum
CNMC:	Cambodia National Mekong Committee
CRBOM:	Center for River Basin Organizations and Management
DONRE:	(Province) Department of Natural Resources and Environment, Viet Nam
GWP:	Global Water Partnership
IUCN:	World Conservation Union
IWMI:	International Water Management Institute
IWRM:	Integrated water resources management
JICA:	Japan International Cooperation Agency
JWA:	Japan Water Agency
MDG:	Millennium development goal/goals
NARBO:	Network of Asian River Basin Organizations
RAS:	Roadmap advisory service
RBC/RBO:	River basin committee/ river basin organization
RETA:	Regional technical assistance
SEA:	Strategic social and environmental assessment
SPS:	Small Publications Series (of CRBOM)
TA:	Technical assistance
TKPSDA:	Tim Koordinasi Pengelolaan Sumber Daya Air, ' <i>Water Council</i> ', Indonesia

Terminology

RBO, RBC/RBO: For the sake of readability, no distinction is made between a river basin committee and a river basin organisation, except if obvious in the specific context

Watershed: For the Philippines, '*watershed*' is applied as synonymous with '*headwater area*', in line with conventional national professional terminology

1 Introduction

Asia's river basins are rich and diverse. They offer a variety of livelihoods, abundant natural resources, unique habitats, and, in many cases, an attractive scope for development. Each basin has its own individual context in terms of resources and development agenda. Policies, legislation and management frameworks vary from one place to another, and over time, following a cycle of reform and consolidation.

Basin-level water management is a powerful tool for holistic, responsive and forward-looking development planning. Throughout Asia, in recent years, many positive lessons have been learnt that are well suited for sharing with others.

RETA 6470, *'Managing water in Asia's river basins: Charting progress and facilitating investment'* contributes to good river basin management practices with a focus on action-oriented, IWRM-based development planning. The aim is pursued by a set of pilot initiatives, being implemented in collaboration with representatives from the Asian community of river basin managers, practitioners and scientists, as well as others involved in resource-based development planning.

The present interim report is intended as a reference for dialogue in support of efficient progress towards a useful outcome.

2 Background

IWRM implementation in Asia

IWRM implementation in Asia is driven by attractive development opportunities, as well as a need of continuous adaptation to new challenges and new knowledge.

Current drivers of change in Asian river basins include:

- Urbanization, new lifestyles, higher demand of water and energy, and higher generation of sewage and solid waste;
- inadequate access to water and sanitation; inadequate rural livelihoods and revenue generation;
- technological development (new technology, improved access to existing technology) (affecting the efficiency of production systems and the related competitive advantages);
- trade regulation, lower trade barriers (as promoted by AFTA, APEC, ASEAN and WTO, not to speak of the Asian 'noodle bowl' of bilateral trade agreements), and 'porous borders';
- global long-term food price escalation, international large-scale contract farming, and new markets for primary production (including biofuel);
- escalating tourism; and
- the need of climate proofing and climate adaptation.

The drivers can represent opportunities as well as threats. The response is mostly a matter of adaptation (although some of the drivers can be managed to some extent). A general requirement is increased efficiency of water uses in general and water-dependent production systems in particular.

Some over-ruling water-related challenges are:

- Wider WSS (and electricity) coverage, including rural areas
- better revenue generation in water-dependent (agricultural) production systems and related value chains;
- improved water efficiencies and improved economic efficiencies of water-dependent production systems; and
- inter-sector and inter-agency dialogue and interaction.

Clear relations are seen between water management and land management, as indicated by GWP's definition of integrated water resources management (IWRM) as addressing '*the coordinated development and management of water, land and related resources ...*'. Water without land can be as pointless as land without water.

Please refer to Ganesh (Aug 09) for a current overview of IWRM implementation in Asia.

ADB's engagement¹

Adopted in 2001, ADB's *Water for All Policy* fosters integrated water resources management (IWRM), as well as improvements in water service delivery. Across the region, ADB clients have adopted IWRM, and an increasing number of water loans are now prepared for river basins.

In March 2006, at the 4th World Water Forum in Mexico City, Mexico, ADB announced its *Water Financing Program for 2006-2010* to double water investments and achieve targeted outcomes through rural, urban, and basin water investments. One target is to help introduce IWRM in 25 river basins.

In 2006, NARBO's 2nd General Meeting requested that ADB: (i) lead the introduction of RBO performance benchmarking and peer review; (ii) support capacity development in RBOs; (iii) chart the progress of IWRM in river basins in the region; and (iv) facilitate further investments in river basin projects to introduce IWRM, involving RBOs as facilitators. The present RETA 6470 is implemented in support of these aims, within the wider perspective of ADB's Water Financing Program.

ADB's Water Financing Program

(from <http://www.adb.org/Water/WFP/default.asp>)

In response to international calls for increased financing for water, ADB launched its *Water Financing Program* to double investments in the sector between 2006 and 2010. Setting a precedent among multilateral development banks, the programme committed to devoting 25% of ADB's investment portfolio to water projects and set out to deliver the following specific outcomes:

- 200 million people with sustainable access to safe drinking water and improved sanitation
- 100 million people with reduced risks to flood
- 40 million people with more productive and efficient irrigation and drainage services
- 25 river basins introduced to integrated water resources management (IWRM)
- Improved water governance through national water reforms and capacity development

Inter-sector dialogue

Better inter-sector dialogue can provide attractive added benefits at a marginal extra cost. A typical example is the scope for coordination of irrigation services and agricultural extension services, which are often the responsibility of separate ministries. Increased irrigation water reliability and seasonal coverage open new opportunities, but these may from case to case require new cultivation technologies, new inputs, and access to new markets.

The national planning typically takes place sector by sector, with different ministries preparing their development plans and related investment plans. Then, the sector plans are brought together when compiling the over-all national development plans and budgets. At this stage, however, it is invariably seen that the sum of the different sector budgets highly exceed what the country can afford, so an overruling challenge to the national planning body is to cut the sector budgets in a meaningful way while incorporating them into the national budget. In the turbulence, there is little capacity to look for inter-sector links and potential synergies, and some opportunities are lost.

¹

This section is based on ADB (Jun 08)

It is seen that even IWRM-based RBCs/RBOs tend to apply a sector perspective rather than an integrated perspective, in order to adjust to sector-based national planning and budgeting procedures.

The small Chi Tok Irrigation scheme (Kampong Cham Province, Cambodia) was upgraded. The farmers, however, continued their traditional livelihood of one crop of rainfed rice for their own household consumption. They had no knowledge about the reliability of the new irrigation water supply, no insight in alternative or supplementary cultivation systems, and no access to a market. These services can be provided at a fraction of the investments in physical infrastructure, and will highly amplify the social and economic benefits.

While a main interface is between irrigation supplies and agriculture, equally attractive benefits can exist at the interfaces with and among other water sectors, such as domestic supplies and sanitation, hydropower, inland fisheries, flood management, navigation, and water-related tourism.

Basin-level management

Basin-level management can be a valuable supplement to national and province-level management. Some disciplines, such as water allocation and water-sharing, flood management, and water quality management must by necessity apply an implicit or explicit basin-level perspective. Many other water-related disciplines - including multi-sector water-related development planning - will strongly benefit from a basin-level perspective.

Activation of these benefits requires a good interaction with the central and de-central bodies of the basic national administrative framework, including the line agencies with their expertise and experience. This requirement is enhanced in cases where the hydrological (river basin) boundaries differ visibly from the established administrative (national and province) boundaries.

Regional networking

Asia is strong in regional networking and knowledge-sharing. Examples of platforms are, by order of alphabet,

CapNet, with regional CapNets for South and Southeast Asia, as well as national CapNets in many countries

GWP (Global Water Partnership), founded in 1996, with regional partnerships in South and Southeast Asia (as well as elsewhere), and numerous national partnership bodies

Japan Water Agency, established as a public corporation in 1962, changed to incorporated administrative agency in 2003, and serving as a secretariat for NARBO

NARBO (Network of Asian River Basin Organizations), initiated in 2003 with support from ADB, ADB Institute, and the Japan Water Agency. NARBO promotes and supports IWRM-based good governance at the river basin level by knowledge-sharing and capacity-building, including training of RBO mid-level managers. In 2005, NARBO initiated an RBO performance benchmarking with a peer review process

UNESCAP (The United Nations Economic and Social Commission for Asia and the Pacific) is the UN's main convening authority in the region. Located in Bangkok, UNESCAP supports regional knowledge-sharing and policy formulation. It was a main sponsor of the former Mekong Committee, while UNDP was material in establishing and consolidating today's Mekong River Commission

SEAWF (Southeast Asia Water Forum), held every second year since 2003, aiming at professional discussions and networking in support of regional policy formulation

National knowledge base development and capacity-building are undertaken by a variety of organizations, projects and programmes in each country, in many cases with technical and/or financial support from development banks, development agencies and NGOs.

Network of Asian River Basin Organizations (NARBO)
www.narbo.jp

... was initiated in 2003 with support from ADB, ADB Institute, and the Japan Water Agency
 ... promotes and supports IWRM-based good governance at the river basin level by knowledge-sharing and capacity-building

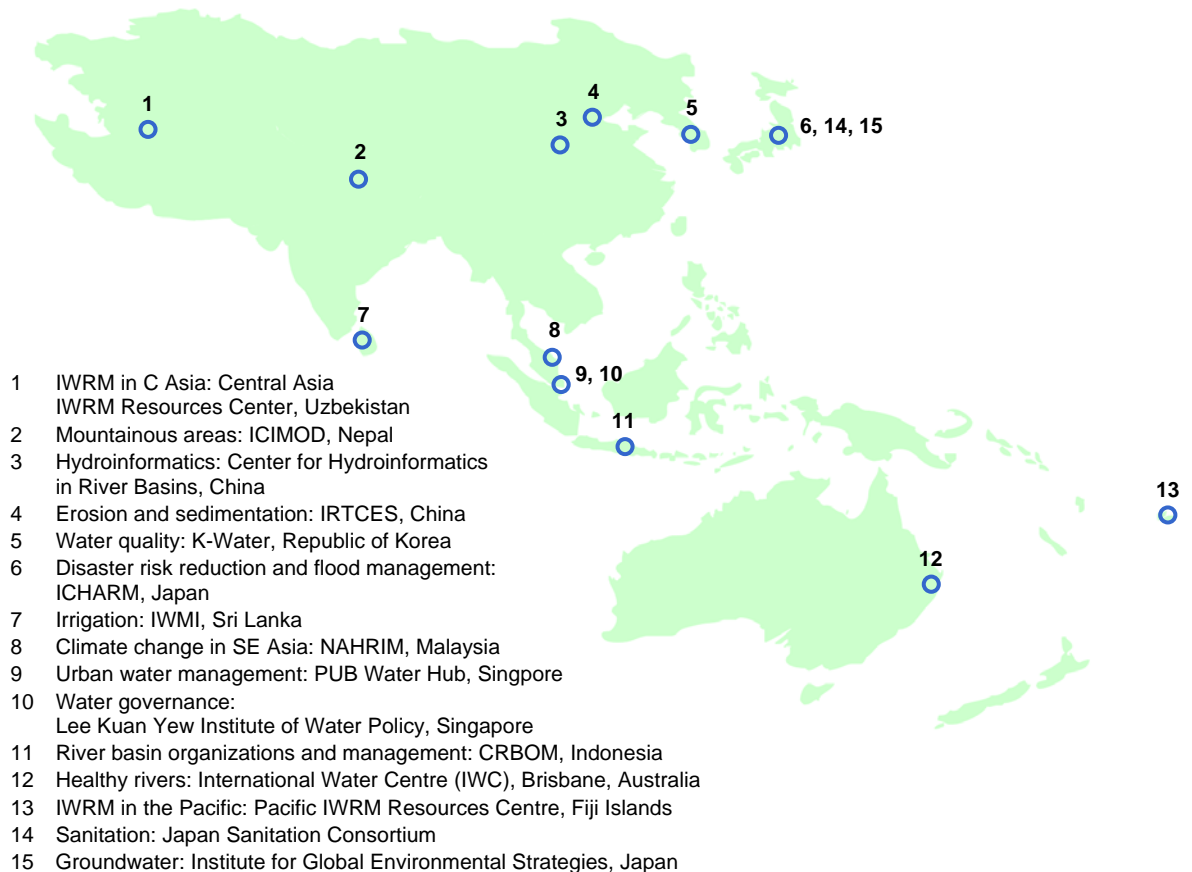
In 2005, NARBO initiated an RBO performance benchmarking with a peer review process

Another key activity is IWRM training of practitioners. The 5th and the 6th regional IWRM training sessions were held in 2009

RETA 6470 is implemented as an integral part of NARBO's work programme

The APWF network of regional knowledge hubs was launched in June 08. Today, the network comprises 13 centres, spanning across the entire Asia-Pacific region, and providing a powerful coverage of key IWRM-related disciplines and perspectives. RETA 6470 is implemented in a close collaboration with *Center for River Basin Organizations and Management (CRBOM)*, which was established in Solo, Central Java, in April 2009.

Figure 1: APWF knowledge hubs



3 RETA 6470

3.1 Overview

Please refer to Appendix A for an overview and to Appendices B-C for details.

3.2 Implementation

Collaboration is maintained with

- *Asia-Pacific Water Forum (APWF)*, in connection with the formation of *Center for River Basin Organizations and Management (CRBOM)* as a member of the APWF network of regional knowledge hubs;
- *IUCN, Bangkok*, about a paper for the World Water Week, Stockholm (August 2009) and a publication about IWRM implementation in Asian river basins;
- *JICA*, in connection with its Capacity Development Project for River Basin Organisations in Practical Water Resources Management and Technology in the Republic of Indonesia (including establishment of the Dissemination Unit for Water Resources Management and Technology, DUWRMT, in Solo);
- *Ministry of Public Works, Indonesia*, as the mother organization of CRBOM and the host of RETA 6470; and
- *Network of Asian River Basin Organizations (NARBO)*, *APWF knowledge hubs initiative* and *Japan Water Forum*, in connection with peer reviews and benchmarking of river basin organizations, and related training and capacity-building

Also, collaboration is in a healthy state of progress with the agencies that are involved in water-related development in the pilot basins:

- *Cambodia*: Cambodia Water Partnership (CamboWP) and Cambodia National Mekong Committee (CNMC)
- *India*: Department of Water Resources, Orissa
- *Indonesia*: *The Bengawan Solo Water Council (TKPSDA)*, Bengawan Solo RBO (Balai Besar Wilayah Sungai Bengawan Solo, BBWS-BS), Jasa Tirta Public Corporation I (Perum Jasa Tirta , PJT1) and its Bengawan Solo branch office
- *The Philippines*: Metro Cebu Water District (MCWD), as well as River Basin Control Office (RBCO) of Department of Environment and Natural Resources (DENR)
- *Viet Nam*: Department of Natural Resources and Environment (DONRE), Quang Nam Province

Others with a background or interest in IWRM-based basin-level management and development planning are most welcome to collaborate in one way or another, for example by exchange of documentation, mutual participation in meetings and workshops, active participation in the various activities, or simply by providing suggestions and guidance.

Partners are informed about progress and outcomes in the following ways:

- A monthly update, sent to anyone who wants it;
- a CD with final and draft documents, updated continuously and broadly distributed; and
- the www.crbom.org website, with final documents.

Guidance and suggestions are welcome, not only from the established partners, but from anyone with an interest in the activities.

CRBOM, with its closely related agenda, serves as the host organization for RETA 6470. A close day-to-day collaboration is maintained, including pilot basin dialogue, the RBO benchmarking and roadmap advisory services, and a broad range of training and capacity-building efforts.

3.3 Staffing

The following staffing has been (or will be) mobilised:

- A senior IWRM specialist serving as adviser and stationed at CRBOM;
- a TA coordinator at ADB headquarters to monitor and coordinate implementation, and facilitate liaison with ADB's Water Community of Practice and regional departments;
- a knowledge management specialist for publication and dissemination activities;
- around 10 project specialists (around 2 person-months each, with expertise in either water resources, environment, institutional development, or governance, as needed from case to case) to support the RAS in the pilot basins

Guidance, supervision and backstopping are provided by ADB staff.

3.4 Progress

The progress by end of 2009 is shown in the following tables. Please refer to Appendix E for summaries of progress in each pilot basin.

Table 1: Summary of progress

Outputs	Performance targets and/or indicators	Target completion date	Progress
Project development facility			
1 Roadmaps for basin investments	5 stakeholder workshops conducted 5 river basin profiles prepared or updated 5 investment road maps prepared	Q2 2010	CAM - in progress IND - in progress INO - in progress PHI - in progress VIE - in progress
2 Establishment of the RAS	RAS developed and piloted in 5 river basins	Q3 2010	In progress
RBO knowledge service			
3 Online access and dissemination of IWRM publications and services	Higher demand for products, online and offline	(Continuous)	In progress
4 Knowledge products on priority topics and case studies	Knowledge products and case studies widely disseminated	(Continuous)	In progress
Country performance assessments			
5 Country performance assessments for IWRM	At least 5 assessments completed	Q3 2010	In progress
6 Dialogues on country and basin assessments	5 successful dialogues with stakeholders held	Q3 2010	In progress
7 Publication on country action plan and regional overview of IWRM progress	Publication widely disseminated	Q3 2010	In progress
RBO performance improvement			
8 Capacities of RBOs on IWRM developed	5 RBOs with improved capacities on IWRM; dialogues, training, workshops, and seminars successfully held	Q3 2010	In progress

Note: Target completion dates for Outputs 2, 5, 6 and 8 changed to Q3 2010

Table 2: Details of progress

Pilot basins and roadmap advisory services		
Activity	Status	Comments
Approach	RAS guidelines drafted	
Cambodia (4-Ps)	Several liaison meetings held; Working Paper 3 in preparation; roadmap drafted	National consultants being recruited, 1st workshop scheduled
India (Baitarani, Orissa)	Kick-off meeting Aug 09; Working Paper 4 in preparation	1st workshop scheduled; proposal on a Baitarani RBC submitted to the state government
Indonesia (Bengawan Solo)	Several consultation meetings held; Working Paper 1 in preparation; 1st stakeholder meeting held; roadmap drafted; national consultant fielded	
Philippines (Cebu)	Concept note prepared; kick-off meeting Sep 09; Working Paper 5 in preparation	National consultants being recruited, workshops being scheduled
Viet Nam (VGTB)	Liaison meeting and kick-off meeting held; Working Paper 2 in preparation	National consultant being identified; 1st workshop re-scheduled to early 2010
RBO benchmarking		
Activity	Status	Comments
Approach	Over-all approach discussed during the inception workshop; Working Paper 8 in preparation	Consultant being identified Collaboration with PJT1 anticipated
Benchmarking workshop; review of lessons learnt; assessment of scope and approach; documentation	Time and place to be decided	With NARBO; expectedly either in Solo or in Manila
Peer reviewer training and certification	Time and place to be decided	With NARBO; expectedly either in Solo or elsewhere in Indonesia
Country assessments		
Activity	Status	Comments
Approach	Working Paper 7 in preparation; details under consideration	
Draft assessment reports (5 countries)	Data collection in progress Working Paper 10 (CAM) in preparation	Jointly with CRBOM Jointly with CNMC
National seminars (5 countries)	Not yet initiated	Expectedly back-to-back with 2nd roadmap stakeholder workshops
River basin publication	Draft paper presented at ADB's 'Eye on Asia' event at the World Water Week, Stockholm	Collaboration with IUCN Bangkok (Ganesh Pangare)
Knowledge services		
Activity	Status	Comments
Knowledge products	CRBOM electronic library and documentation CD operational RETA 6470 documentation CD operational CRBOM 'Small Publications Series' on www.crbom.org/SPS/	Jointly with CRBOM Jointly with CRBOM
Online access	www.crbom.org/RETA6470/	Jointly with CRBOM
Training programs	Active participation in 5th and 6th NARBO training	With several partners
Seminars	In progress	(as above)
Leadership training	Not yet initiated	(as above)

3.5 Documentation

The following documentation has been or will be produced:

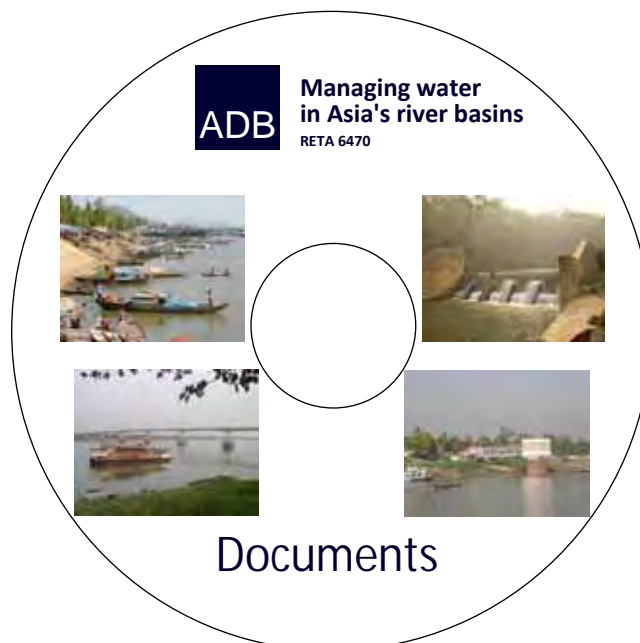
- Inception report; the present interim report; and a completion report
- A series of working papers. Presently, 10 such papers have been drafted jointly with partners. All of these are in a state of development and will be upgraded in the course of time. Please refer to Appendix F
- The CRBOM Small Publications Series. Presently, 12 issues have been published on the CRBOM website. Please refer to Appendix G
- Ganesh Pangare et al: Innovations and advances in basin management in Asia. Draft, presented for discussion at ADB's 'Eye on Asia' event at the World Water Week, Stockholm
- Various slide presentations, courseware, and a set of posters.

All final and draft documents are disseminated on a CD, which is continuously updated. Final documents are published on the CRBOM website. By late 2009, the CD contains

- 29 documents (draft or final) produced or facilitated by the TA
- 5 pilot basin summaries (similar to Appendix E)
- 12 slide presentations produced or facilitated by the TA
- 3 data tables (in an early stage of preparation)
- Photo series from each pilot basin
- Miscellaneous other documents and presentations: A poster series, information about CRBOM, and a small Bengawan Solo library

CRBOM publishes its own dual-language documentation CD. For the sake of self-sustainability, a certain overlap is maintained between the two.

Figure 2: River basin CD



4 Pilot basin roadmaps

The TA is developing a Roadmap Advisory Services (RAS) that is being implemented jointly with CRBOM and other partners. Initial implementation is in progress in the five pilot basins.

The roadmaps are referred to as basin-level investment or development roadmaps. Each roadmap reflects the specific development agenda in each basin. They can cover infrastructural development, water-dependent production, knowledge-building and education, and institutional aspects. One anticipated outcome is a starting point for subsequent preparation of water-related investment and development initiatives.

River basin investment roadmaps

An action-oriented, IWRM-based basin-level development roadmap is a powerful tool for social, economic and environmental progress. It can provide a clear and agreed sense of direction, illustrate the relations between various development initiatives, and assure that gaps and overlaps are sorted out. Also, the roadmap provides guidance on implementation.

It can build on (and fully accommodate) previous planning, such as sector master plans. If such plans are needed but not yet prepared, the roadmap can include them as proposed activities.

A close dialogue must be maintained with institutional and individual stakeholders, possibly including the private sector. Links with national and province-level planning will facilitate implementation.

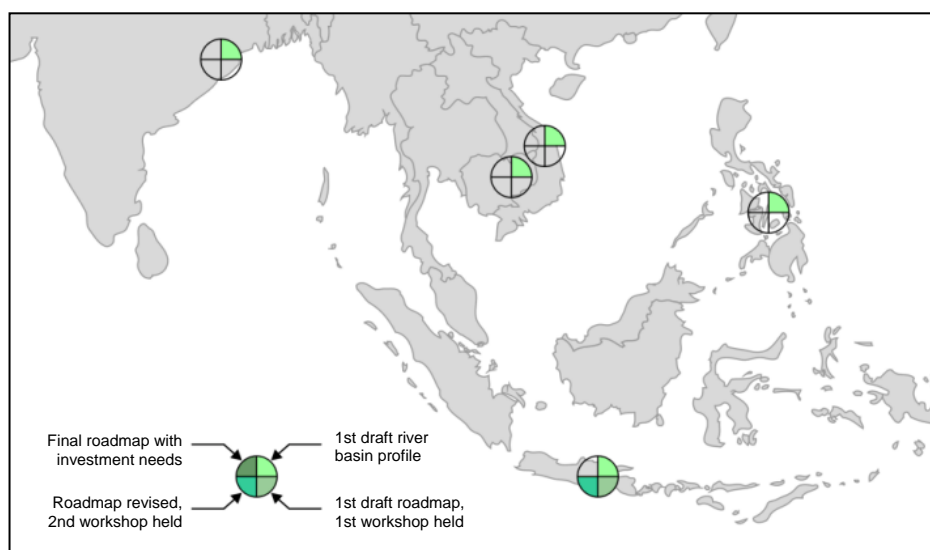
Implementation of the roadmap can be facilitated by the RBO, but many of its specific elements will be implemented by sector agencies, de-central administrative bodies, and others - who should therefore be involved in the planning 'up front'.

The present project applies the following steps:

- 1 Gather data and information
- 2 Draft a roadmap framework (vision, goals, and activities)
- 3 Conduct 1st workshop (with participation by stakeholders and peers)
- 4 Final draft of development/investment roadmap, including 'packaging' and sequencing of identified development opportunities, in consultation with stakeholders
- 5 Conduct 2nd workshop (with participation by stakeholders and peers)
- 6 Final editing of roadmap

By late 2009, roadmaps have been drafted in two of the pilot basins (Cambodia and Indonesia). Please refer to the figure below for an overview.

Figure 3: Status for roadmap preparation



5 RBO strengthening

Back in 1992, 179 countries convened for the UN Conference on Environment and Development (UNCED) in Rio de Janeiro. In their Agenda 21², they recommended that *'integrated water resources management, including the integration of land- and water-related aspects, should be carried out at the level of the catchment basin or sub-basin ...'*. Since then, a basin-level approach to IWRM implementation has been regarded as good practice with proven advantages. IWRM guidelines at river basin level were published in March 09 by UNESCO and NARBO with support from JWA. A handbook for IWRM in basins was published in the same month by GWP and INBO, and CapNet's training manual on IWRM for river basin organisations was published in June 08.

RETA 6470 provides support to institutional development and capacity-building of river basin organisations, building on previous work (by NARBO and others) and linking into parallel work (by NARBO and others). The following activities are in progress:

- Participation in and support to NARBO's IWRM training;
- support to networking among RBOs in connection with workshops and meetings;
- support to CRBOM's Small Publications Series, providing examples or thoughts to share among Asian practitioners about basin-level management and related topics;
- support to RBO formation or consolidation (in four of the pilot basins); and
- support to NARBO's RBO benchmarking programme.

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 used a set of 14 performance indicators and 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.

In parallel, CRBOM is conducting an inventory of RBOs in Indonesia, and is planning to initiate documentation of Asian RBOs in the time to come.

²

6 National IWRM implementation

Assessment of IWRM implementation in selected countries was initiated in 2009 and will continue in 2010. Building on previous work by ADB and others, two working papers have been drafted as a basis for dialogue on a useful and manageable approach:

- 9: Data and information about river basins and IWRM implementation (Oct 09); and
- 10: IWRM implementation in Cambodia (Dec 09).

At this stage, two sets of indicators are tentatively considered, as listed below.

Key indicators

Access to safe water (percent of households)
 Access to sanitation (percent of households)
 Access to electricity (percent of households)
 Poverty incidence (percent of population)
 Irrigated area, wet season (percent of cultivated area)
 Irrigated area, dry season (percent of cultivated area)
 Average paddy yield (t/ha/year)

IWRM implementation indicators

Resource management instruments (8 indicators)
 Institutions and regulation (5 indicators)
 Supplies and services (3 indicators, in addition to the primary key indicators)
 Water-dependent production systems (3 indicators)
 Aquatic environment (3 indicators)
 Knowledge-base (3 indicators)

As a related activity, a publication on Asian river basins is in preparation (jointly with IUCN, Bangkok).

7 CRBOM

Center for River Basin Organizations and Management (CRBOM) was formed by decree for Ministry of Public Works, Indonesia, on 27 February 2009, and was launched as an APWF knowledge hub on 29 April 2009. CRBOM is located in Solo, Central Java.

Building on the comprehensive expertise available with national agencies and river basin organizations (RBOs), the Center will compile, produce and share expertise within IWRM-based, development-oriented river basin management. By its own capacity, or jointly with partners, the Center will undertake research and development, produce documentation, and provide advisory services and education.

CRBOM vision

IWRM-based river basin management successfully implemented, in support of social benefits, economic growth and environmental quality

CRBOM mission

CRBOM consolidated as a national centre of excellence and a regional knowledge hub within river basin organizations and management

As an APWF knowledge hub, CRBOM is committed to the applicable operating principles, as listed below.

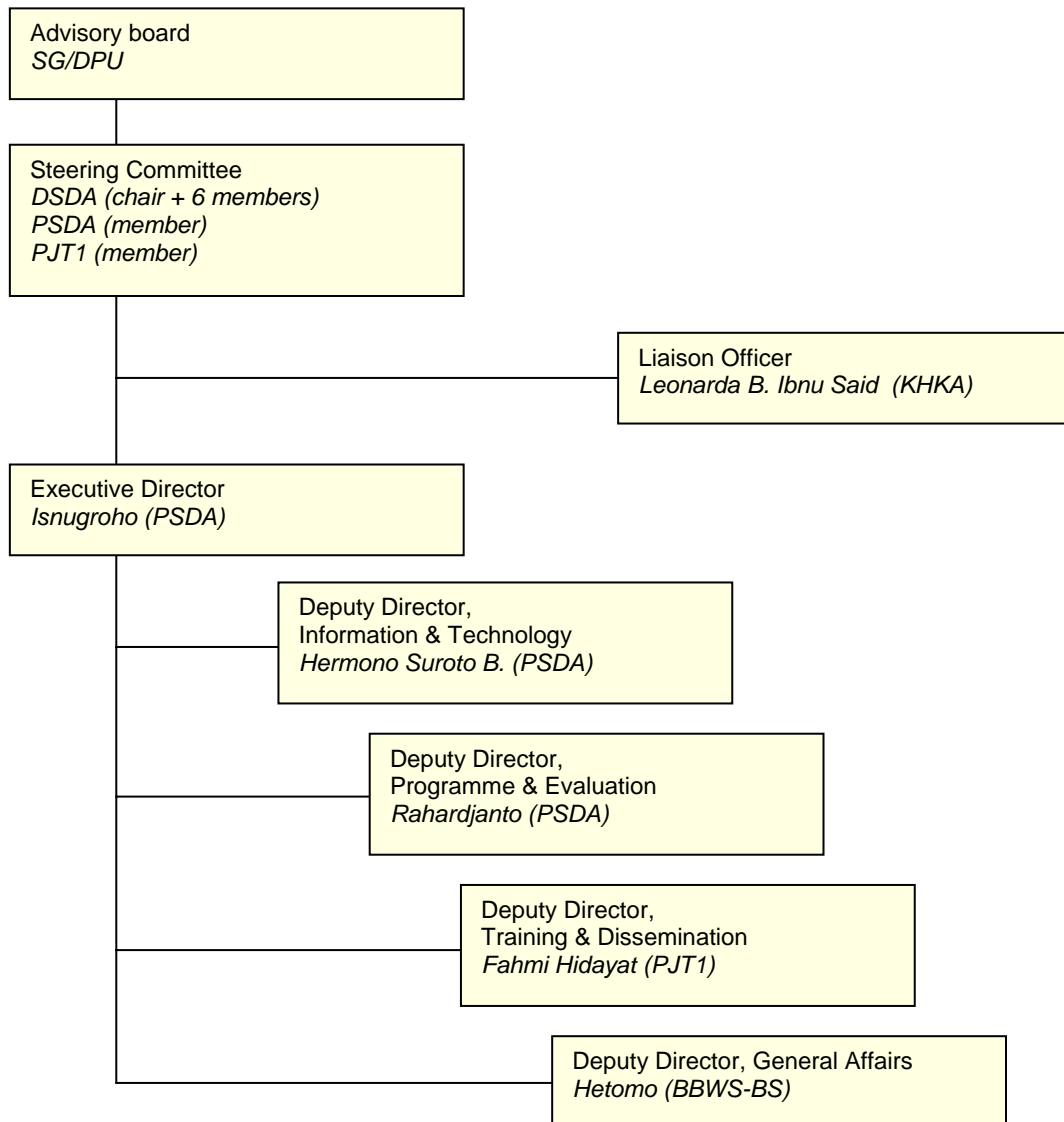
The 10 key operating principles for APWF knowledge hubs

- 1 Vision and leadership for achieving results in the hub's priority topic
- 2 A focus on meeting client needs with relevant and feasible solutions
- 3 An inclusive attitude to knowledge networking with clients and partners
- 4 An (international) team of experienced specialists working at the hub
- 5 A stimulating research environment at the hub, including internships
- 6 Generation, identification, and dissemination of state-of-the-art knowledge
- 7 Regular comparative analysis of progress in countries across the region
- 8 Excellent products and services for knowledge and capacity development
- 9 Adequate human and financial resources to develop the hub's excellence
- 10 An entrepreneurial approach to developing a sustainable business model.

CRBOM collaborates with partners in Indonesia and Asia. A monthly update is circulated by e-mail.

CRBOM's structure is shown in the figure below.

Figure 4: CRBOM organogramme



Origin: Ministerial Decree on formation of CRBOM, 27 Feb 09

BBWS-BS: Balai Besar Wilayah Sungai Bengawan Solo, Solo River Basin Organisation

DSDA: Ditjen, SDA, Directorate General, Water Resources

DPU: Departement Pekerjaan Umum, Ministry of Public Works

KHKA: Kasubdit Hidrologi & Kualitas Air, Hydrology and Water Quality (Sub-Division)

PJT1: Perum Jasa Tirta I

PSDA: Puslitbang SDA, Centre for Water Resources Research and Development

SDA: Sumber daya air, water resources

SG: Secretary General

8 Moving to the next level

Basin development/investment roadmaps

The roadmap approach to basin-level development is attractive due to its flexibility and action-orientation. The pilot basins, with their widely different characteristics and starting points, will produce a range of roadmaps on a scale from minimalistic to comprehensive. With appropriate documentation and dissemination, the pilot implementation can be expected to provide a good basis for replication elsewhere.

RBO strengthening

The concept of '*RBO performance*' is valuable in its own right. The RBO's ability to do what it is expected to do (or wants to do) is a key characteristic, and any supportive measures in this regard are likely to have immediate and visible benefits - often achieved at a modest cost. This can, from case to case, be a matter of fine-tuning, or a comprehensive overhaul, involving policy formulation and legislation.

Supportive measures may include a continued

- networking and knowledge-sharing among RBOs and their institutional environs;
- provision or relay of performance-related concepts, tools and application examples;
- support to NARBO's RBO benchmarking.

The RBO benchmarking developed and piloted by NARBO is well suited for broad application, although a certain adaptation must be routinely considered from one context (or one country) to another - a matter of learning rather than copying. Continued dissemination and knowledge-sharing will support the further awareness of the approach and its usefulness. There is a need for continued training/certification of reviewers, and of support to networking among the reviewers.

There is a particular interface between Indonesia, with its 92 RBOs (many of which operate well or excellently) and countries where RBO implementation is less comprehensive or less consolidated. Many of CRBOM's activities are related to this interface.

CRBOM consolidation

As a new institution, there is a scope for consolidation in several ways:

- Expansion of business plan (as per APWF guideline)
- Network of professional practitioners (*'associates'* or *'friends'*)
- Further use of the CRBOM Steering Committee, drawing expertise and suggestions
- Profiling of CRBOM as a shared national enterprise, open to broad collaboration and further partnerships
- Inventory of national river basins and RBOs
- Close liaison with DUWRMT
- Network of institutional partners, in Indonesia (including national NGOs) and elsewhere in Asia
- Strengthened NARBO relations
- A secondee of JWA is assigned to assist to strengthen relationship between NARBO and CRBOM
- Strengthened liaison with Indonesian RBOs
- Liaison with BAPPENAS evolving into active collaboration
- Continued support to roadmap advisory services
- Continued support to RBO benchmarking
- Continued provision of knowledge products: Electronic library; SPS, courseware
- Expansion and streamlining of the CRBOM website and CD

APWF's *'knowledge hub scorecard'* can provide guidance for the consolidation.

Valuable guidance on operation and activities was provided at the launch workshop and remains a source of inspiration.

An expansion of activities may, in due course, involve some of the following:

- New institutional partners, perhaps including MRC
- University liaison (with CKNet), perhaps in support of a national MSc and/or MBA in IWRM; hosting of interns
- National and international courses/seminars/round tables/dialogue meetings/leadership seminars, by own resources, and (mostly) in collaboration with partners within and outside Indonesia - NARBO, IndoWP/GWP, others
- (Support to) study tours, twinning arrangements ...
- Case studies
- A full-blown RBO research programme, to be implemented in small steps, jointly with partners
- Inventory of Asian river basins and RBOs
- In due time, upgrading the monthly 'update' to a (quarterly?) newsletter, with broader dissemination
- Development of river basin management tools (dual language): Scenario analysis; multi-criteria scoping and ranking of development initiatives; basin-level water and mass balance models; multi-sector project cycle management; knowledge management; indicators; LFA; GIS applications; public participation; dispute management;
- ... and perhaps a small programme of in-house training sessions (*'master classes'*) - IWRM, climate change, etc.

Liaison meetings between CRBOM, PJT1 and NARBO took place on 23 and 25 Nov 09 at the initiative of the PJT1 President Director. Discussions were held on a strengthened partnership in support of CRBOM's operation.

Capacity-building and knowledge products

Given the economic and social significance of water in Asia, there is an obvious need of professional skills within water resources management. The need is enhanced by broad and steadily evolving challenges.

Postgraduate education programmes are piloted by NARBO and others, providing highly attractive benefits at a marginal cost; but the demand highly exceeds the supply.

IWRM-oriented advanced education is offered regionally at Asian Institute of Technology, as well as in several (but far from all countries); Viet Nam has a dedicated Water Resources University. The demand is open-ended, however. There is a scope for additional support to universities and business schools, separately and perhaps in an occasional collaboration (to cover a broader range of IWRM-related disciplines). The initial aim might be quality as much as quantity, and covering both public administrative and technical specialist skills.

Knowledge is required about cause-effect relationships and management options relating to

- general (normal and reliable) water availability - rainfall, evaporation, storage, runoff;
- water demand for various purposes - offshore as well as in-stream;
- the efficiency and value generated by water-dependent production systems (agriculture, fisheries yields);
- water-dependent livelihoods;
- demand management potential and response (including subsidies and green taxes);
- river morphology (erosion and accretion);
- *'hot spots'* (assets with a particular vulnerability and exposure); and

- sewage treatment and disposal, diffuse pollution, water quality, and the state of aquatic ecosystems and habitats.

The knowledge should not only describe present conditions, but future conditions as well. Tools should be implemented for prediction of the impacts of specific interventions, such as withdrawals, flow regulation, sewage discharges, etc. This means that knowledge must be built about cause-effect relations that determine or influence the social, economic and environmental conditions in the river basin.

A clear and present need of knowledge-sharing is seen in the following areas, where links are needed between availability of useful experience and demand of inspiration:

- Groundwater management: Regulation, licensing, authorization of well drillers, compulsory data reporting and data sharing, monitoring, impact assesment;
- public participation in basin-level IWRM;
- septic tank operation and maintenance, including large cities;
- sustainable livelihoods in mountainous headwater areas; and
- successful collaboration with the private sector in connection with IWRM-based water resources management, in many ways, from mine clearance and flood protection to sponsorships of university textbooks.

Leadership training

Next to political will, good leadership is the most decisive factor in IWRM implementation, whether at the national level or the basin level. Support in this connection can be made in three ways:

- University-level education of future practitioners, possibly expanded beyond technical skills to managerial skills, for example by collaboration between universities and business schools, or by MBA-level (post-degree) education in IWRM;
- post-graduate and on-the-job training of mid-level managers and mid-career professionals (some of whom will later become executives), with support to national and international networking; and
- targeted training of today's executives.

The second approach is probably the most effective for the specific context of leadership, but the full benefits will not emerge until after some time. The third approach can generate immediate benefits, but is more difficult, because executives are busy people. Furthermore, executives' need of learning can be patchy.

An approach to targeted training of executives may include

- Careful (possibly pro-active) selection of participants, and, once identified, an advance screening of their needs and expectations;
- a thematic 1-day leadership seminar (or a small series of such 1-day seminars), with a few high-impact presentations/introductions, contributions by the participants, and otherwise conducted as a round table/plenary discussion with high-quality facilitation;
- elaborate reporting of the proceedings, leading to some sort of a joint publication; and
- facilitation of post-seminar networking.

Examples of themes could be: Public participation; government-corporate-society (GCS) partnerships; media relations; cost recovery; private sector collaboration; permits and licensing; responsive corporate adaptation; human resources development; resolution of water-related conflicts; climate proofing; management of basin assets; etc.

References

- ADB (Oct 09): Capacity development for water resources in a decentralized environment (TA 7016 INO). Draft mid-term report
- ADB (Apr 09): Process development for preparing and implementing IWRM Plans, RBO benchmarking program. Completion report prepared under RETA 6351 by DHV (The Netherlands) in association with WL Delft Hydraulics (The Netherlands) and PT Mitra Lingkungan Dutaconsult (Indonesia)
- ADB (Mar 09): RETA 6470 inception report
- ADB (Nov 06): ADB Water Financing Program 2006-2010 - Helping to introduce IWRM in 25 river basins in the Asia-Pacific Region (*'the 25 IWRM elements'*)
- Asia Society (Apr 09): Asia's next challenge: Securing the Region's water future
- CapNet (Jun 08): IWRM for river basin organisations. Training manual
- Ganesh Pangare, Tue Kell Nielsen, Anjali Mohan Bhatia and Ian W Makin (Aug 09): Innovations and advances in basin management in Asia. Draft paper presented for discussion at ADB's *'Eye on Asia'* event at the World Water Week, Stockholm
- GWP and INBO (Mar 09): A handbook for IWRM in basins
- NARBO and UNESCO (Mar 09): IWRM guidelines at river basin level
- Vermillion, Douglas and Douglas J Merrey (Mar 09): Facilitating pragmatic river basin development and management. Euroconsult/BMB MottMacdonald
- Yusuf, Arief Anshory and Herminia A Francisco (Jan 09): Climate change vulnerability mapping for Southeast Asia. Economy and Environment Program for Southeast Asia (EEPSEA)
- Zhou Yaozhou (Sep 08): Promoting environmental flow management in Asian rivers: Policy, cases, and lessons. Slide presentation at 11th River Symposium, Brisbane

Websites

- ADB Water for All: www.adb.org/Water/
- Capacity Building for Integrated Water Resources Management (CapNet): www.cap-net.org
- CRBOM: www.crbom.org
- GWP: www.gwpforum.org
- International Network of Basin Organizations (INBO): www.inbo-news.org
- Intergovernmental Panel on Climate Change (IPCC): www.ipcc.ch
- International Water Management Institute (IWMI): www.iwmi.cgiar.org
- Network of Asian River Basin Organizations (NARBO): www.narbo.jp
- UNESCO Water and UNESCO World Water Assessment Programme: www.unesco.org/water/
- Water Encyclopedia: www.waterencyclopedia.com
- Wikipedia: www.wikipedia.com
- World Water Council (WWC): www.worldwatercouncil.org
- ... and many more!

Appendix A: RETA 6470 at-a-glance

Origin: ADB (Mar 09)

This regional TA aims to encourage further basin water investments under the Water Financing Program and demonstrate good IWRM practices in river basins across the region.

The TA is financed on a grant basis by the Japan Special Fund, funded by the Government of Japan. It is implemented by ADB and NARBO over a period of 24 months (2009-2010).

The TA is hosted by Center for River Basin Organizations and Management (CRBOM), Solo, Central Java, established under Ministry of Public Works, Indonesia.

Pilot activities are conducted in river basins located in Cambodia (the 4-Ps area of Prek Preah, Prek Krieng, Prek Kampi, and Prek Te), India (the Baitarani), Indonesia (Bengawan Solo), the Philippines (Cebu), and Viet Nam (Vu Gia-Thu Bon).

The TA has four components:

A **A Project Development Facility**

Roadmaps for long-term integrated river basin investment programs will be prepared for each pilot basin. A roadmap advisory service (RAS) will be developed to assist the RBOs with this work.

A small RAS team of international and national specialists and NARBO peer experts will be mobilized for the purpose.

B **RBO knowledge service**

Up-to-date information and knowledge will be compiled and shared to better equip RBOs in addressing the changing river basin management needs for IWRM, including urbanization, decentralization, stakeholder collaboration, water rights and allocation, adaptation to climate change, and integrating environmental management in infrastructure and water services development.

Online dissemination of knowledge products and services is provided via CRBOM.

C **National IWRM implementation**

Systematic country assessments will be conducted to chart the progress of introducing IWRM against operational indicators and to gather experience and lessons learnt.

The results will be disseminated in a publication that will highlight the region's overall performance, challenges, lessons learnt, and opportunities for basin water investments.

D **RBO performance improvement**

Capacity development activities will be organized to improve RBO performance, expectedly including:

- (i) training workshops for RBOs and stakeholders on preparing investment roadmaps with the RAS,
- (ii) peer reviewer certification training for senior RBO staff to conduct NARBO's performance benchmarking service,
- (iii) leadership training for RBO champions in implementing IWRM and organizational changes, and
- (iv) seminars on adapting to the changing needs in IWRM and on improving water governance.

Appendix B: RETA 6470 components, activities and outputs

This section is based on ADB's Board Paper, (ADB Jun 08), with minor adjustments made during the inception phase

B.1 Components and activities

A *Project development facility*

A roadmap advisory service (RAS) will be developed to help RBOs in preparing roadmaps for long-term integrated river basin investment programs. It will be tested and consolidated in the pilot basins.

The following activities are envisaged:

- A.1 Prepare draft RAS guidelines to define objectives, process, requirements and outputs (by the RETA, during its inception phase);
- A.2 for each pilot basin, prepare or update a river basin profile, using the RAS guidelines. This activity will be conducted by each RBO in collaboration with stakeholders, largely by their own resources;
- A.3 for each pilot basin, conduct a river basin profile assessment to identify IWRM investment needs. This and the following two activities will involve a small RAS team of international and national specialists and NARBO peer experts;
- A.4 for each pilot basin, conduct a 1st basin stakeholder workshop to discuss the assessment's findings;
- A.5 for each pilot basin, develop a roadmap outline for a long-term integrated river basin investment program;
- A.6 for each pilot basin, prepare a draft roadmap (by each RBO);
- A.7 for each pilot basin, conduct a 2nd basin stakeholder workshop to review the draft; and
- A.8 for each pilot basin, finalize the roadmap (by each RBO).

The outcome will serve as a basis for future project preparatory TA aiming at implementation of one or several investment projects, and possibly involving initial social and environmental examination (IEE) and/or strategic social and environmental assessment (SEA).

B *RBO knowledge service*

Up-to-date information and knowledge will be compiled and provided to better equip RBOs in addressing changing river basin management needs for IWRM. The following activities are envisaged:

- B.1 Compile documents, guidelines and case studies from partners as well as by in-house capacity, with emphasis on electronic documents;
- B.2 establish an *www.crbom.org* website; and
- B.3 disseminate knowledge products via the website and in other ways (in connection with training, by direct networking, etc).

This component will link closely with parallel providers of knowledge about IWRM and RBOs, including the APWF network of regional knowledge hubs.

Examples of subjects

- Urbanization
- Decentralization
- Stakeholder collaboration
- Water rights and allocation
- Adaptation to climate change
- Integrating environmental management in infrastructure and water services development

C Country performance assessments

Systematic country performance assessments will be conducted to chart the progress of introducing IWRM against operational indicators and to gather experience and lessons learnt from basin projects implemented to date. These assessments will involve national water sector apex bodies, key water agencies, RBOs, and other stakeholders, and will result in specific recommendations for investment programs to address the changing needs in IWRM.

- C.1 Prepare draft assessments, possibly using guidelines as indicated in the inception report;
- C.2 consult stakeholders about preliminary findings and adjust accordingly; and
- C.3 publish the results, highlighting the region's overall performance, challenges, lessons learnt, and opportunities for basin water investments.

D RBO performance improvement

Capacity development activities will be organized to improve RBO performance through diagnostic assessments, training programs, workshops, and seminars. These are expected to include:

- D.1 Training workshops for RBOs and stakeholders on preparing investment roadmaps with the RAS;
- D.2 peer reviewer certification training for senior RBO staff to conduct NARBO's performance benchmarking service;
- D.3 performance benchmarking on a pilot basis, possible drawing on the indicative outline attached to the inception report;
- D.4 leadership training for RBO champions in implementing IWRM and organizational changes; and
- D.5 seminars on adapting to the changing needs in IWRM and on improving water governance.

B.2 Outputs

The following outputs are expected to be produced under each component in 2009 and 2010:

General

- Inception report and inception workshop: 1st quarter 2009
- Mid-term report: 4th quarter 2009
- Completion report and completion workshop: 4th quarter 2010

A Project Development Facility

- Draft RAS guideline: 1st quarter 2009
- 5 river basin profiles: 3rd quarter 2009
- 5 river basin profile assessments to identify IWRM investment needs: 4th quarter 2009
- 5x2 basin stakeholder workshops: 1st quarter 2010
- 5 roadmaps: 2nd quarter 2010

B RBO knowledge service

- An electronic archive with courseware and reference documents: 2nd quarter 2009
- An www.crbom.org website, consolidated with useful documents: 2nd quarter 2009

C Country performance assessments

- 5+ draft country performance assessments: 1st quarter 2010
- Stakeholder workshop: 2nd quarter 2010
- River basin publication: 3rd quarter 2010

D RBO performance improvement

- 5 training workshops for RBOs and stakeholders on preparing investment roadmaps with the RAS (expectedly back-to-back with the 1st series of basin stakeholder workshops under Component A): 4th quarter 2009
- Peer reviewer certification training: 3rd quarter 2009
- 5 performance benchmarking reviews: 2nd quarter 2010
- Leadership training seminar: 3rd quarter 2010
- 1-2 water governance seminars: 4th quarter 2010

B.3 Reporting

The reporting will include

- Basic project reporting:
 - o An inception report;
 - o quarterly progress reporting;
 - o the present a mid-term-report; and
 - o a completion report.
- A series of workshop reports
- A stand-alone publication about river basins in Asia, produced under activity C.3
- A series of thematic working papers, expectedly describing
 - o each pilot basin, in two different perspectives: Its development needs and opportunities (in support of roadmap preparation) and its institutional framework (in support of the RBO performance review) (possibly taking Appendix E and its references as a starting point);
 - o proposed routines for roadmap preparation, country performance assessment, and RBO benchmarking (possibly taking Appendices F, G and H and their references as starting points); and
 - o other subjects.

Relevant parts of the documentation are being compiled (by CRBOM) into an '*electronic library*' together with various ADB publications and other papers and reports.

Appendix C: RETA 6470 design and monitoring framework

(Appendix 1 in ADB's approved Board Paper, June 2008)

<i>Design summary</i>	<i>Performance targets and/or indicators</i>	<i>Data sources and/or reporting mechanisms</i>	<i>Assumptions and risks</i>
Impact			
Quality of water resources management is improved and progress of IWRM implementation in the Asia and Pacific region is accelerated	<p>Implementation of IWRM in the region significantly improved</p> <p>Basin water targets under ADB's Water Financing Program (WFP) achieved</p> <p>Water-related MDG targets achieved in the region by 2015</p>	<p>APWF and ADB water reports on region's progress</p> <p>WFP reports</p> <p>UNESCAP-ADB progress reports on MDGs</p>	<p>Assumptions</p> <ul style="list-style-type: none"> • Stronger enabling environment for IWRM including updated legislation • Political will and commitment of governments and RBOs to implement IWRM <p>Risk</p> <ul style="list-style-type: none"> • Low priority for basin water investments for IWRM
Outcome			
<p>Basin water investments under WFP encouraged</p> <p>Demonstrated good practices in introducing IWRM in river basins</p> <p>Enhanced RBO knowledge in new basin challenges</p> <p>Improved RBO performance</p>	<p>Number of basin water projects identified in WFP</p> <p>Good practices for IWRM demonstrated in WFP</p> <p>RBOs train staff and basin stakeholders</p> <p>Higher performance ratings of RBOs</p>	<p>WFP reports</p> <p>Basin plans and WFP reports</p> <p>Knowledge products, RBO reports, and web sites</p> <p>NARBO performance benchmarking service</p>	<p>Assumptions</p> <ul style="list-style-type: none"> • Technical and institutional capacities for IWRM • Financing for IWRM investments are available <p>Risks</p> <ul style="list-style-type: none"> • Lack of technical and institutional capacities for IWRM • Lack of coordination resulting in fragmented investments
Outputs			
<ol style="list-style-type: none"> 1. Roadmaps for basin investments 2. Establishment of the RAS 3. Online access and dissemination of IWRM publications and services 4. Country performance assessments for IWRM 5. Dialogues on country and basin assessments 6. Publication on regional overview of IWRM progress 7. Knowledge products on priority topics and case studies 8. Capacities of RBOs on IWRM developed 	<p>Investment roadmaps prepared by five RBOs</p> <p>The RAS developed and piloted in five river basins</p> <p>Higher demand for products, online and offline</p> <p>At least five assessments completed</p> <p>Five successful dialogues with stakeholders held</p> <p>Publication widely disseminated</p> <p>Publications widely disseminated</p> <p>Five RBOs with improved capacities on IWRM; dialogues, training, workshops, and seminars successfully held</p>	<p>RBO reports, RBO web sites, progress reports</p> <p>RBO reports, RBO web sites, progress reports</p> <p>RBO reports, RBO web sites, ADB and NARBO web sites, progress reports</p> <p>Progress reports, publications, ADB and NARBO web sites</p> <p>Dialogue reports</p> <p>Progress reports, web sites</p> <p>RBO reports, RBO web sites, progress reports, publications, ADB and NARBO web sites</p> <p>RBO reports, event proceedings prepared by consultants</p>	<p>Assumptions</p> <ul style="list-style-type: none"> • RBOs strengthen hardware, software, and human resources based on improved knowledge • RBOs commit to pilot the RAS <p>Risks</p> <ul style="list-style-type: none"> • Lack of available staff to participate in training • Stakeholders are unable to participate in consultations and training

Activities with milestones	Inputs
<i>Component 1: Project development facility</i>	ADB:
1.1 Develop the RAS guidelines (third quarter 2008)	• 2 million USD
1.2 RBOs prepare or update river basin profile (fourth quarter 2008)	Government:
1.3 The RAS conducts river basin assessments, and identifies IWRM investment needs (second quarter 2009)	• Participation in workshops, training seminars, dialogues
1.4 Conduct basin stakeholder workshops (fourth quarter 2009)	RBOs:
1.5 Finalize the investment roadmaps (first quarter 2010)	• Participation in workshops, training seminars, dialogues
<i>Component 2: RBO knowledge service</i>	IWMI:
2.1 Develop knowledge products on new basin challenges (fourth quarter 2009)	• Expected to conduct peer reviewer certification training for RBOs on performance benchmarking service
2.2 Develop online IWRM knowledge services (third quarter 2009)	
2.3 Publish assessment of IWRM elements and roadmap (first quarter 2010)	
2.4 Publish case studies on innovative approaches emerging from assessments (second quarter 2010)	
2.5 Improve online access and dissemination of publications (third quarter 2009)	
<i>Component 3: Country performance assessments</i>	IUCN:
3.1 Conduct country performance assessments on introducing IWRM in river basins (first quarter 2009)	• Expected to collaborate in training workshops and seminars
3.2 Analyze and publish results of the country action plan and regional overview (third quarter 2009)	NARBO and APWF including Japan Water Forum:
3.3 Disseminate and pursue actions at the regional level (first quarter 2010)	• Provide advice in training programs and workshops and through the advisory group
<i>Component 4: RBO performance improvement</i>	
4.1 Conduct training seminars to build capacities on new challenges in river basin management, changing needs in IWRM, and improving water governance (third quarter 2009)	
4.2 Conduct RBO peer reviewer certification training (fourth quarter 2008)	
4.3 Conduct dialogues on country performance assessments (second quarter 2009)	
4.4 Conduct leadership training for RBO management on championing organizational change for improved RBO performance and how RBO can best facilitate the introduction or strengthening of IWRM (third quarter 2009)	

Appendix D: Chronology of activities

Feb 10	NARBO general meeting, possibly in Solo (to be confirmed)
Jan 10	1st stakeholder workshop, Baitarani, 4th week of January 1st stakeholder workshop, 4-Ps, 2nd week of January
Dec 09	Interim report
15 Dec 09	Bengawan Solo Water Council (TKPSDA) meeting
9 Dec 09:	DUWRMT/JICA workshop: <i>'River area management and river facilities O&M'</i> , Solo
30 Nov-6 Dec 09	6th NARBO IWRM training, Da Nang, participation by RETA team and 4 pilot basins
23 and 25 Nov 09:	CRBOM/PJT1/NARBO liaison meetings
3-5 Nov 09	IWC knowledge hub launch, Brisbane, participation by RETA team and 3 pilot basins
21-22 Oct 09	Bengawan Solo Water Council (TKPSDA) meeting
9-10 Sep 09	Visit to Solo by a joint identification mission from ADB, JWA and NAHRIM, preparing for two new development initiatives within climate adaptation and water security
2-6 Sep 09	Cebu kick-off meeting
3-7 Aug 09	Baitarani kick-off meeting, Bhubaneswar
29 Jul 09	JICA/DUWRMT workshop: <i>'Vision sharing on capacity building for RBOs in IWRM'</i> , Jakarta
22-23 Jul 09	RBO diagnostic meeting, Bandung (with JICA), performance survey of Indonesian RBOs
2-3 Jul 09	Conference on <i>'New thinking on water governance'</i> , Singapore
25 Jun 09	2nd NARBO TAC meeting. Singapore
24 Jun 09	1st Annual APWF Knowledge Hub Progress Review Meeting in Singapore
22 Jun 09	VGTB kick-off meeting in Quang Nam
19 Jun 09	RBO workshop in Yogyakarta, organized by Indonesia Water Partnership
9-10 Jun 09	Bengawan Solo Water Council (TKPSDA) meeting
26-28 May 09	NAHRIM workshop on climate change
20 May 09	Meetings about roadmap preparation for Bengawan Solo
1 May 09	Bengawan Solo stakeholder meeting, with the Bengawan Solo Water Council (TKPSDA)
28-30 Apr 09	CRBOM launch and RETA 6570 inception workshop (Solo)
27 Apr 09	Completion workshop of RETA 6351, <i>'Process Development for Preparing and Implementing IWRM Plans'</i> (Solo)
16-17 Apr 09	Workshop on <i>'Indicators for RBO performance benchmarking'</i> , Surabaya
14 Apr 09	Bengawan Solo Basin Council (TKPSDA) meeting
24 Mar 09	Liaison meeting between TA 7016, DUWRMT and RETA 6470
16 Mar 09	CNMC workshop about the 4-Ps area, Phnom Penh
27 Feb 09	Consultation meeting with CNMC, Cambodia
24 Feb 09	Consultation meeting with DONRE, Quang Nam Province
18-25 Feb 09	5th NARBO Training, <i>'Keys for success in IWRM'</i> , Hoi An, Viet Nam
30 Jan 09	RETA 6470 inception report, 1st draft
13 Jan 09	Arrival of Senior Adviser to Solo
8-9 Jan 09	Review of the <i>'IWRM Guideline at the River Basin Level'</i> (Bangkok) (WWAP and JWA)
22-24 Dec 08	Inception mission to Jakarta and Solo
20 Dec 08	Mobilisation of Senior Adviser

Appendix E: Pilot basins

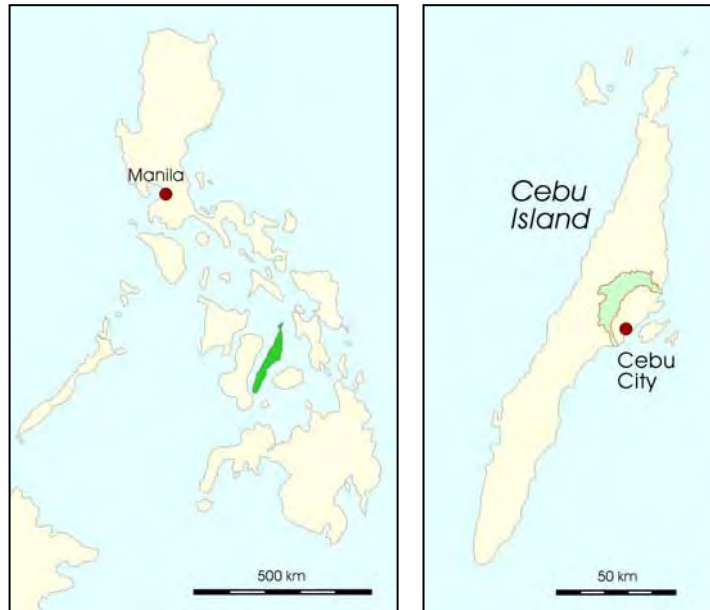
The 4-Ps area, Cambodia



Summary	<p>Area: 12,472 km²</p> <p>Population: 143,000 (11 p/km²)</p> <p>Average rainfall: 1,900-2,200 mm/year</p> <p>The basin covers parts of two provinces: Kratie and Mondulkiri</p>
Development agenda	Poverty, livelihoods, land use management, safe water & sanitation, electricity, floods, drought
Implementation partner(s):	CNMC, representing ministries involved in water-related development, in close liaison with Kratie and Mondulkiri Provinces, and in active collaboration with other institutional and non-governmental stakeholders
Related developments	Part of the Mekong Basin, and covered by MRC's studies and planning Work building on ADB RETA 6325: Promoting effective water policies and practices (Phase 5)
Management framework	A Basin Coordination Committee for Development (BCCD) has recently been designated in support of water-related development, management and protection.
Status	<p>Basin profile drafted</p> <p>Roadmap drafted; national consultants identified</p> <p>National IWRM assessment drafted</p>
Notes	Workshop scheduled for January 2010

Bengawan Solo, Indonesia

Summary	<p>Area: 16,100 km²</p> <p>Population: Around 15 mio. (930 p/km²)</p> <p>Average rainfall: 2,100 mm/year</p> <p>The basin covers parts of two provinces: Central and East Java</p>
Development agenda	Economic growth, water security, floods, drought, sedimentation, land degradation, water quality, capacity-building
Implementation partner(s):	Bengawan Solo Water Council, in close liaison with BBWS-BS and PJT1, and in active collaboration with other institutional and non-governmental stakeholders
Related developments	TA 7016 INO: Capacity Development for Water Resources in a Decentralized Environment (in progress); CC adaptation (Java) (in preparation, with NAHRIM); RETA 7276, Supporting Investments in Water-related Disaster Management (presently in inception stage, with ICHARM); Dissemination Unit for Water Resources Management and Technology (supported by JICA); various JICA TA and pilot initiatives (in the pipeline)
Management framework	(1) Jasa Tirta Public Corporation 1 (Perum Jasa Tirta 1, PJT1), operating and maintaining the basin's water infrastructure, as well as flood management, watershed management, morphological management, and water quality monitoring; (2) The River Basin Development Agency (Balai Besar Wilayah Sungai Bengawan Solo, BBWS), undertaking basin-level water resources planning and related tasks; (3) Bengawan Solo Water Council (TKPSDA), assembling 64 public agencies and NGOs, involved in policy advice and water resources development planning
Status	<p>Basin profile drafted</p> <p>Roadmap drafted</p>
Notes	

Central Cebu, the Philippines

Summary	<p>The basin comprises the Central Cebu Protected Landscape, comprising the mountainous headwater areas of the Mananga, Kotkot and Lusaran rivers (291 km², population 106,000), and downstream urban areas surrounding Cebu City.</p> <p>The area is an important source of raw water. It is fully located within Cebu Province</p>
Development agenda	Poverty; safe water, sanitation and electricity; land degradation; habitat conservation; storage capacity; roads; water quality; tourism
Implementation partner(s):	Metropolitan Cebu Water District, in active collaboration with institutional and non-governmental stakeholders
Related developments	A water resources master plan for the entire Cebu province is in preparation by the River Basin Control Office (under DENR)
Management framework	No RBC/RBO at present
Status	Basin profile drafted Inception seminar and kick-off meeting held
Notes	National consultants being identified

Baitarani, Orissa

Summary	<p>Area: 14,218 km²</p> <p>Population: 4.4 mio (311 p/km²)</p> <p>Average rainfall: 1,488 mm/year</p> <p>Most of the basin is in Orissa, with 5 percent in Jharkhand</p>
Development agenda	(According to the Orissa Water Policy): Participatory irrigation management, hydraulic infrastructure, floods, drought and cyclones, food security, household supplies, industrial water, water quality, salinity, and environmental flows
Implementation partner:	DOWR, Orissa
Related developments	ADB is involved in two related activities under the Orissa Integrated Irrigated Agriculture and Water Management Investment Program (OIIAWMIP): A special TA, and an Institutional Strengthening and Project Management (ISPM) project. Both are supporting state-level IWRM implementation and cover related institutional aspects. A close coordination is maintained
Management framework	DOWR, Orissa, with other sector agencies and de-central bodies Proposal on a Baitarani RBC submitted to the state government
Status	Basin profile drafted Kick-off meeting held.
Notes	Workshop scheduled for January 2010, back-to-back with the Special TA and the ISPM

Vu Gia-Thu Bon, Viet Nam

Summary	<p>Area: 10,400 km²</p> <p>Population: Around 1.8 mio. (173 p/km²)</p> <p>Average rainfall: 2-4,000 mm/year</p> <p>The basin covers major parts of Quang Nam Province and Da Nang City, and a small part of Kon Tum Province</p>
Development agenda	Economic development, household supplies, irrigation, floods, drought, morphology, salinity, hydropower, tourism
Implementation partner(s):	DoNRE, Quang Nam, in collaboration with PCC, DARD, Da Nang city, and institutional and individual stakeholders
Related developments	
Management framework	An RBC is being established under MoNRE, replacing two existing ones (under National Decree No. 120 about river basin management, Dec 2008)
Status	<p>Basin profile drafted</p> <p>Kick-off meeting held</p>
Notes	National consultants being identified

Appendix F: Working papers

The following working papers are available as complete outlines. All are prepared jointly with partners, and all are maintained as 'live documents' for the time being.

1 **Bengawan Solo Basin, Indonesia** (jointly with Bengawan Solo Water Council, TKPSDA)

Bengawan Solo (or Solo River) is the longest river in Java (600 km). The basin is densely populated, with around 15 mio. people and an area of 16,100 km².

The land use is distributed between paddy fields (35 percent of the area); other farmland; forest; and other uses. Some 70 percent of the paddy fields are irrigated. There are 44 dams with a total active storage of 0.66 billion m³. They are small, except for the Wonogiri Multipurpose Dam (from 1983) with an effective storage volume of 0.44 billion m³.

About 8 percent of the basin is flood-prone, and major floods (caused by extreme direct rainfall) occur regularly along the mainstream. One flood in late 2007 inundated 120,000 ha. Also, drought is frequent, affecting both the rainfed and the irrigated areas.

Parts of the basin are exposed to erosion. This causes damage to the infrastructure, siltation in the reservoirs (notably the Wonogiri Reservoir), and adds to the flood risk.

This working paper is intended as a support for preparation of an action-oriented roadmap for Bengawan Solo Basin.

2 **Vu Gia-Thu Bon Basin, Viet Nam** (jointly with DoNRE, Quang Nam Province)



The Vu Gia-Thu Bon Basin covers major parts of Quang Nam Province and Da Nang City, and a small part of Kon Tum Province. Its area is 10,400 km², and the population is around 1.8 mio.

The basin has a rich potential for continued economic development. It has abundant natural resources, including land, water, forests and fisheries.

A master plan for Da Nang City and Quang Nam Province aims to make the province a prosperous industrial centre. Emphasis is put on the development of industries that create added value and are export-oriented, producing goods for consumption and export, such as construction materials, products based on agriculture, forests and fisheries, machinery, and electronics. The major part of this development will take part along the coast.

This working paper is intended as a support for preparation of an action-oriented roadmap for IWRM-based, water-related development in the Basin.

3 **The 4-Ps Area, Cambodia** (jointly with Cambodia National Mekong Committee)

The 4-P area is located on the eastern (or left) bank of the Mekong. It forms a triangle delineated by the Mekong towards west, by the Sre Pok Basin towards northeast, and by the Prek Chhloung Basin towards south. The area covers some 12,472 km² (which is 7 percent of Cambodia's entire area) and has a population of some 143,290 persons (or 1 percent of the national population).

Only around one percent of the area is cultivated (excluding plantations and orchards), with a quarter of the cultivated areas served by irrigation infrastructure. The major parts are covered by forests, in various states of degradation, and forest plantation.

Many people in the area are vulnerable to floods and drought, as they are heavily dependent upon agriculture, often conducted on a subsistence basis. The average rice yield ranges from 1.4 to 1.9 tons per ha.

Safe water - whether by piped network, from orderly wells, or bought from vendors - is accessible to 40% of the population in Kratie Province and only 25% in Mondulkiri Province. The majority of remote areas have no such access, and this situation affects people's health and life expectancy. Mondulkiri Province has the highest infant mortality rate in Cambodia (with 125-170 deaths per 1,000 live births).

This working paper is intended as a support for preparation of an action-oriented roadmap for IWRM-based, water-related development in the 4-Ps Area.

4 Baitarani Basin, Orissa, India (jointly with Department of Water Resources, Government of Orissa)

Most of Baitarani Basin is in Orissa, with 5 percent in Jharkhand. Its area is 14,218 km² and the population is around 4.4 mio.

The water-related development agenda includes (i) laws and institutions; (ii) environment: Upper watersheds; water quality, wetlands, and other aquatic ecosystems; (iii) basic water supply and sanitation in cities, towns and rural areas; (iv) food security, including realization of the potential offered by existing irrigation infrastructure, expanded surface and groundwater irrigation, and soil and water conservation; (v) economic development: Farm incomes; off farm employment; poverty reduction, and small-scale irrigation; (vi) disaster management: Floods, cyclones and drought; and (vii) hydraulic infrastructure: Water allocation and transfer, inter seasonal storage.

There is no RBC/RBO at present.

Participatory irrigation management (by water user groups, pani panchayat) has been strongly expanded with the Orissa Pani Panchayat Act (2002) and the Orissa Pani Panchayat Rules (2003), with clear benefits.

5 Central Cebu Protected Landscape, the Philippines (jointly with Metropolitan Cebu Water District)



The Central Cebu Protected Landscape is formed by mountainous catchments with an area of 291 km² and a population of some 106,000 people. Farming is the major occupation but contributes only 11% to household incomes. About 2/3 of the households live below the poverty line.

Development needs and opportunities are partly related to the area itself and partly to the area's function as a major raw water source for Central Cebu.

The present working paper is intended as a support for preparation of an action-oriented roadmap for IWRM-based, water-related development in this area and (expectedly) the downstream parts.

A substantial positive interaction is hoped for between the roadmap preparation and a comprehensive, ongoing water resources master planning undertaken by the River Basin Control Office. This requires good information flows and a certain synchronization of activities.

6 Roadmaps for IWRM-based river basin development (jointly with CRBOM)

A roadmap describes a set of projects (or '*interventions*', or '*development initiatives*') that are needed to reach a goal. An action-oriented, IWRM-based development roadmap is a powerful tool for social, economic and environmental progress. It can

- provide a clear and agreed sense of direction;
- illustrate the relations between various development initiatives;
- assure that gaps and overlaps are sorted out; and
- provide guidance on implementation.

This draft guideline covers IWRM-based basin development roadmaps. It comes with two examples - a simple one and a comprehensive one. Also, it describes the Roadmap Advisory Services being piloted by ADB and CRBOM.

7 Assessment of national IWRM implementation (jointly with CRBOM)

Assessment of national IWRM implementation can serve several good purposes, such as

- related capacity-building;
- related institutional consolidation; and
- regional knowledge-sharing.

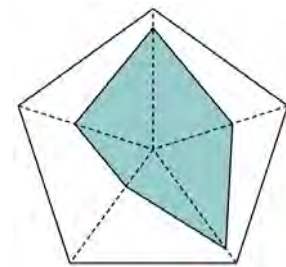
This working paper proposes a modality for conducting the assessment.

8 Assessment of river basin organizations (jointly with CRBOM)

An RBO assessment is a structured evaluation of its performance relative to *'best practices'*, considering its stated responsibilities and operation.

The assessment can provide guidance for capacity-building and institutional consolidation, in support of the various social, economic and environmental benefits that can be achieved by IWRM.

This working paper describes modalities for assessment of river basin organizations, in support of institutional consolidation and performance upgrading, as well as regional knowledge-sharing.



9 Data and information about river basins and IWRM (jointly with CRBOM)

This working paper comments on the availability and acquisition of data and information about river basins and river basin management. In its appendices, the paper lists examples of IWRM-related indicators, roughly (but with visible unavoidable overlaps) divided into country-level aspects and basin-level aspects. These, in turn, are sub-divided into state indicators (of the conditions in a country or a river basin) and IWRM indicators (of management modalities).

Indicators should be relevant and manageable. General knowledge-building can benefit from access to a large set of indicators; but for specific analyses, the number should be as small as possible.

10 IWRM implementation in Cambodia (jointly with CNMC)

This working paper is the first of five such papers, one for each of the pilot basins. It provides an assessment of IWRM implementation in Cambodia. It summarises the national water-related governance framework and development challenges. A set of indicators has been applied for the purpose. As the first in a planned series of such working papers, these indicators should be duly considered and upgraded, aiming at a uniform approach in the subsequent similar country assessments. The paper includes some preliminary suggestions on water-related development initiatives for consideration and expansion at a consultation meeting to be held in 2010.

Appendix G: CRBOM Small Publications Series

Can be downloaded from www.crbom.org/SPS/

The 'Small Publications' are intended for knowledge-sharing and dialogue within the Asian community of professionals involved in river basin management or related fields. In some cases the papers present facts, information and lessons learnt. In other cases, they provide news, opinions, ideas, or open questions for discussion.

Contributions are most welcome! Please contact ms Esti Rumanthi: esti@crbom.org

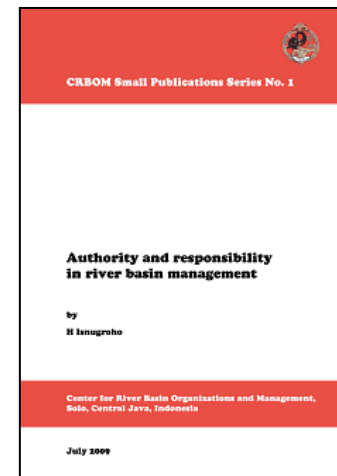
Isnugroho (July 2009): Authority and responsibility in river basin management CRBOM Small Publications Series no. 1

Some river basin organisations have a high degree of formal authority, while others do not. In both cases, the organisation can hold important responsibilities and can fulfil 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).

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

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



Watt Botkosal (July 2009): Water resources for livelihoods and economic development in Cambodia CRBOM Small Publications Series no. 2

A substantial part of Cambodia's economy and the majority of livelihoods are water-dependent and will remain so in the foreseeable future. Agriculture represents 29 percent of GDP and occupies 75 percent of the labour force. The links between water, livelihoods and economic development are quite visible in the country.

Water resources management and water-related development can, at the same time, support national macroeconomic growth and rural livelihoods. These two objectives can add value to each other and are, when approached in parallel, an effective poverty alleviation measure.

Integrated water resources management (IWRM) is a well suited framework, with its broad collaboration, its orientation towards interaction between sectors, and its aim to balance present and future needs.

Sri Hernowo M July 2009(July 2009) Roadmaps for river basin development CRBOM Small Publications Series no. 3

An action-oriented, IWRM-based river basin development roadmap is a powerful tool for social, economic and environmental progress. It can provide a clear and agreed sense of direction, illustrate the relations between various development initiatives, and assure that gaps and overlaps are sorted out. Also, the roadmap provides guidance on implementation.

This paper introduces the rationale of development roadmaps, illustrated by two examples - a small one and a comprehensive one.

**Debaraj Swain (August 2009):
Orissa's pani panchayats - a case of successful irrigation management
CRBOM Small Publications Series no. 4**

In Orissa, India, participatory irrigation management (by water user groups, pani panchayat) has been strongly expanded with the Orissa Pani Panchayat Act (2002) and the Orissa Pani Panchayat Rules (2003). By end of 2008, 15,500 pani panchayats have been formed, representing an area of more than 1.5 mio. ha. Experience from their operation is clearly positive. There is no doubt that pani panchayats are an excellent platform for increased agricultural production and for improved economic conditions of the farmers.

**Sudarsono (September 2009):
The Bengawan Solo Water Council - providing insight and directions
CRBOM Small Publications Series no. 5**

The '*Water Council*' of Bengawan Solo Basin (or TKPSDA Bengawan Solo) was established in February 2009 as a platform for stakeholder liaison and an advisory body for water-related, basin-level development. It has 64 members, representing agencies, organisations and bodies that are in some way involved in water resources management in the basin, at the national, province, or de-central level. Half of these - 32 - are governmental, and the other half are non-governmental. Among the members are the two river basin organisations of the Bengawan Solo Basin.

The Council identifies development needs and opportunities, provides policy guidance, and undertakes strategic development planning and implementation planning. It reports to the Minister of Public Works and to the Governors of Central Java and East Java Provinces.

Early experience indicates that the Council serves its purpose well, providing practical and useful guidance, in a functional, active collaboration with stakeholders.

**Yem Dararath (September 2009):
Kampong Bay, Cambodia - the climate perspective in water-related development
CRBOM Small Publications Series no. 6**



The climate vulnerability of Kampong Bay Basin is related to (i) increased rainfall irregularities (which will affect the flood risk in the entire basin, and possibly incur a drought risk that is not imminent today); (ii) increased frequency and height of storm surges in the sea (which will in turn influence the flood risk in the downstream parts of the basin); and (iii) an increased mean sea level (which will enhance the salinity intrusion).

A functional climate proofing must encompass adaptation of water management, land use, infrastructure, and production systems. Due to the diverse interactions and potential synergies, benefits can be assured by a holistic, inter-agency and multi-sector approach.

One key observation is that most viable climate proofing measures tend to be 'safe', as far as they serve several good purposes at the same time. They will remain feasible even if the climate does not change in the way that is presently expected.

**James T Cherian (September 2009):
Water demand management in Selangor - why and how?
CRBOM Small Publications Series no. 7**

In order to manage our water and water-dependent resources in a sustainable way, it is vital to develop the knowledge and soft skills that is necessary to safeguard our catchments and river basins from water sullyng socioeconomic activities and to attenuate our demand for water.

Water demand management (WDM) is an essential part of the challenge to sustain our water resources. The principle that underlies WDM is '*efficient use of water in order to maintain vital environmental flows and to reduce dependence on costly infrastructure projects*'.

The present paper presents a study of water demand management in Selangor conducted in 2008-09. The study identified 10 recommendations that were regarded as useful and practical, and suitable for implementation within the existing institutional and legislative framework. It is believed that between them, by

2020, the proposed measures can reduce the total demand of water by around 20 percent as compared with a scenario without demand management.

Fahmi Hidayat (September 2009):
The planning spiral of Brantas River Basin
CRBOM Small Publications Series no. 8

Brantas River Basin, East Java, has a population of some 16 mio. people, most of whom depend on water for their livelihoods. Since 1961 (when the population was less than half of what it is today), a sequence of four master plans have been formulated and implemented, under the principle of '*one river - one plan*', covering individual themes that reflected the development agenda at the time: Flood control; irrigation; and water conservation/water resources management.

The planning process has provided the framework for construction of 8 reservoirs; 4 river improvement schemes; 4 barrages; and 3 rubber dams. The total investment under the first 3 master plans (1960-2001) was 8.6 trillion IDR, or around 3 bio. USD.

Watt Botkosal (October 2009):
IWRM-based development in a small Cambodian river basin
CRBOM Small Publications Series no. 9

The 4-Ps area in NE Cambodia is formed by four tributaries (preks) on the left (or eastern) bank of the Mekong. The basin area is 12,500 km² and the population is around 143,000 persons. Many people in the area depend on agriculture, often conducted on a subsistence basis. The average rice yield ranges from 1.4 to 1.9 tons per ha. Floods and drought are prevalent.

An IWRM-based development has been piloted in support of improved livelihoods and risk exposure, covering flood management, water supply and sanitation, irrigation for agriculture development, and small scale hydro-power development. It is hoped that this development will generate benefits to local economies and minimize the negative environmental impacts. A participatory approach plays a central role in the development of the investment plans.

Apart from significant achievements in their own right, the work has demonstrated the benefits of political will; basin-level management, inter-sector coordination, and a functional public participation, feeding valuable local knowledge into the planning process.

Fahmi Hidayat (October 2009):
Floods and climate change - observations from Java
CRBOM Small Publications Series no. 10

Java is exposed to a number of factors that affect the flood risk and flood vulnerability, such as (in random order): El Niño (mesoscale) climate oscillations; global climate change; volcanic eruptions and earthquakes; changed land use; land subsidence related to groundwater abstraction; sand mining; river regulation; and general development of the physical infrastructure. With land slides as a related calamity, serious (and apparently escalating) consequences to human lives, crops, properties and infrastructure have occurred in recent years.

Flood proofing measures are in progress or are being planned at the national, province, regency/municipality and community level of administration. They include flood storage capacity; dykes; flood channels; drainage (flow) capacity maintenance and enhancement; land conservation in headwater areas; erosion control (terracing, re-greening, reforestation and sabo works); flood hazard mapping; public awareness; and forecasting and operational warning.

Rahardjanto (October 2009):
A small self-powered pump irrigation scheme in the Bengawan Solo Basin
CRBOM Small Publications Series no. 11

The Colo micro-hydro-powered pump irrigation scheme is located on Bengawan Solo, Central Java, 13 km downstream of the Wonogiri Dam and Reservoir. The scheme supplies water to an otherwise rainfed paddy area of 30-40 ha with an elevation above the river level, so that gravity flow from the weir is not possible.

The scheme is regarded as practical, inexpensive and highly beneficial.

The feasibility of the scheme is related to the following circumstances:

- Availability of a suitable reliable flow with a reasonable pressure height; and

- a nearby area suited for cultivation (and irrigation) with a ground level that cannot be reached by gravity flow, but not too far above that level.

The feasibility of similar schemes at other locations depends on the actual design conditions, as well as the additional value generated by the irrigated cultivation.

**Vicente B. Tuddao Jr. (November 2009):
Framework planning for basin-level management - the Philippine approach
CRBOM Small Publications Series no. 12**

In the Philippines, basin-level water resources management is in a state of dynamic progress. The institutional landscape is complex, and the water-related development agenda is comprehensive, with far-reaching social, economic and environmental implications.

A whole suite of management modalities have been implemented, reflecting specific needs and opportunities, from the widely autonomous Laguna Lake Development Authority to a variety of commissions, councils and committees, as well as multi-sector project management offices.

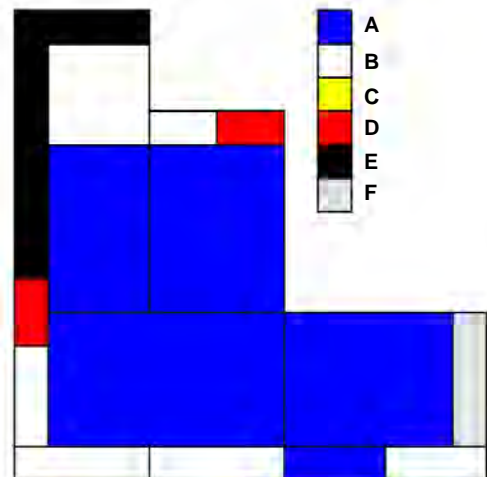
In the process, valuable experience has been achieved, invariably confirming the benefits of inter-sector coordination, inter-agency collaboration, and a functional public participation. Also, the experience is positive regarding the directions and guidance provided by the national IWRM and basin management framework planning.

**Dennis Von Custodio (December 2009):
Examples of how to describe a river basin
CRBOM Small Publications Series no. 13**

This paper provides examples of ways to describe, monitor and analyse river basins.

The demand of data and information varies from one context to another. Different river basins have different development agendas and different management needs and options. For a specific application, the operation of a dam or an irrigation system requires a decision basis that is different from what is needed for a strategic development plan, a feasibility study or an impact assessment.

In general, decision-makers prefer condensed information, with a few key indicators - knowledge rather than data - and suited for a clear course of action. In comparison, technical staff and scientists tend to prefer much more detailed information and a large number of indicators - data as well as knowledge.



**In preparation (December 2009):
Ten steps to benefit-sharing
CRBOM Small Publications Series no. 14**

Hydropower schemes are intended to generate substantial benefits. Sometimes, however, it is seen that while the impacts are local, the benefits mainly occur outside the affected areas - perhaps even outside the country. Regulation can be required to assure a local share in the generated benefits.

This paper describes a 10-step approach to a practical benefit-sharing modality that is being developed in Viet Nam.

Benefit-sharing can be a win-win solution. During project preparation, a credible benefit-sharing can highly facilitate the technical and financial processing by reducing the concerns of affected stakeholders. If the scheme can improve the land use in the headwater areas, hereby reducing siltation in the reservoir and extending its lifetime, it may even be directly profitable for the developer.

Transparency and credibility are required to achieve the intended results, and the approach described in the paper has been developed with this in mind. A dubious scheme could be worse than nothing.

Although custom-made for hydropower development, the scheme (or a closely similar one) is well suited for other large-scale land acquisitions.

**Sungguh, Harry M (December 2009):
RBO benchmarking
CRBOM Small Publications Series no. 15**

An RBO benchmarking is a structured assessment of its performance relative to '*best practices*', considering its stated responsibilities and operation, made for the sake of improving its performance.

Benchmarking can describe an RBO's ability to do what it is expected to do (or wants to do), and hereby provide a starting point as well as directions for performance upgrading. Also, a benchmarking can facilitate a structured sharing of experience and inspiration between participating RBOs. Typically, the associated costs are moderate.

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 used a set of 14 performance indicators and was conducted with participation by external peers, for the sake of consistency and knowledge-sharing.

Benchmarking is now applied as a standard practice for Indonesian RBOs. The present paper describes recent national experience, which is clearly positive.

**Herman Mondeel and Hermono S Budinetrio (January 2010):
The Banger Polder in Semarang
CRBOM Small Publications Series no. 16**

Many of Asia's cities are located in low areas near the coast and are exposed to flooding and poor drainage. The exposure can escalate due to land subsidence or climate-related changes of rainfalls, floods and sea level.

The paper describes a viable adaptation scheme, the polder. A polder is an area, surrounded by a closed ring of flood protection elements (dykes and dams) to separate the water regime inside the polder area from the water regime outside. The water table inside the polder is controlled by tidal gates and/or pumping stations.

The example provided is from Semarang, Central Java, a low-lying town with some 1.4 mio. inhabitants. The town is severely affected by floods from the sea as well as floods caused by direct extreme rainfall. The Banger area, named after its main channel, covers 550 ha with 84,000 inhabitants. The present land elevation is around Mean Sea Level, but with a land subsidence of 9 cm/year the area is progressively sinking below the sea.

The polder concept has been identified as a feasible way to alleviate the flood and drainage problems in the area, with benefits favourably exceeding the costs.

**Tomonobu Sugiura (Jan 2010):
Satellite-based assessment of flood risk and flood exposure
CRBOM Small Publications Series no. 17**

Flood analysis requires rainfall data, water level data and flow data. The availability of such data is always less than ideal, and sometimes much less than ideal. In recent years the ready (and free) availability on the Internet of global satellite-based rainfall data offers a spectacular opportunity for enhancing the coverage and validity of traditional rain gauges.

The paper describes the use of satellite-based rainfall data as a supplement to, or even (if need be) a substitute for traditional hydrological measurements.

The quality of satellite-based rainfall data is high in terms of coverage but low in terms of accuracy (and resolution of peak events). This is complementary to the quality of ground-based monitoring networks, where the quality is high in terms of accuracy but low in terms of coverage.

A powerful data basis can be achieved by combining the two types of data, adding their respective advantages while neutralizing their weaknesses.

**Md. Tamimul Alam Chowdhury (Jan 2010):
Resource-dependent livelihoods in the Sundarbans
CRBOM Small Publications Series no. 18**

This paper describes an example of a community living in a balance with a surrounding mangrove forest, upon which it depends for subsistence and livelihoods. The balance is fragile, because excessive exploitation can undermine the resource availability. At the same time, due to prevailing poverty, there is an urgent need of supplementary or alternative livelihoods and income generation.

The Sundarbans is the World's largest continuous mangrove area, covering some 10,000 km² of land and water within the Ganges Delta, with some 62 percent located in Bangladesh and the remainder in the Indian state of West Bengal. The Sundarbans forms a uniquely rich ecosystem, famous for its tiger population (with perhaps more than 600 individuals), but with some 40 other mammal species, hundreds of bird species, as well as a wealth of reptiles, shellfish and marine turtles.

Exemplified by one community, Southkhali, typical occupations are fisheries, farming, labour, trade and services, with half of the households depending mainly on the mangrove resources for their livelihoods, and the remaining ones to some extent.

Several development initiatives are in progress, and more are needed, in pursuit of sustainable resource utilization and an overruling need of poverty alleviation.

Good management - and good knowledge - are required to assure a win-win situation rather than a development where both the mangrove forest and its communities stand to lose.