german cooperation
DEUTSCHE ZUSAMMENARBEIT

Published by:
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Training Manual

Transboundary Cooperation and Hydropower Development

Network for Sustainable Hydropower Development in the Mekong Countries (NSHD-M)

Training Manual

Transboundary Cooperation and Hydropower Development

PREFACE

Intergovernmental co-operation between countries that share the Mekong River and its tributaries commenced in 1957 when the United Nations founded the Mekong River Committee. At this time, the Mekong River was one of the world's largest unregulated rivers and the Mekong River Committee was to capitalise on the economic potential of the river. The 1995 Mekong Agreement established the Mekong River Commission (MRC), which is charged 'to promote and co-ordinate sustainable management and development of water and related resources for the countries' mutual benefit and the people's well-being by implementing strategic programmes and activities and providing scientific information and policy advice'. The 1995 Mekong Agreement also placed the MRC under the direct responsibility of its four member states, viz. Thailand, Laos, Cambodia and Vietnam. There are two important upstream partners to the MRC, viz. China and Myanmar, with whom the MRC engages on its shared water courses.

The development of the water resources of the Mekong River and its tributaries has seen the establishment of a number of large dams within the member countries. These dams were constructed for a variety of purposes, including flood protection, irrigation and hydropower. These dams have not been without their controversy in terms of negative effects on the natural and social environments, to the extent that some member countries, for example, Thailand, ceased building dams within their territory.

In 2000, the World Commission on Dams (WCD) published its report *Dams and Development: A New Framework for Decision-Making*. The WCD proposed an approach based on the recognition of rights and the assessment of risks, in particular, rights at risk that would take into account core values of equity, efficiency, participatory decision-making, sustainability and accountability. In addition, the WCD identified seven strategic priorities with associated principles and twenty-six guidelines for the way forward.

On completion of its mandate, the WCD was disbanded. In order not to lose the momentum created by the WCD, and as a neutral entity to disseminate the WCD report and take forward the review of its recommendations at national and local level through inclusive multi-stakeholder dialogues, the United Nations Environment Programme (UNEP) agreed to host a follow-up initiative named the Dams and Development Project (DDP). One of the outputs of the DDP process was *A Compendium of Relevant Practices for Improved Decision-Making on Dams and their Alternatives*.

Against the backdrop of previous water resource development projects with their legacies, many of them negative, and recognising the developmental challenges faced by emerging economies of the world, in particular, the ever-increasing need for sustainable renewable energy (in particular, hydropower in the Mekong region), German Development Cooperation through GIZ agreed to facilitate learning experiences between member countries to promote the sustainable development of the Mekong's water resources, minimising negative effects and optimising benefits. This led to the establishment of the Network for Sustainable Hydropower Development in the Mekong Countries (NSHD-M) amongst academics and researchers from the MRC member states and China. A key function of the NSHD-M is human resource development, advanced training, dialogue and regional networking for the sharing of information and good practices.

This is to be achieved through the sharing of information on six key topics:

- Dealing with Social Aspects

- Sustaining River Basin Ecosystems
- Comprehensive Options Assessment
- Hydropower and Economic Development
- Hydropower Development on Transboundary Rivers
- Hydropower and Climate Change

It is intended that these topics will be addressed in six respective training manuals supported by country-specific case studies developed by academics and researchers from MRC member states and China. This training manual covers 'Dealing with Social Aspects'.

Each of the training manuals is developed in three phases, viz. the development of generic manuals of sufficient scope and depth, the adaptation of these generic manuals to align with Mekong basin states' country-specific legal and institutional frameworks, and socio-economic conditions, and further adaptations as may be required, including the translation of the training manuals into local languages.

GIZ promotes and supports participatory learning and adopts a 'Participatory Adult Learning Approach' (PALA). Participatory adult education is founded in the belief that people have a right to influence the decisions that affect their lives and that adult learners come with particular goals and ideas about education. Thus, participatory education programmes involve learners in making decisions about their own learning, particularly through activities chosen or created by learners. This, in turn, validates learners' knowledge and needs, enhances academic achievement, and shapes the extent to which participants can exercise control in the classroom, their lives, and communities. According to adult education scholars, the purposes of participatory education are to enhance learners' autonomy, critical thinking, leadership, and active citizenship.

It is important that what is taught is applicable to real life situations. Therefore, a workshop will provide an opportunity for adult learners to apply what has been learned to life situations and job requirements. Learners will be encouraged to share their experiences and possible solutions, thus, making workshops learning cooperatives.

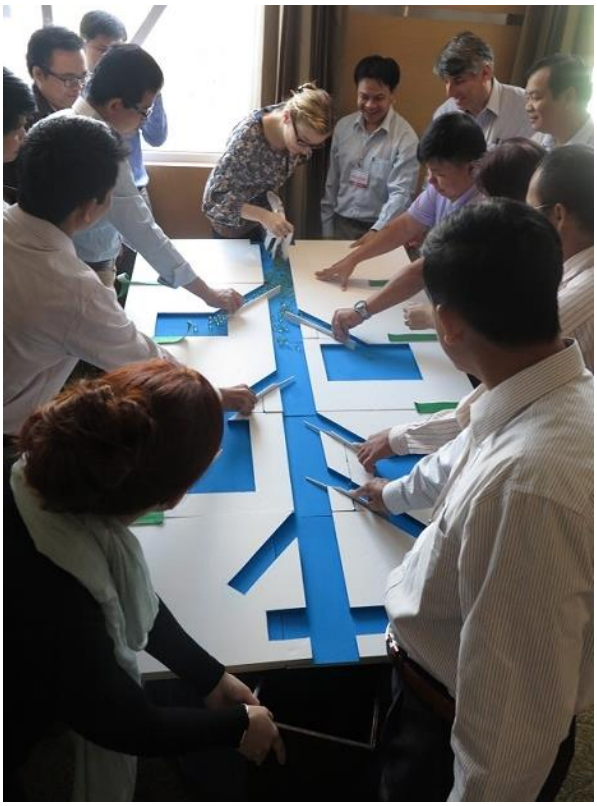
Adults have different experiences throughout life which lead to the accumulation of knowledge. Some of the experiences are based on past learning, some on everyday community life and work. This provides a significant information resource which can be used in the learning process with the experience and skills of some learners helping others. It is important to establish what the existing knowledge of the learners is and to encourage them to share this knowledge with others.

Participants learn more by listening and actively participating than by taking detailed notes. Learners need to actively participate in order to satisfy their learning needs. In participatory learning, learners actively participate to determine what and how they learn. This may include the objectives, knowledge, skills and attitudes or the teaching methods. Traditionally, learning is done through the teacher giving information. In participatory learning, learning is an active process where a learner goes through a process and learns from it.

While a participatory approach to learning is encouraged, at times information needs to be presented to learners. Examples of this include: giving instructions, giving advice or suggestions, summarising, explaining or demonstrating something. The challenge is to provide the information without people becoming bored.

Other ways in which participatory learning can be implemented include: group work, group discussions, brainstorming, role play, field work, and questions and answers.

It is intended that the trainings that will be provided based on this training manual will be participatory in nature, optimising the benefits of the 'Participatory Adult Learning Approach'.



The application of modern adult learning methods at the Training-of-Trainers Workshop in Bangkok, October 2013

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

3SPN	3S Rivers Protection Network
ABS	Access and Benefit Sharing
ADB	Asian Development Bank
ADR	Alternative Dispute Resolution
AMCOW	African Ministers' Council on Water
ASEAN	Association of Southeast Asian Nations
AusAID	Australian Agency for International Development
BCM	Billion Cubic Meter
CAPCO	Central African Power Corporation
CBD	UN Convention of Biodiversity
CBWS	Comprehensive basin-wide Study of Power Development Options and Trade Opportunities
CIE	Interstate Committee (Comité Inter-Etats pour l'Aménagement du fleuve Sénégal)
CSO	Civil Society Organization
DANIDA	Danish International Development Agency
DDP	Dams and Development Project
DFID	Department for International Development
DOS	Development Opportunity Space
EEM	Eskom Energy Manantali
EIA	Environmental Impact Assessment
ENCOM	Eastern Nile Council of Ministers
ENSAP	Eastern Nile Subsidiary Action Program
ENTRO	Eastern Nile Technical Regional Office
EP	Equator Principles
ESIA	Environment and Social Impact Assessment
EU	European Union
FAO	Food and Agriculture Organization
FCDI	Forum for the Comprehensive Development of Indochina
GAP	Southeastern Anatolia Project (Turkish: Güneydoğu Anadolu Projesi)
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GMS	Greater Mekong Subregion
HP	Hydropower Development
HSAP	Hydropower Sustainability Assessment
ICEM	International Centre for Environmental Management

ICID	International Commission on Irrigation Development
IFC	International Finance Corporation
ICJ	International Court of Justice
ICOLD	International Commission on Large Dams
ICPDR	International Commission for the Protection of the Danube River
IEA	International Energy Agency
IHA	International Hydropower Association
IHP	International Hydrological Programme
IIED	International Institute for Environment and Development
INGO	International Non-Governmental Organization
ISH	Initiative on Sustainable Hydropower
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
IUCN	International Union for Conservation of Nature
IWRD	Integrated Water Resource Development
IWRM	Integrated Water Resource Management
LFCD	Lesotho Fund for Community Development
LMB	Lower Mekong Basin
MRC	Mekong River Commission
MRCS	Mekong River Commission Secretariat
NBI	Nile Basin Initiative
NBSF	Nile Basin Sustainability Framework
NELSAP	Nile Equatorial Lakes Subsidiary Action Program
NGO	Non-Governmental Organization
NMC	National Mekong Committee
NORAD	Norwegian Agency for Development Cooperation
NSHD-M	Network for Sustainable Hydropower Development in the Mekong Countries
OERS	Organization of Boundary States of the Senegal River (Organisation des États Riverains du fleuve Sénégal)
OMVS	Senegal River Basin Development Organization (Organisation pour la mise en valeur du Fleuve Sénégal)
PDIES	Procedures for Data and Information Exchange and Sharing
PMFM	Procedures for the Maintenance of Flows on the Mainstream
PNPCA	Procedures for Notification, Prior Consultation and Agreement
PWQ	Procedures for Water Quality
PWUM	Procedures for Water Use Monitoring
RAMSAR	Convention on Wetlands of International Importance especially as Waterfowl Habitat
RBO	River Basin Organisation

REC	Regional Economic Community
RSAT	Rapid Sustainability Assessment Tool
SADC	Southern African Development Community
SEA	Strategic Environment Assessment
SEMFOP	Social and Environment Management Framework and First Operational Plan
SHD	Sustainable Hydropower Development
SHD-M	Sustainable Hydropower Development in the Mekong Countries
SIA	Social Impact Assessment
SIDA	Swedish International Development Cooperation Agency
SIWI	Stockholm International Water Institute
SOGEM	Manantali Energy Management Company (Société de Gestion de l'Énergie de Manantali)
TFDD	Transboundary Freshwater Dispute Database
TWINS	Transboundary Waters Interaction NexuS
UN 1997	UN Convention on the Law of the Non-navigational uses of International Water-courses
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNECE 1992	Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992)
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WANI	Water and Nature Initiative
WCD	World Commission on Dams
WEC	World Energy Council
WFD	EU-Water Framework Directive
WWF	World Wildlife Fund
ZACPLAN	Zambezi Action Plan
ZAMCOM	Zambezi Watercourse Commission
ZRA	Zambezi River Authority

PURPOSE OF THIS TRAINING MANUAL

Water is the lifeblood of society. All sectors depend on water and any socio-economic development depends on it. This is also true for the dependence of the Mekong region. The Mekong sustains the region with its abundant water resources and high biodiversity, he "supports the World's largest and most productive inland fishery, at least 35 per cent of which depends on migratory species."[1]

Socio-economic development depends on reliable and sustainable energy supply. The Mekong region experiences rapid development, together with population growth, urbanisation, and increased land conversion etc. Over the last decade, economic growth together with energy demand has risen by approximately 8 percent per year[2]. Energy demand is steadily increasing and the recent Energy Outlook for Southeast Asia[3] projects a raise in energy demand by 80% until 2035. However, a more conservative estimation for the Mekong Region only projects an increase of approximately 2-7 times in the next 20 years[4]. "While the rate of energy demand growth in the region is high, average per capita electricity consumption in the greater Mekong region still remains with only two-thirds the average of all developing countries (920 kWh per capita per year). Moreover, an estimated 74 million people - 20 per cent of the Greater Mekong Sub-region - do not yet have electricity supply in their homes"[5]. So far, primary energy is mainly supplied by oil imports, making the region increasingly depend onexternal supply. Alternatively, hydropower provides a more sustainable and renewable energy source in the region.

The potential of hydropower in the Lower Mekong river basin is 30,000 MW. More than 3,235 MW of hydropower capacity has been installed on tributary systems, mostly in the past two decades[6]. A further 3,209 MW are currently under construction. Adding the planned hydropower project exhausts the potential at 30,000 MW. Thailand has developed most of its potential tributary sites and Vietnam is already well advanced in developing the potential of its tributaries. Lao PDR has developed only a few of many potential sites while Cambodia has yet to construct its first major hydropower project within the basin. A new development is to consider mainstream hydropower on Laos, Lao-Thai and Cambodian reaches of the mainstream, as well as in the Upper Mekong basin (China).[7]

Hydropower development has an impact on the environment and society, which is often amplified by unsustainable implementation practices and uniformed decision making, often led by unilateral interests and without sufficient participation of affected stakeholders. The construction and operation of Hydropower projects have significant social and environmental impacts in the short and long term. The impacts of large scale infrastructure development on the Mekong's biodiversity and its capacity to provide peoples livelihoods (fishery) are unknown, potentially leading to competition between different uses and users of the shared water resource on multiple levels. Sometimes hydropower projects will exclude other uses and foreclose future development potential. User conflicts and competing demands on the water resources are often not solved in a fair and equitable way (on the local as well as on

[1]WWF 2013.
[2]MRC 2010a.
[3]IEA 2013.
[4]Compared to 2005, MRC 2010a.
[5]MRC 2010a.
[6] MRC2009a.
[7]MRC 2010a.

the regional level) and provide potential for conflict or may fuel other conflicts on different levels.

The major challenges for Hydropower development in general and in the region are related to the following factors:

- There are many uncertainties about (future) cumulative impacts of large scale hydropower projects that may result in long-term negative impacts for the region at large compared to the short term benefits of an individual state;
- Knowledge about optimal resources management strategies and their effectiveness for water resources development in a transboundary river basin are often limited;
- Data and information about the hydrological system and its linkage to the socio-economic system are not available;
- Knowledge about lost benefits due to construction of physical infrastructure vs. natural infrastructure is limited or not available;
- Implementation of projects is often not in line with state of the art requirement and proper due diligence.

However, there are strategies and more sustainable solutions for hydropower development at hand to optimise the benefits for the region and potentially outweigh and mitigate negative impacts of hydropower development. Ultimately, hydropower is a sustainable renewable energy source, compared to the current dependence of the region on fossil fuel. Thus, the main focus of this manual is to understand and discuss about how hydropower could be developed in a sustainable way in the region. What are the most important aspects and how can we achieve this?

Participants of the training shall understand more about hydropower development and complexities of its development along shared resources in general and in the MRC region in particular. The training manual will therefore cover relevant aspects in order to achieve the following:

- Participants shall get to know the most important basic concepts relevant to the issue (covered throughout all chapters);
- Participants shall be aware of how an integrated management and development of the resource makes use of comparative advantages in the region (Session I, II, IV);
- Participants shall learn about ways to cooperate along transboundary rivers, necessary governance structures, e.g. potential institution and policy solutions (Session II, III,IV);
- Participants shall learn about innovative benefit sharing mechanisms to increase the value of the resource for the whole regions and allow for a sustainable development of the shared resources (Session II);
- Participants shall get an insight into provisions and guidelines to guide the sustainable development and implementation of hydropower projects, what are common challenges and what is the approach in the MRC region (Session IV);
- Participants shall understand causes for conflicts and develop skills to improve cooperation, communication and negotiations, which can be applied at various levels of the participants' professional life (Session V).

As far as possible, each session is a stand-alone training course. However, to avoid repetition there is some cross-referencing. The following section will provide more detailed information on the structure of the training manual, each of the modules and its sessions.

STRUCTURE OF THE TRAINING MANUAL AND SOURCES

Structure of the manual

The learning material in this manual is divided into five sessions. Each session[8] is divided into two to three sub-sessions: 1) providing a general introduction into the topic, 2) highlighting international experiences and 3) discussing the context for the Mekong region.

Sessions	Sub-Sessions
1 Cooperative governance on transboundary hydropower development	**1.1 General introduction** This sub-session gives a general introduction into the topic of shared river basins in the world focusing in particular on hydropower potential. The chapter discusses the nexus challenge of competing water uses in a basin and presents the key players in the context of transboundary hydropower development. An overview on transboundary hydropower development in the Mekong is provided in the last part.
	1.2 Provisions of international water law After a short introduction into characteristics of international law, this sub-session presents the most important treaties and customary provisions of international water law. Moreover, key principles for transboundary hydropower development are discussed.
	1.3 Introduction to transboundary hydropower development in the Mekong The purpose of this sub-session is to develop a first understanding of hydropower development in the Mekong region. This part of the manual brings up key issues, introduces the most important actors and provides an introduction into the provisions for transboundary hydropower development in the framework of the MRC.

[8] Only the first session deviates from this structure.

Sessions	Sub-Sessions
2 The benefits and challenges of cooperation in transboundary hydropower development	**2.1 Benefits and challenges of cooperation** This sub-session focuses on benefits of cooperative approaches through joint protection, management and development of water resources. It provides insights on potential risks and impacts of hydropower projects for riparian countries and the comparative advantages of joint management.
	2.2 Transboundary benefit sharing mechanisms This sub-session provides an overview of different mechanisms and incentives for countries to enter into benefit sharing agreements. After a conceptual input on benefit sharing with particular focus on joint hydropower development, real-life examples will illustrate the application of the concept in practice. Important aspects are in particular the discussion of the difference of the Benefit Sharing concept on the local and national levels as well as regarding interstate negotiations.
	2.3 Transboundary benefit sharing in the framework of the MRC This sub-session introduces the potential for benefit sharing and actual benefit sharing mechanisms that exist in the Mekong river basin.
3 The role of RBOs for transboundary hydropower development	**3.1 The role of RBOs** This sub-session introduces important theories and concepts relevant to describe the roles, means and mechanisms available to RBOs to support cooperative governance and in particular, it explains how hydropower development is usually done by RBOs.
	3.2 Examples from other river basins Three international examples of RBOs with their role and strategy in supporting sustainable hydropower development in their river basin are presented in this sub-session.
	3.3 The role and mandate of the MRC This sub-session specifies the role and mandate of the MRC in terms of functions, capacities and guidelines that are available to support transboundary hydropower development in the Lower Mekong basin. It explains who is planning, building and operating hydropower projects in the MRC, as well as how hydropower schemes are financed.

Sessions	Sub-Sessions
4 Guidelines and procedures for transboundary hydropower development	**4.1 International frameworks and guidelines for hydropower development** This sub-session provides an introduction into international hydropower development frameworks that guide the different project stages. Special attention is paid to the transboundary dimension of these assessment frameworks. Moreover, the sub-session provides information on guidelines and requirements of international development banks and finance institutions.
	4.2 Examples from other river basins This sub-session discusses how different RBOs address the challenges of hydropower project development. Selected guidelines and procedures in place in three different transboundary river basins will be presented. The focus lies on the Danube, the Nile and the Zambezi.
	4.3 Current situation at the Mekong The emphasis of this sub-session is on the current situation of hydropower development in the Mekong region. The chapter explains the MRC provisions guiding and supporting water resources development and particularly hydropower development (tools, guidelines, mechanisms, support structures).The Rapid Basin-wide Hydropower Sustainability Assessment Tool (RSAT) will be introduced.
5 Negotiation and dispute resolution processes relevant for transboundary hydropower development	**5.1 Negotiations and conflict resolution on transboundary hydropower dams** This sub-session centers on negotiation processes and disputes with regard to hydropower development. It provides a theoretical input on the spectrum of conflict resolution and gives concrete advice on necessary skills for an effective dialogue.
	5.2 Examples from other river basins The focus of this sub-session lies on negotiation and conflict resolution mechanisms in two case studies, namely the La Plata basin and the Senegal river basin.
	5.3 Negotiation and conflict resolution at the Mekong This sub-session provides a quick overview of the provisions for negotiation and dispute resolution which are in place in the Mekong basin.

Structure of the Sessions

At the beginning of each session, a table summarises the sub-sessions and their respective key aspects. Each session is structured into two to three sub-sessions which comprise a standard set of items (table below).

At the beginning of each sub-session, a table highlights purpose, objectives and preparatory reading for the topic. Discussion topics, exercises and additional readings are listed in another table at the end of each sub-session.

Item	Description
Key questions	A brief list of the most important points in the session
Purpose	Statement of purpose
Objectives	Brief statement of the knowledge and skills the trainee should have at the end of the session
Preparatory reading	A list of preparatory reading
Content	The content of the session, as text, lists, tables etc.
Discussion topics	Suggestions for the trainer
Exercises	Suggestions for the trainer
Additional reading and resources	Additional reading and resources to help the trainee expand his/her knowledge

Sources

This manual is based on information from various sources. Citations are given for all quotations and all sources are referenced in footnotes. A comprehensive literature list is part of the annexure. The authors welcome notification of errors and omissions.

1 COOPERATIVE GOVERNANCE ON TRANSBOUNDARY HYDRO-POWER DEVELOPMENT

Session1: Cooperative governance on transboundary hydropower development	
Sub-Session	**Key questions**
I. General introduction	• Which role does hydropower development play in transboundary river basins? • What are key actors in transboundary hydropower development? • How can the nexus challenge of competing water uses in a basin be addressed in a sustainable manner? • In how far does transboundary hydropower development play a role in the Mekong basin?
II. Provisions of international water law	• Which international treaties and customary law are relevant for transboundary hydropower development? • What are the key principles guiding transboundary water resources management?
III. Hydropower development in the Mekong basin	• A snapshot on the current situation and prospects of hydropower development in the region • What is the planning • What are countries' interests?

1.1 General introduction

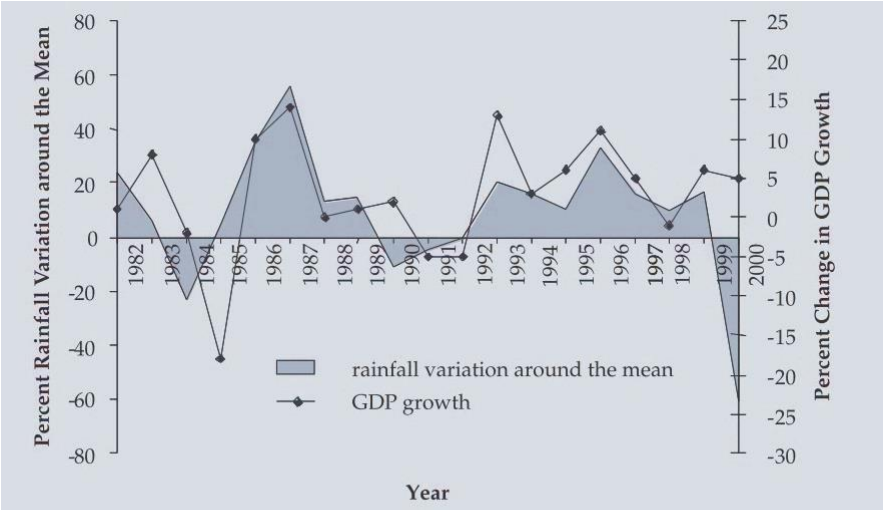
Purpose	This sub-session gives a general introduction into the topic of shared river basins in the world focusing in particular on hydropower potential. The chapter discusses the nexus challenge of competing water uses in a basin and presents the key players in the context of transboundary hydropower development. An overview on transboundary hydropower development in the Mekong is provided in the last part.
Objectives	By the end of the sub-session, the trainee will: • Know the key drivers and dynamics of hydropower development in shared river basins • Understand the nexus challenge of competing water uses in a basin • Know relevant players in the hydropower context
Preparatory reading	UN Water 2008: Transboundary waters. Sharing benefits, sharing responsibilities (UN Water Thematic Paper). Available online at http://www.unwater.org/downloads/UNW_TRANSBOUNDARY.pdf.
	WCD 2000: Dams and development. A new framework for decision making. The report of the World Commission on Dams. London: Earthscan. Available online at http://www.internationalrivers.org/files/attached-files/world_commission_on_dams_final_report.pdf, Chapter 1.
	Sadoff, Claudia et al. (eds.) 2008: Share. Managing water across boundaries. Gland: IUCN, Available online at http://data.iucn.org/dbtw-wpd/edocs/2008-016.pdf, Chapter 5

As pressure on the world's water resources due to economic development and population grows this quickly the importance of transboundary cooperation along shared rivers continues to increase Moreover, intensifying global cooperation and diversification of trade relations multiply the complexity of actors managing resources. Currently, there are comparatively few basins with a comprehensive approach for the utilisation and management of its water resources. Future developments, such as climate change impacts, will increase pressure on water resources and increase uncertainty and risks about their availability. In consequence, closer cooperation and joint management are necessary to ensure the most efficient use of this precious resource.

1.1.1 Water for growth – development trajectories

As all sectors depend on water, multiple water uses are linked through water and impede on its water availability. For growing economies, water will be an important determinant for their progress (e.g. Figure 1-1 below, Ethiopian example). Rapid and competing developments will increase the pressure on water availability, and water may not only become a limiting

factor to this development but may also present a threat. Water-related hazards accounted for 90% of all natural hazards, and their frequency and intensity is generally rising. In some countries, natural disasters have caused damages amounting to 2-15% of their annual GDP. Thus, we have two trajectories that impede the basin development: On the one hand the basin internal developments and their very uncertain cumulative impacts, and on the other hand external pressures resulting from climate change impacts and increasing extreme events. Both together reinforce each other and therefore seriously threaten development of basin communities and states. Unilateral action may undermine the overall sustainable development within the basin.



Source: Compiled from SIMA and African Rainfall and Temperature Evaluation System data.

Figure 1-1 Rainfall variation around the mean and GDP growth in Ethiopia 2006[9]

i. Population growth

The world population is predicted to grow from 6.9 billion in 2010 to 8.3 billion in 2030 and to 9.1 billion in 2050.[10] The Mekong region is continuing to grow substantially during this period. Due to increased needs for food, energy and livelihoods, this will ultimately result in increased pressure on land and water resources. For a sustainable development the use of comparative advantages for food and energy production has to be at the centre.

[9] World Bank 2006.
[10] World Water Assessment Programme 2009.

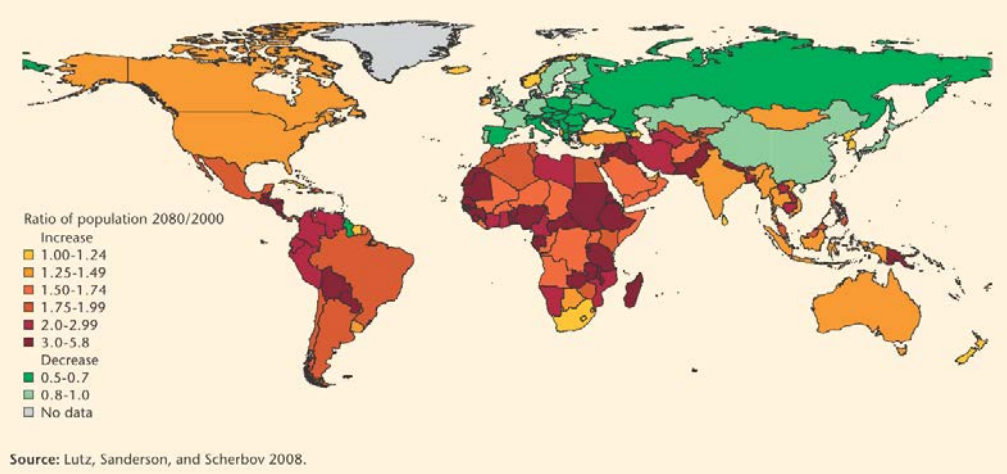


Figure 1-2 Expected areas of population growth and decline, 2000-2080[11]

ii. Land conversion and environmental degradation

Land conversion is one of the greatest challenges for healthy ecosystems, which in turn are needed to sustain societies with their services, and at the same time maintain water quality and quantity. Poor and unsustainable land utilisation and management practices are leading to desertification and land degradation, increasing pressure on water resources due to rising direct and diffuse pollution and sediment loads into surface water.

iii. Agriculture

Water for irrigation and food production constitutes one of the greatest pressures on fresh-water resources. Agriculture accounts for ~70% of global freshwater withdrawals and up to 90% in some fast-growing economies.

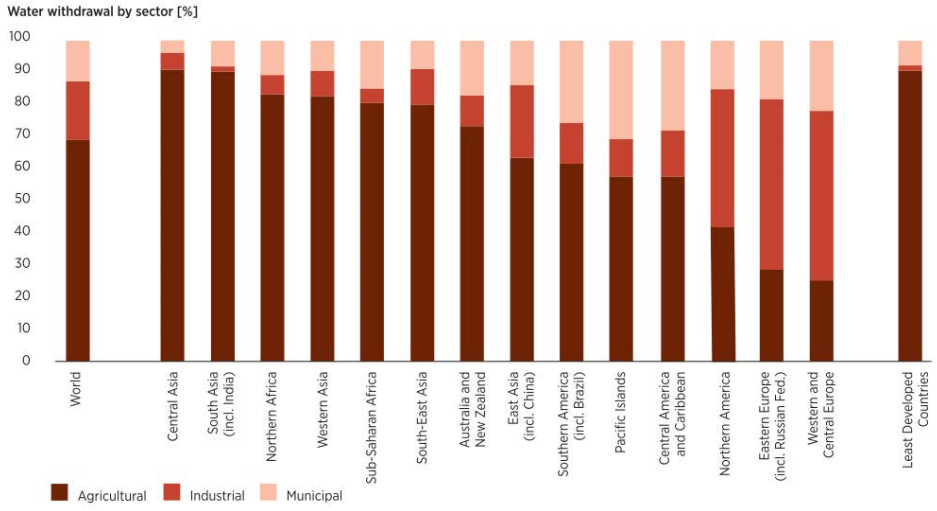


Figure 1-3 Water withdrawal by sector (2008)[10]

[11]World Water Assessment Programme 2009: 30.

iv. Energy production

Energy is a key driver for economic development. Figure 1-4 below illustrates the significant relation between rising energy use and the GDP per capita increase. Energy and water belong together in two ways: 1) for the production of energy – water always plays an important role, e.g. during processing, for cleaning, cooling, but also the production of biomass and evidently for hydropower generation. Hydropower supplies about 20% of the world's electricity, a share that has remained stable since the 1990s. 2) Energy is needed for the "production and delivery" of water, e.g. for transport and treatment of drinking and waste waters. Of all energy produced globally, 7–8% is used to lift groundwater and pump it through pipes to ensure drinking water supply and to treat both groundwater and wastewater.[12] Until now, over 80% of used water worldwide is not yet collected or treated[13] and will require additional energy in future.

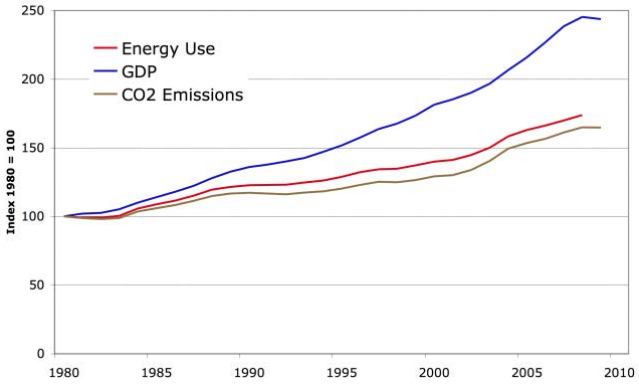


Figure 1-4 World energy, GDP, and CO2: 1980-2009

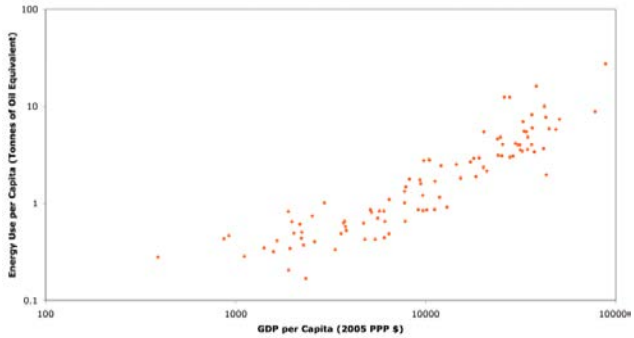
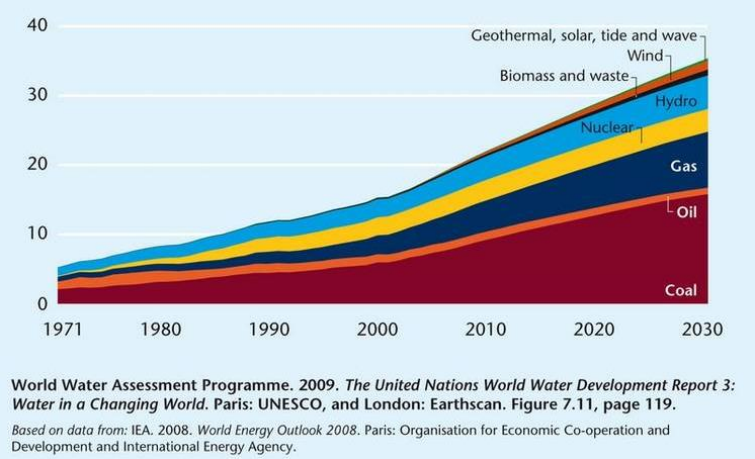


Figure 1-5 Energy and income per capita 2007: 99 countries

[12]Source: WEF, 2011a
[13]Source: Corcoran et al., 2010

1.1.2 Hydropower development

According to the International Energy Agency, electricity generation from hydropower and other renewable energy sources is projected to increase at an average annual rate of 1.7% from 2004 to 2030, for an overall increase of 60% through 2030. However, despite the worldwide increase of renewable energies it will only meet a small part of the projected energy demand[14].



World Water Assessment Programme. 2009. *The United Nations World Water Development Report 3: Water in a Changing World*. Paris: UNESCO, and London: Earthscan. Figure 7.11, page 119.

Based on data from: IEA. 2008. *World Energy Outlook 2008*. Paris: Organisation for Economic Co-operation and Development and International Energy Agency.

Figure 1-6 Global production of electricity by energy source, 1971-2013 (thousands of terawatt hours)[15]

Hydropower is currently utilised in over 160 countries. According to data published by the International Energy Agency, only 33 percent of the world's hydropower potential has been exploited. Asia exploits 22 percent of its hydropower potential.[16] Since 1990, global hydropower generation has increased by 50 percent with the highest absolute growth in China.[17] With a share of 86 percent in 2008, hydropower makes up for the largest portion of renewable energy resources. At the end of 2008, global installed hydropower capacity stood at about 874 GW. Figure 1-13 and 1-14 illustrate potential hydro capacities per region, the latter highlighting the distinction between technically and economically feasible potentials.

The density of existing dams is highest in North America and Europe (Figure 1-7). Comparing the installed capacity per region, Asia, led by China, has overtaken Europe, while North America and South America take the third and fourth place respectively (Figure 1-12). One of the major impediments for the development of hydropower are funding and financing issues. The strong growth of hydropower in South America and Asia provides the evidence for better accessibility to finance here compared to Africa. Worldwide hydropower capacity is expected to grow significantly over the period between 2011 and 2020, with Asia and South America continuing to show strong growth.[18]

[14]The Oil Drum 2011.
[15]World Water Assessment Programme 2009: 119.
[16]: IEA 2010b.
[17]IEA 2010a.
[18]IEA 2010b.

Facts and figures about hydropower development (I)

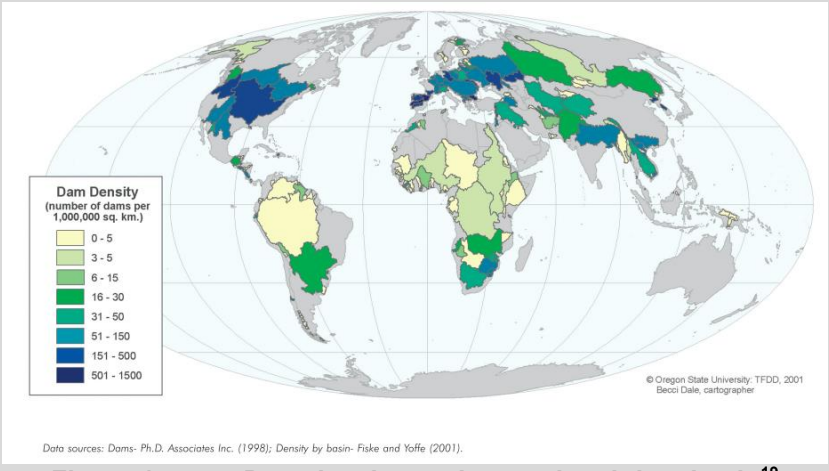


Figure 1-7 Dam density per international river basin[19]

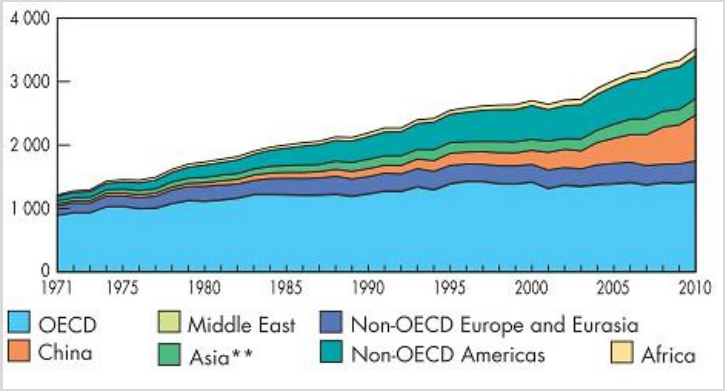


Figure 1-8 Hydro production from 1971 to 2010 by region (TWh)[20]
(includes pumped storage, ** Asia excludes China)

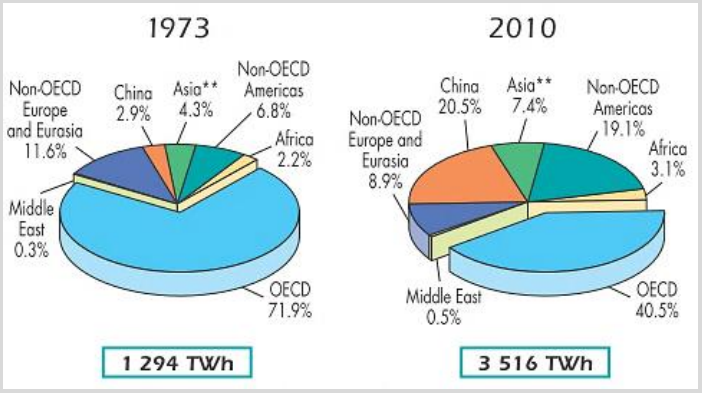


Figure 1-9 1973 and 2010 regional shares of hydro production[21]
(includes pumped storage, **Asia excludes China)

[19] Wolf2002.
[20] IEA 2012.
[21] IEA 2012.

Facts and figures about hydropower development (II)

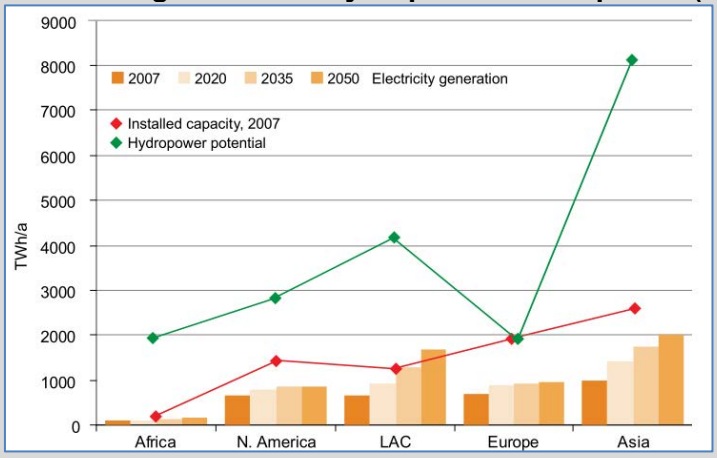


Figure 1-10 Electricity generation from hydropower [22]

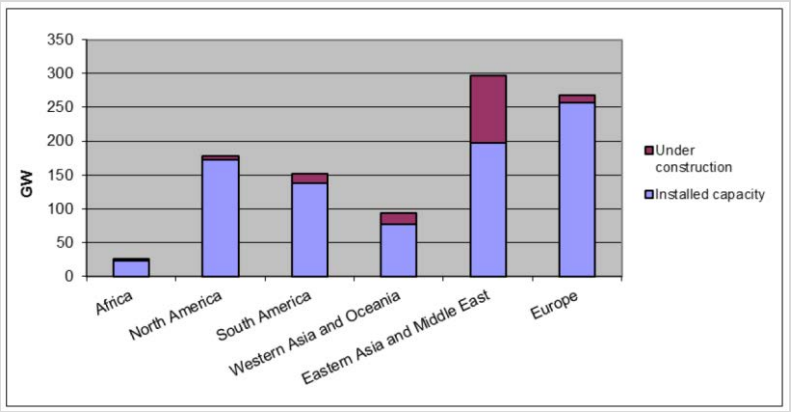


Figure1-11 Hydropower capacity at beginning-2008: installed and under construction[23]

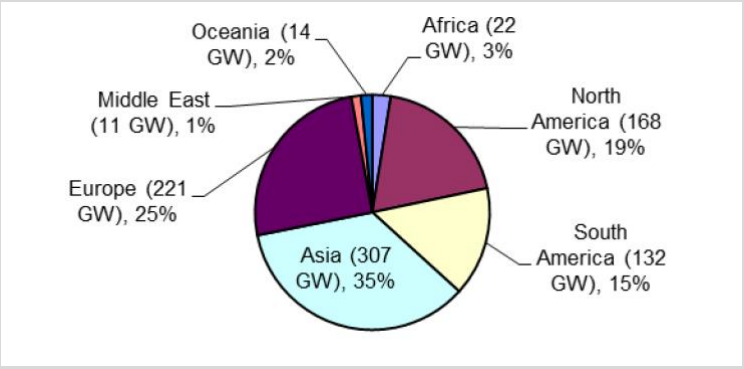


Figure 1-12 Current installed hydropower capacity by region[24]

[22] World Energy Council 2010a.
[23] World Energy Council 2010b.
[24] World Energy Council 2010b.

Facts & figures about development trajectories

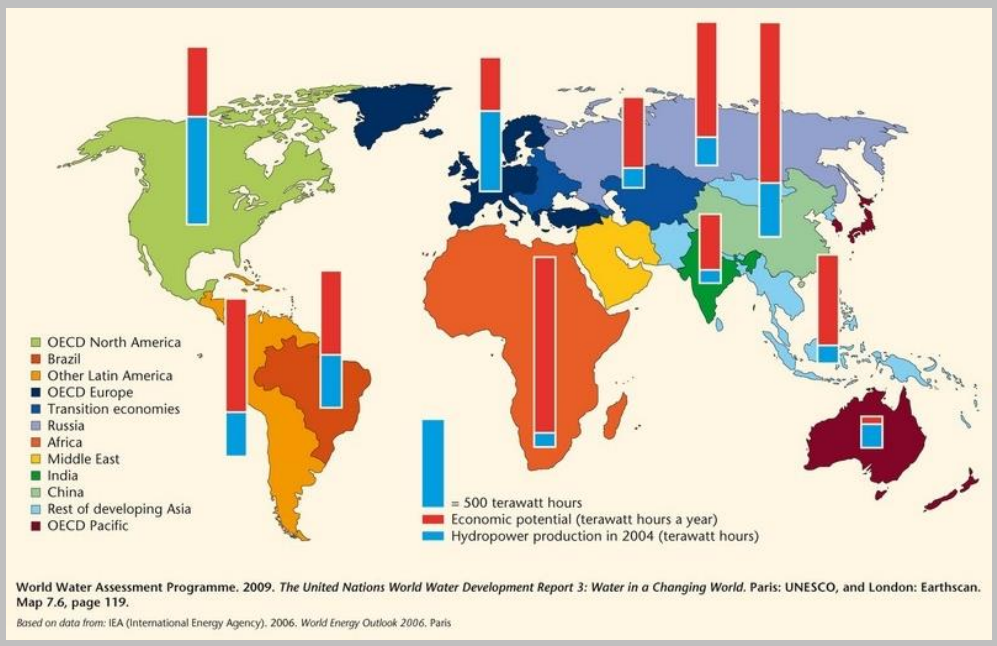


Figure 1-13 World potential and current hydropower production, 2004[25]

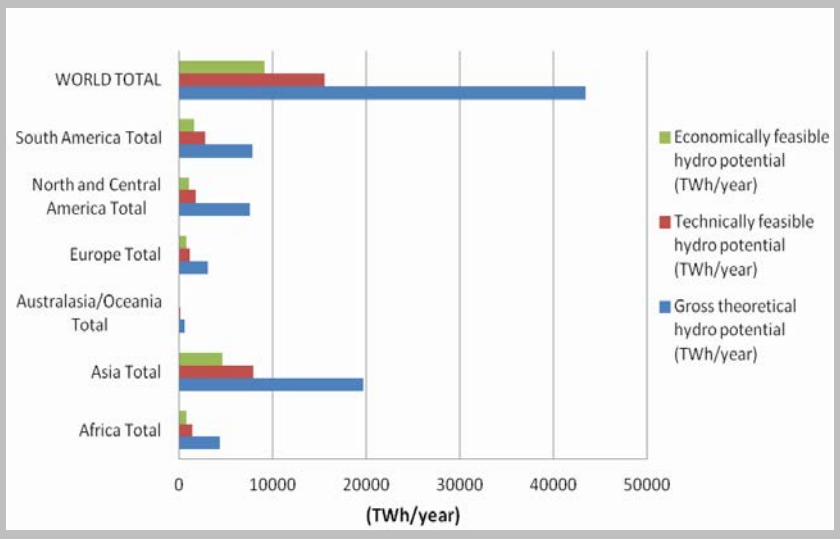


Figure 1-14 Capability for hydropower generation[26]

[25]World Water Assessment Programme 2009: 119.
[26]UNESCO no date.

1.1.3 Overview on transboundary river basins and cooperation

There are currently 276 rivers that either cross or demarcate international political boundaries (Figure 1-15). A total of 148 countries contribute territory to international basins. These river basins cover nearly one-half of the earth's land surface, generate approximately 60% of global freshwater flow and are home to about 40% of the world's population.[27] 166 countries have their territories within international basins, of which 21 countries are entirely located within an international basin. As most countries are partly or fully located in transboundary river basins, any hydropower development thus has transboundary impacts. Yet, the number of agreements including aspects of joint hydropower development is often limited or restricted to bilateral/trilateral arrangements.

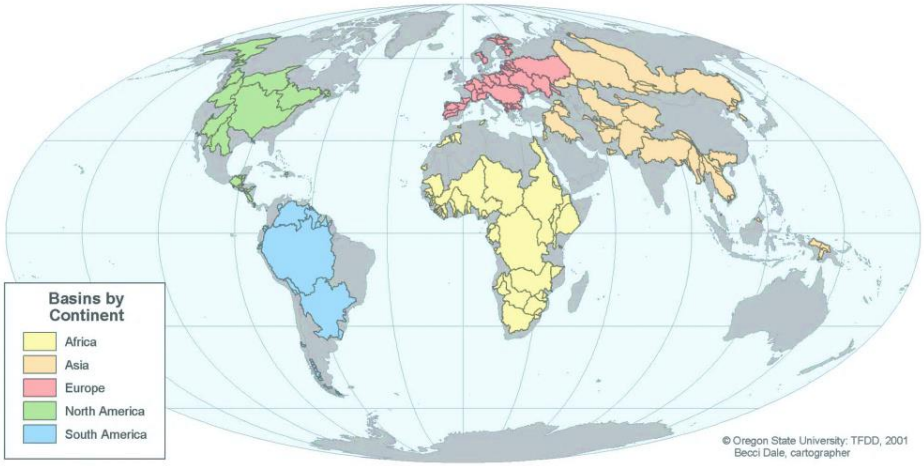


Figure 1-15 International River basins as delineated by the Transboundary Freshwater Dispute Database Project, Oregon State University, 2000[28].

Schmeier (2013) identifies the following broad categories of water-related collective action problems in 116 international river basins studied, as well as the distribution of these key issues in river basins[29].

- Water quantity and allocation problems related to the use of and the competition over water resources;
- Water quality and pollution problems stemming from the intrusion of pollutants;
- Hydropower and dam construction problems affecting the watercourse as a consequence of electricity generation;
- Infrastructure development and their respective environmental consequences;
- Environmental problems;
- Climate change consequences;
- Fisheries problems (overfishing, competitions for fishing grounds, etc.);
- Economic development and the exploitation of river basin resources;
- Invasive species problems;

[27] Giordano /Wolf 2002.
[28] Wolf et al. 1999.
[29] Schmeier 2013.

- Flood effect on the basin and its people and respective management options, biodiversity protection issues, navigation and transport related problems.

Hydropower is one of the key issues in river basins. Given the interdependence of ecological and socio-economic systems within a catchment, those collective action problems will result in cumulative impacts that provide their own challenges. As a basin is an interlinked and interdependent hydrological unit, the basin perspective provides the best system boundary to ensure sustainable development and efficient decision making on the management and development of its water resources.

UN Water has defined 7 pillars that are relevant for successful and long-term transboundary cooperation (see Figure below). All topics are further explored in the following chapters of this manual.

Box: UN Water – 7 pillars for long-term, sustainable and reliable transboundary cooperation

Political will and commitment from all Governments, at all levels, are prerequisites for successful transboundary water management. While there is no universal solution, the following seven pillars are usually considered as necessary for long-term, sustainable and reliable transboundary cooperation.[30]

Legal instruments: A sound legal framework is essential for stable and reliable cooperation.

Institutional structures and capacity development: The right institutional structures at the national, transboundary and regional levels are a precondition for sustainable development and management of transboundary waters and for lasting cooperation among the riparian States. A clear mandate for the different national and transboundary organizations is an important prerequisite for the formation of strong governing bodies.

An integrated approach: Transboundary as well as national water development and management are strongly linked to sustainable and responsible growth. Thus, an integrated approach favouring long-term and contingency planning is needed, building resilience into vulnerable systems, with an emphasis on increased diversity and flexibility. New management approaches should be based on regional cooperation principles, focusing on river basins and aquifer systems; Integrated Water Resources Management (IWRM)

Exchange of information and joint monitoring and assessment: Information based on well-organized measurement networks and monitoring programmes is a prerequisite for accurate assessments of water resources and problems. Assessment is essential for making informed decisions and formulating policy at the local, national and transboundary levels. Moreover, basin management by two or more countries calls for comparable information. A common basis for decision-making requires harmonized (if not standardized), compatible assessment methods and data management systems as well as uniform reporting procedures.

A participatory approach: Public participation is fundamental to maximize agreement, enhance transparency and decision-making, create ownership and facilitate the acceptance and enforcement of decisions and policies. It is also a mechanism for gaining a better or common understanding between the various stakeholders on the nature of a given problem and the desirability of specific outcomes. Stakeholder participation strengthens integration, thereby contributing to conflict prevention, and risk reduction – all highly important in large infrastructure development projects.

Benefits and costs-sharing: Riparian countries should focus first on optimizing the generation of basin-wide benefits, and secondly on sharing those benefits in a manner that is agreed as fair. The use of water, rather than the allocation of water itself, provides by far the best scope for identifying mutually beneficial cooperative actions. The perception by all countries that a cooperative basin development and management plan which maximizes overall benefits is “fair” is essential to motivating and sustaining cooperation.

Financing: Effective development and management of transboundary water resources, more and more widely understood as an international and common public good, requires appropriate financing.

[30]The list of seven pillars is based on UN Water 2008.

1.1.4 Sustainability considerations relating to hydropower development

This section highlights key issues that need to be taken into account relating to the potential of this precious resource and its sustainable development.

i. What type of hydropower?

Hydropower can be classified as 'run of river' (where the power is generated through the flow of a river), 'reservoir' (where power is generated through the release of stored water) or 'pumped storage'[31]. Currently, policies favour hydropower projects with minimum land-to power ratios. Thus, most of the projects only have "run-of-river capabilities". However, less storage capacities may limit the potential to balance variabilites in energy provision due to intermittent sources and varying demands[32]. Storage will play an increasingly important role to balance peak loads and intermittent sources from other renewable energy sources, such as wind, solar or tidal energy. Moreover, it is a net user of energy as well and depends on the strong differentials in the market price, between low and peak demand. Hydropower has the potential to satisfy both base load and peaking requirements at the same time.

There are various categories to define dams, depending on their size, usage, capacity, construction and some others more. The basic distinction is made between small and large dams, where large dames are larger than 15 meters from foundation to crest[33].

ii. Multiple functions of dams

While the discussion on hydropower is often narrowly focusing on the minimum land-to-power ratio of run-of-river capabilities, the role of multipurpose reservoirs and pumped storage may change this perspective in future. Increasing hydropower potential through pumped storage will gain in importance. Furthermore, several water storage schemes serve many of the typical water management functions: irrigation, hydropower, water supply and flood control. These multi-purpose water storage schemes can provide more benefits. Single purpose dams are expected to perform better when compared to multi-purpose storage because it is usually less complicated to improve performance in one area than it is to manage trade-offs from several user needs. Combining different uses, such as hydropower and flood control, requires that alternative reservoir functions are balanced and maintained in an optimal way to maximise benefits from multi-purpose schemes.[34] Figure 1-17 depicts the various functions provided by dams across Asia.

iii. Climate Change adaptation and mitigation

As a renewable energy source, hydropower has potential to mitigate climate change impacts through reduced emissions compared with fossil fuel generation. However, reservoirs need to be well managed, e.g. removal of all plants before inundation, as they could also become a significant source of methane emissions and thus invalidate this argument.

Hydropower also plays a role for climate change adaptation. Increasing storage capacities will enable rising buffering capacities during droughts and floods in order to counteract increasing uncertainties of water resources availability. Also, balancing excessive runoff during

[31] World Energy Council2010a.
[32] World Energy Council2010a.
[33] International Commission on Large Dams 2011.
[34] Lindström at al. 2012.

floods will play a bigger role in future. Water infrastructure is thus critical to global water security by providing buffers against increasing hydrological variability.[35]

iv. Nexus of water-energy-food (Water security debate)

Food supply, energy production and different water delivery services all depend on sizable, reliable, continuous and efficient supply of water. Vast amounts of energy are needed throughout the food supply chain. Water supply services likewise require significant sums of energy to move heat and treat water for human use. With increasing competition for water resources between different sectors as well as increasing uncertainty of its availability over time, the nexus between water-energy-food needs to be analysed better to design adequate management and development solutions. Hydropower production is one element within this nexus.[36]

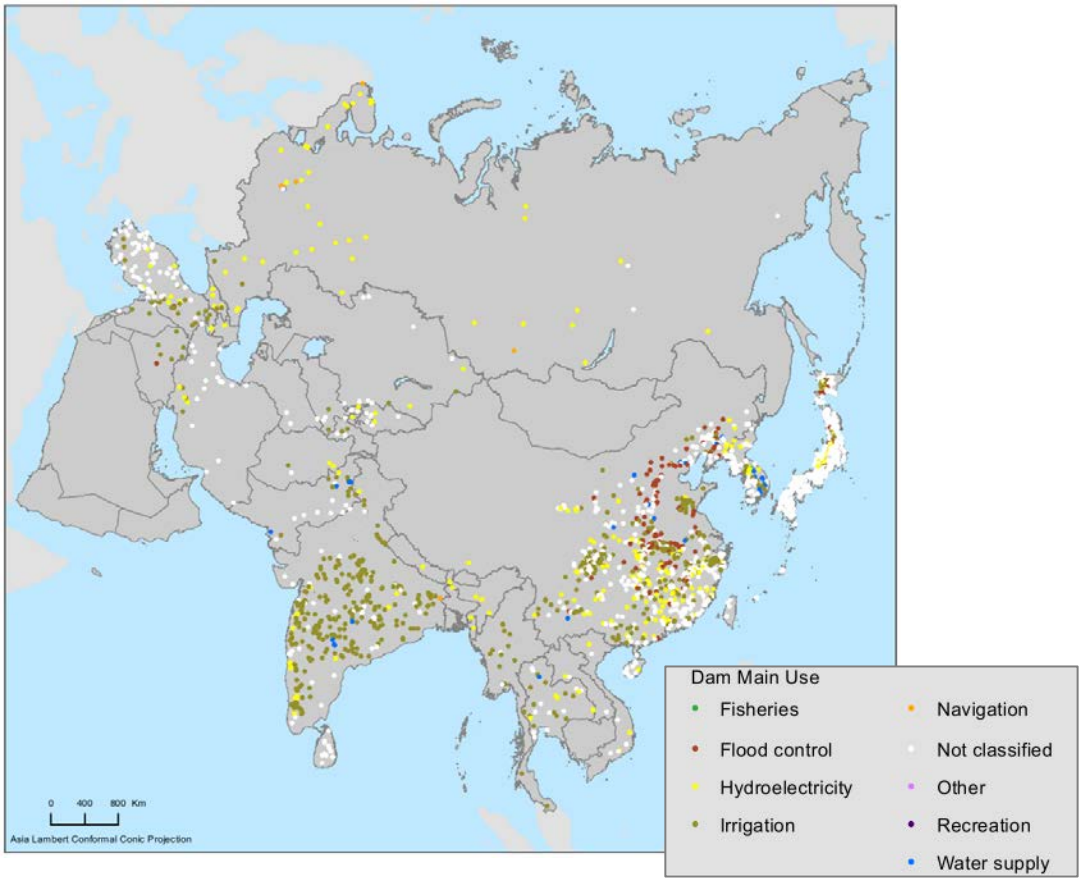


Figure 1-16 Location of large dams by function in Asia[37]

v. Social and environmental consequences of hydropower development

With the development of hydropower projects, impediments on environment, biodiversity, society, culture are unavoidable and need to be addressed. Strategic multi-sector planning on the regional/basin level allows for the reductions and partly avoidance of such negative impacts resulting from water storage projects. Understanding the potential negative social

[35] IHA 2013.
[36] Lindström et al. 2012.
[37] Lehner et al. 2011.

and environmental consequences from water storage projects and how to mitigate them is essential to optimise the outcomes of and returns on such investments. Main aspects for consideration in a cost-benefits analysis of water storage and potential trade-offs are developed along the following categories[38]:

- Environmental impacts: Such as flow regimes, sedimentation, aquatic ecosystems and fisheries, as well as evaporation and greenhouse gas emissions;
- Social impacts: Health, cultural heritage, reduced/increased income/revenues of affected persons or sectors such as agriculture or fishery.

vi. Development requirements for transboundary resources

General requirements for sustainable hydropower development in a shared river basin include:

- a high level of cooperation between the different national governments sharing a basin, as well as the different levels of government at the sub-national and local levels;
- a shared vision for sustainable and equitable development across the basin;
- an IWRM approach in order to ensure that water resources development serves economic, social, ecological and political objectives. In the context of hydropower, an integrated approach implies that development and management decisions are based on basin-wide assessments and strategies. The role of the nexus is crucial, too.

Managing risks related to dams consists of several possible components. The most important stage is the planning, which needs to incorporate qualified water resources modelling to assess potential outcomes under varying climatic- and hydrological conditions. Other crucial aspects to risk management include strong monitoring systems, performance protocols and training for operators to respond to critical situations.[39] Flooding is a primary consequence of dam failures. Floods are created when volumes of water exceed the reservoirs capacity to contain them. When storage structures give way, substantial quantities of water can reach previously protected areas and harm ecosystems and societies. As several rivers are blocked by a sequence of multiple dams, the breach of one such structure can induce a domino effect with potentially devastating consequences for an entire catchment area. Consequently, managing floods and excess run-off water is important in order to prevent disasters related to dam failures and the failures themselves.[40]

vii. Complexity - Multi-level, multi-stakeholder

Sustainable solutions require a sufficient participation of all affected stakeholders across the region – horizontally and vertically. It has been seen in the past that transboundary cooperation focusing mainly on balancing national interests may often face the challenge of insufficient incorporation of local and provincial level interest. This results in an increasingly complex network of actors and stakeholders, which additionally changes over time.[41]

[38] Lindström et al. 2012.
[39] Cederwall2006.
[40] Lindström et al. 2012.
[41] Mirumachi 2013.

Furthermore, other actors previously not involved in the hydropowe rtopic are entering this sphere – the private sector. This provides a challenge for RBOs' mandate, and domestic regulations and licensing.

1.1.5 Relevant actors in transboundary hydropower development

The construction of hydropower schemes involves a series of decisions and choices from the start of the planning process until the ultimate approval of a project and financial closure. At each stage there are several different actors which come into play. Important stakeholders are for example government agencies, public or private utilities, interested actors from the region, financing agencies, consulting and construction firms and equipment suppliers. Moreover, affected communities and NGOs take increasingly important roles, for example in the form of people's movements against the construction of dams. These actors groups all try to influence the process according to their very own interests, ranging from profits and political influence to property and livelihoods.[42]

Sector	Stakeholder
Governments	• Of involved states • Of riparian states • Of donor states
International organisations	• International Hydropower Association (IHA) • Development Banks/ multilateral Donors • UN agencies (such as UNEP)
Regional organisations	• RBOs • Other regional organisations
NGOs	• International: WWF, IUCN, International Rivers • Regional/local NGOs
Private sector	• Hydropower developers • Banks • Consulting companies

Table 1-1 Relevant actors for transboundary hydropower development

The above stakeholder groups need to be involved at particular stages during the HP development projects. Capable and functioning intermediary organisation such as RBOs can play an important role to coordinate this process, ensuring the sustainability of the basin by adhering to international best practice and standards (Chapter 4) are as important as negotiation and conflict resolution skills (see Chapter 5) to mediate between parties. The development of a shared vision that builds on shared values and shared benefits is at the heart of triggering collective action.

[42]WCD 2000.

1.1.6 Implementation challenges of transboundary projects

i. Interests – national vs. regional interests

The variability of geography and climate conditions within river basins allow for the identification of comparative advantages for the locations of hydropower projects across river basins. Such assessments incorporate variations of evaporation rates, hydropower potential, availability of land, impediments on biodiversity and ecosystems, impacts on livelihoods and cultural heritage, etc. Viewed from a regional perspective, economic benefits of hydropower could be increased and shared between countries, potentially allowing for a more effective utilisation and management of the water resources. However, conflicting interests in resource use and its allocation between riparian countries provide a typical collective action problem. Due to the different position of countries along transboundary rivers, interests and benefits are allocated differently for upstream and downstream riparians. Also, environmental and social impacts of infrastructure projects are allocated differently across the basin. This increases the complexity to identify mutual benefits and negotiate and agree on joint solutions.[43] This depends strongly on relations between countries, their history, availability of salient solutions, etc., but also on institutional capacities to enable and facilitate cooperation on transboundary rivers and guide regional development of the resource and implement joint projects.

ii. Benefit sharing

As discussed in the latter sections (Chapter 2), there are various benefits related to hydropower development that can be significantly enhanced if comparative advantages in the basin are utilised. However, complex institutional solutions that are acceptable for all parties need to be developed. At this point it needs to be noted that not only positive impacts but also negative impacts need to be included in such arrangements. Often this requires a cross-sectoral perspective, where institutional solutions need to package different benefits and impacts to balance impacts (positive and negative) between riparian and to allow for a sustainable mitigation of impacts.

iii. Compatibility of national legislation

A major implementation challenges for transboundary hydropower projects that regularly results in implementation delays and identification and mobilisation of funding are diverging national legal frameworks and development priorities. Planned projects need to be harmonized with existing policies in a national and regional context. This ensures that current guidelines regarding different values, not least humanitarian, are not disregarded in the project development process.[44] Some basins have therefore strived to provide guidelines, such as safeguard guidelines that are applied in all transboundary projects. Moreover, processes to harmonise policies are initiated.

Furthermore, especially in the water sector institutional capacities are often limited. Water and energy projects are heavily dependent on the quality and regulatory functions of several government institutions, especially the ministries working with finance, the environment, and

[43] Mirumachi 2013.
[44] Lindström et al. 2012.

labour. Pre-assessment studies should therefore strive to determine the need for institutional or regulatory framework strengthening.[45]

iv. Finance and funding

The mobilisation of financial resources and funding for shared infrastructure projects are more challenging, as general preconditions are more difficult to obtain/ non-existent on shared resources. Preconditions, such as harmonised legal frameworks, joint agreements, mandated and functioning institutions with strong capacities, rarely exist on the regional level. Formulas for cost and benefit sharing are not readily available and need to be negotiated for each context.

v. Discussion of smaller scale vs. larger scale development

The predominant hydropower discourse is criticised for valuing hydropower projects as 'more important' or 'more valuable' than ecosystems and rural livelihoods, and for dismissing alternative development options[46].

Discussion topics	• Discuss why it is important for riparian states to cooperate in the management of their shared water resources.
	• What are current discussions on benefits and risks of dams? What are alternative and more sustainable solutions?
	• What are additional factors emerging from the transboundary context to assess and ensure the sustainability of dams?
	• What are the roles of different stakeholders/ actors?
Exercises	• Illustrate the relationship between upstream and downstream riparian states in a shared river basin in a diagram.
	• Map relevant factors to assess sustainability of dams. What is the difference to tackle challenges?
	• Movie and discussion
Additional Reading	World Energy Council 2010: Survey of Energy Resources. London: World Energy Council, chapter 7. Available online at http://www.worldenergy.org/documents/ser_2010_report_1.pdf.

[45] Lindström et al. 2012.
[46] Friend/Blake 2009.Friend et al., 2010

1.2 Provisions of international water law

Purpose	After a short introduction into characteristics of international law, this sub-session presents the most important treaties and customary provisions of international water law. Moreover, key principles for transboundary hydropower development are discussed.
Objectives	By the end of this sub-session, the trainee will: • Know key treaties and documents with relevance for transboundary hydropower development • Be able to identify key principles of transboundary water law relevant for hydropower development • Be aware on current discussions related to water law: to what extent can "justice" serve transboundary water interaction?
Preparatory reading	Rieu-Clarke, Alistair/Moyinihan, Ruby/Masgig, Bjørn-Oliver. 2012: UN Watercourses Convention User's Guide. IHP-HELP Center for Water Law, pp. 100-133. Online: http://dl.dropboxusercontent.com/u/391260/UN%20Watercourses%20Convention%20-%20User%27s%20Guide.pdf.
	UNEP Dams and Development Project 2007: Dams and Development: Relevant practices for improved decision-making, chapter 8.
	UNEP et al. 2002: Atlas of International Freshwater Management. Online: http://www.transboundarywaters.orst.edu/publications/atlas/.

1.2.1 Introduction into international water law and treaties

The Atlas of International Freshwater Agreements identifies 400 water agreements adopted since 1820.[47] But nonetheless, the international legal architecture regulating transboundary waters remains fragmented. In international law, there is no one law-making body able to create laws which are internationally binding upon everyone, or a proper system of courts with compulsory jurisdiction to interpret and progress the law. Rules and obligations for states can be derived both from international, regional and basin-level treaties and from international custom. States are only bound by treaties establishing rules they expressly recognised. Moreover, there are customary norms which arise when the international community accepts a norm as binding and as a result of the practice of states.

Since there is no overarching "sovereign" in international law, the enforcement of rules can be difficult. In case of a dispute, states can refer the dispute to the International Court of Justice (ICJ). One of the ICJ's landmark cases was the case of Gabčíkovo–Nagymaros between Hungary and Slovakia concerning the construction of dams on the Danube River. However, a state cannot be tried before the ICJ against its will. Therefore, this measure is only possible if the involved states accept the jurisdiction of the court. Alternatively, states can try to

[47] Giordano/Wolf 2002.

settle disputes before arbitral tribunals or appeal to regional courts if existent. Treaties of international law usually contain provisions on how parties should settle disputes concerning the interpretation or application of the respective treaty. Individuals can also appeal to regional and national courts if this is foreseen by the domestic or regional legislation. The underlying principles of International Water Law ("soft law") often lay the fundament for binding treaties and rules recognized by States on the regional and basin levels ("hard law").The principles traditionally guiding transboundary water resources management are also relevant for transboundary hydropower development (discussed in more detail in the next section). In the following, major international treaties and conventions with relevance for transboundary hydropower development are presented briefly.

i. UN Convention on the Law of the Non-navigational uses of International Watercourses (1997)

The 1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses[48] provides a set of guiding principles for cooperation between watercourse states on the use, management and protection of international watercourses. The main categories of rights and obligations set forth in the Convention are:

- *'equitable and reasonable utilization and participation';*
- *'prevention of significant harm';*
- *'cooperation';*
- *'regular exchange of data and information';*
- *'no inherent priority of any one kind of use over other kinds of uses';*
- *'notification of planned measures with possible adverse effects on other riparian States';*
- *'protection and preservation of ecosystems';*
- *'prevention, reduction and control of pollution';*
- *'notification of and cooperation with respect to emergency situations'.*

As of November 2013, 31 states are parties to the Watercourses Convention and an additional four states signed the document. In order to enter into force, the Convention needs to be ratified by 35 parties. The Mekong riparians are not parties to the Convention. However, all MRC member states sponsored or voted in favour of the Convention when it was adopted as a UN General Assembly Resolution in 1997.[49] The states that supported the Resolution are not obliged to join the Convention. Nonetheless, their sponsoring and approving vote created an expectation in the international community, that those countries would eventually become parties[50]. However, Myanmar's representative was absent during the General Assembly vote and China voted against the Resolution. Many of the provisions laid down in the Convention are generally considered as codifications of customary international law, even though the Convention itself has not yet entered into force as a binding treaty. The customary rules reflected in the Convention are binding on states. However, the UN Convention's practicality has been questioned because of its vague and sometimes contradictory language and the slow progress towards its ratification.[51]

[48] A/51/869: UN Convention on the Law of the Non-Navigational Uses of International Watercourses, adopted by the General Assembly, New York, 21 May 1997.
[49] Loures et al. 2009.
[50] At the moment, Vietnam seems to be considering to join the Convention.
[51] Giordano/Wolf2002.

ii. UNECE Water Convention (Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes 1992)

The Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes[52] was adopted in 1992 by the UNECE, obliging parties to prevent, control and reduce transboundary impact, use transboundary waters in a reasonable and equitable way and ensure their sustainable management. Parties bordering the same transboundary waters shall cooperate by entering into specific agreements and by establishing joint bodies. The Convention also includes provisions on monitoring, research and development, consultations, warning and alarm systems, mutual assistance, and exchange of information, as well as access to information by the public. Initially negotiated as a regional instrument, the Convention was amended in 2003 to allow accession by all United Nations Member States. The amendments entered into force on 6 February 2013, turning the Convention into a global legal framework for transboundary water cooperation. It is expected that non-ECE countries will be able to join the Convention as of end of 2013.[53]

A topic currently discussed is the comparative analysis of the UN Watercourses Convention (UN 1997) and the UNECE Water Convention (UNECE 1992). Both conventions were developed on the same subject-matter, namely to address issues related to water quantity and water quality of international and transboundary waters. Even though differences can be noted in the focus adopted for the approach of these issues in the Conventions, as well as in their provisions regarding related principles and procedural rules, both Conventions do not contradict each other and appear to be compatible frameworks. The main differences between both Conventions are explained by differences in the process of their development, UNECE 1992 emanating originally from regional negotiations whereas UN 1997 was developed as an international framework resulting from a long term drafting process by the United Nations International Law Commission. The regional development context results in a more detailed character of prescriptions in UNECE 1992. However both instruments are recognized as important contributions to the on-going customary law process in international water law. Comparative analysis yields the following[54]:

- The material and procedural rules of UNECE 1992 are more stringent than the rules of UN 1997;
- UNECE 1992 sets out more precise guidelines and advanced standards of conduct for prevention of transboundary impact, while in US 1997 guidance as to consequence of occurrence of no harm can be derived;
- In UNECE 1992 there is a special emphasis on the mandatory character of institutional cooperation between co-riparians, while UN 1997 only provides this as a recommendation.

iii. Espoo Convention

The Convention on Environmental Impact Assessment (EIA) in a transboundary Context[55] (Espoo Convention) was adopted in 1991 and entered into force on 10 September 1997. This regional treaty operates under the scope of the UNECE and sets out the obligations of parties to assess the environmental impact of certain activities at an early stage of planning. It lays down the general obligation of States to notify and consult each other on all major

[52]Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes. Helsinki, 17 March 1992. UN Treaty Series , vol. 1936.
[53]UNECE (n.d.).
[54]Tanzi 2000.
[55]Convention on Environmental Impact Assessment (EIA) in a Transboundary Context. Espoo, 25 Feb. 1991.

projects under consideration that are likely to have a significant adverse environmental impact across boundaries.[56]

The Espoo Convention provides a system considered as an international reference model regulating the EIA procedure in terms of transboundary risk, which is a very relevant topic particularly for transboundary hydropower development. Main provisions of the Espoo Convention include[57]:

- A list of activities or projects that are in any case subject to an EIA, as well as guiding criteria for all activities not included in the above mentioned list (Appendix I of the Convention);
- A set of minimum guidelines or policies to be followed regarding the EIA procedure, even though the importance of a State's own regulation needs to be taken into account (Appendix II of the Convention).
- Criteria aimed at determining the extent of the impact of certain activities on the environment (Appendix III of the Convention);
- Specific provisions on post-project analysis, such as monitoring and tracking how measures are enforced, the degree of compliance and overall effectiveness.

According to the Convention, these provisions result in a "duty to cooperate on transboundary issues", meaning that the State Party of origin must notify, "as early as possible", other affected States of any activities that are likely to have a transboundary impact. This procedure opens the way to conducting a transboundary EIA process, involving information exchange between the Parties in order to provide a sound basis for discussions on potential transboundary impacts of the proposed activity, including mitigation measures, zero option or non-project possibilities, and providing mutual assistance for reducing any type of harmful transboundary impacts.[58]

1.2.2 Other major sources of international law

Some other major sources of international law governing shared water are relevant in the case of transboundary hydropower development, as provisions included in these frameworks often need to be taken into account when building dams, mostly in terms of consequences on the environment. The most important that can be named here are[59]:

- The 1923 Convention on the Use of Hydraulic Resources[60];
- The Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar, Iran, 1971)[61];
- The 1992 Convention on Biological Diversity[62];
- Sources which, from a geographical point of view, have a more limited application because they are either linked to a particular region or to a particular water basin, such as: the 1995 and the 2000 Protocol on Shared Watercourse Systems in the Southern African Development Community (SADC), the Protocol on Water and Health to the 1999 Con-

[56]Convention on Environmental Impact Assessment (EIA) in a Transboundary Context. Espoo, 25 Feb. 1991.
[57]Aguilar/Iza 2011.
[58]Aguilar/Iza 2011: 92-94.
[59]Aguilar/Iza 2011.
[60]Convention relatingtothe development of hydraulic power affecting more than one state. Geneva, 9 December 1923. Adopted by the International Law Association in 1966.
[61] Convention on Wetlands of International Importance especially as Waterfowl Habitat. Ramsar (Iran), 2 February 1971. UN Treaty Series No. 14583.
[62]Convention on Biological Diversity.Rio de Janiero, 5 June 1992. UN Treaty Series vol. 1760.

vention on the Protection and Use of Transboundary Watercourses and International Lakes and the Directive 2000/60/EC of the European Parliament and Council ("EU Water Framework Directive"), establishing a community framework for action in the field of water policies.

1.2.3 Discussion of principles and their relevance for hydropower development

The following section outlines relevant principles guiding transboundary cooperation, derived from customary international water law, and international, regional and basin-level treaties.

Traditionally, five important principles guide transboundary water resources management:

- ***Reasonable and equitable utiliation of resources;***
- ***Not to cause significant harm;***
- ***Cooperation and information exchange;***
- ***Notification, consultation and negotiation;***
- ***Peaceful settlement of disputes.***

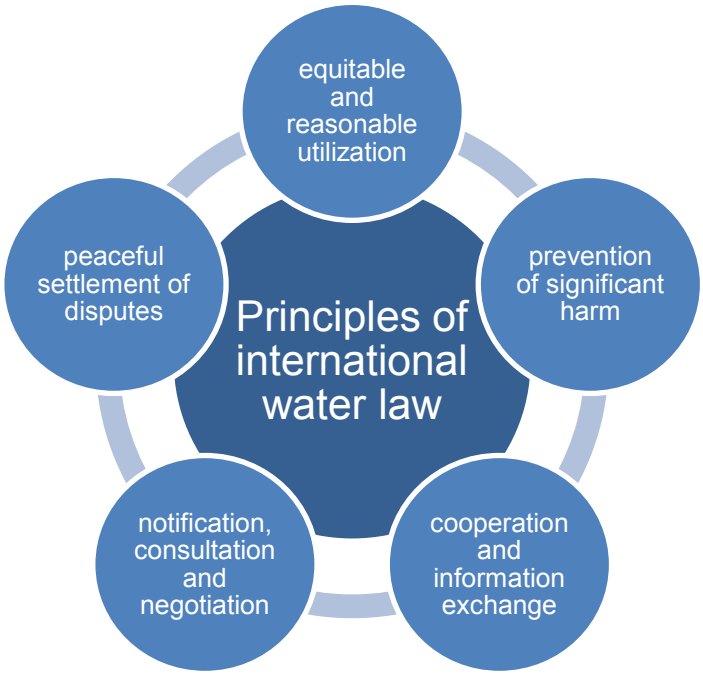


Figure 1-17 Principles of international water law

i. Equitable and reasonable utilisation of resources

"Watercourse States shall in their respective territories utilize an international watercourse in an equitable and reasonable manner. In particular, an international watercourse shall be used and developed by watercourse States with a view to attaining optimal and sustainable

utilization thereof and benefits therefrom, taking into account the interests of the watercourse States concerned, consistent with adequate protection of the watercourse."[63]

All riparian states have the right to enjoy the benefits of transboundary water resources. '*Equitable and reasonable use'* of transboundary water resources is an important principle to be taken into account in the case of transboundary hydropower development. This situation occurs when States who share a transboundary river decide, for instance, to increase their use of the shared water resources for the development of their economic activity, involving hydropower production. All relevant factors and circumstances must then be taken into account in order to assess whether the planned water uses of the involved States are both equitable and reasonable, including but not limited to: natural factors, social and economic needs, populations dependent on the watercourse, effects on other states, existing and potential uses, conservation of water resources, costs, and the availability of alternatives (Based on Article 6 of United Nations 1997: Watercourses Convention). Once the States have reached the conclusion that the existing or planned uses of the transboundary water resources are both equitable and reasonable, they can determine how to proceed on the actual transboundary hydropower development project.

ii. Not to cause significant harm

"Watercourse States shall, in utilizing an international watercourse in their territories, take all appropriate measures to prevent the causing of significant harm to other watercourse States."[64]

The *'no significant harm'* principle ensures states develop water resources in a manner that does not endanger the quality and quantity of the shared water resources that riparian states rely onto. In the case of transboundary hydropower development, States must bear in mind this principle as the construction of a new dam by an upstream State, for instance, may affect water resources and the related ecosystems. This can be harmful to downstream States that rely on these resources for basic human needs, such a drinking water or significant fisheries, in case no alternatives can be found for satisfying those needs in the downstream States.

iii. Cooperation and information exchange

"Watercourse States shall cooperate on the basis of sovereign equality, territorial integrity , mutual benefit and good faith in order to attain optimal utilization and adequate protection of an international watercourse."[65]

"Watercourse States shall on a regular basis exchange readily available data and information on the condition of the watercourse, in particular that of a hydrological, meteorologi-

[63]UN 1997: Watercourses Convention. Article 5(1). See also UN 1997: Watercourses Convention. Article 6; International Law Association 2004: Berlin Rules. Articles 12-15.
[64]UN 1997: Watercourses Convention. Article 7. See also UN 1992: Rio Declaration. Principle 2; International Law Association 2004: Berlin Rules. Article 16.
[65]UN 1997: Watercourses Convention. Article 8. See also United Nations 1992: Rio Declaration on Environment and Development. United Nations Conference on Environment and Development; International Law Association 2002: New Delhi Declaration of Principles of International Law Relating to Sustainable Development. 70th Conference of the International Law Association, Article 3; International Law Association 2004: Berlin Rules on Water Resources. Berlin Conference. Article 11.

cal, hydrogeological and ecological nature and related to the water quality as well as related forecasts."[66]

The sustainability of a transboundary watercourse cannot be guaranteed by one country alone. Since it connects the riparian countries, their economies and their ecosystems as one integrated unit, it is ultimately only through inclusive basin-wide *'cooperation'* that sustainability can be achieved. This principle therefore implies the need for countries to coordinate and jointly formulate and adopt common policies, approaches and strategies that guide the management and development of the shared water resources, particularly when it comes to transboundary hydropower development. The principle of cooperation seems particularly important then, as the planned uses of shared water resources involving hydropower development may often lead to conflicts of uses between riparian States. The involved States need to enter consultations and to aim for a certain degree of cooperation in order to achieve a sustainable and equitable use of the water resources. The timely provision and *'exchange of data and other information'* is a fundamental aspect related to cooperation in order to achieve effective and knowledge-based transboundary management and development of shared water resources.

iv. Notification, consultation and negotiation

"Before a watercourse State implements or permits the implementation of planned measures which may have a significant adverse effect upon other watercourse States, it shall provide those States with timely notification thereof. Such notification shall be accompanied by available technical data and information, including the results of any environmental impact assessment, in order to enable the notified States to evaluate the possible effects of the planned measures."[67]

Every riparian State shall receive prior notice, be consulted and have the opportunity to negotiate in situations in which the proposed use or activities affecting the condition of water resources by another riparian may cause serious harm to its rights or interests. The principle of *'notification, consultation and negotiation'* is particularly relevant in the case of hydropower development as such activities are very likely to affect the water resources shared by riparian States in terms of quality and quantity. Bearing in mind this principle will enable to assess the consequences of the planned hydropower development activities on the shared water resources and if necessary, to come to an acceptable arrangement with the riparian States, involving e.g. payment of compensation for the use of water in excess of the equitable share.

v. Peaceful settlement of disputes

"In the event of a dispute between two or more parties […] the parties concerned shall, in the absence of an applicable agreement between them, seek a settlement of the dispute by peaceful means."[68]

As a basic obligation under the UN Charter, disputing states are obliged to seek a *'peaceful settlement'* by negotiation, enquiry, mediation, conciliation, arbitration, judicial settlement, or other means of their choice. As far as transboundary hydropower development is concerned,

---

[66] UN 1997: Watercourses Convention. Article 9.
[67] UN 1997: Watercourses Convention. Article 12. See also UN 1992: Rio Declaration. Principle 19; International Law Association 2004: Berlin Rules. Article 57.
[68] UN 1997: Watercourses Convention. Article 33. See also UN 1945: UN Charter. Article 33; United Nation 1992: Rio Declaration. Principle 26; International Law Association 2004: Berlin Rules. Article 72.

disputes may occur in case of conflicts of uses of shared water resources related to non-equitable, non-reasonable or even harmful use of water resources. The unwillingness, for instance, to amend the planned increased use of water resources related to the increase of hydropower production or to enter into negotiations about it constitutes a breach of international legal obligations; however, States should seek a peaceful settlement of such disputes.

General principles and rules of international law have a guiding function for riparian States. However, cooperative management of international river basins is best ensured and implemented though agreements between the riparian states themselves. In these agreements, the States apply and adjust the general principles and rules to the specific characteristics of the basin (UNEP DDP 2007: 131f.). The relevance of agreements in the framework of a river basin will be further discussed in session 3 on river basin organisations.

1.2.4 Snapshot on current discussions: the concept of 'justice' in transboundary water interaction

Analysis of topics related to transboundary water management and planning, among which hydropower development is the major focus in this training manual, must consider the concept of 'justice' alongside the role of soft power, sanctioned discourse, power asymmetry, and coercive cooperation. In the current literature, 'water justice' explores how disadvantaged groups may face greater exposure to water pollution, how justice is enshrined in legal policy statements and how these statements are or are not effectively translated on the ground.[69]

It is stated in the Proceedings of the HH6 Workshop that: *"Equity and fairness are at the very heart of the Dublin Principles, IWRM, many developing notions of 'water security', International Water Law, and multiple transboundary treaties – or so it is claimed. The reality in many transboundary basins and aquifers is very different: power asymmetries allow steering of the outcome, whenever there are trade-offs made. When expectations about what is achievable and what is fair are set, social equity typically loses out, against economic efficiency and – possibly – environmental sustainability."*[70]

When investigating more particularly what 'justice' might bring to Article 6 of the UN Watercourses Convention, experts came to the conclusion that even though seven factors were originally chosen to help states determine what 'equitable and reasonable use' means, justice or equity were not successfully brought about in transboundary water interactions. The reason is that different conceptions of justice are included in the principle of 'equitable and reasonable use'. Being prioritised differently by different actors, they suggest very different – and often contradictory – visions of just outcomes. Given this, a possibility that might be explored is 'justimetrics', consisting in creating a justice assessment model rather than a legal assessment model for analysing shared water resources distribution.[71]

Pandal basin exercises(see fictitious case in Annex IV)

[69]UEA Water Security Research Centre:chapter 1.
[70]UEA Water Security Research Centre: 15.
[71]UEA Water Security Research Centre: chapters 3, 6.

1.2 Exercise 1 (Principles): The facilitator should ask the simulation country leaders to come up with a "worst basin future." What would the Pandal basin be like if it neglected the international water law principles? What would the basin look like 20 years from now without these principles and norms in place? The facilitator should capture participant ideas on a flipchart. Then, the facilitator should ask the country representatives to describe a Pandal basin that applies the principles and norms of international water law. What might the basin look like 20 years from now with these norms in place? Some country representatives may feel their interests are threatened by these principles. Ask all participants which picture/which future (without principles or with principles) has better outcomes for their country, and which has better outcomes for the basin as a whole. Debrief.

1.2. Exercise 2 (Justice): Ask the country representatives to discuss the political/cultural/ethnic composition of the basin. What people(s) are most directly impacted by basin management decisions and/or the impacts of climate change? If the representatives wanted to form a focus group to discuss river issues, who all would need to be represented? Whose voices are not currently at the table? What subsets of the population are frequently overlooked? What knowledge and other resources do those people(s) offer? What benefits might come from including them? The facilitator should keep track of groups mentioned and what they offer to the discussion. Then, the facilitator should ask the group to brainstorm potential ways to reach/include these groups and how to capitalize on the knowledge/benefits those groups would bring to the table. If countries bring up risks or negative aspects of including certain groups, ask them to brainstorm ways to mitigate those risks. Debrief.

Discussion topics	• Discuss possible conflicts that might arise between different principles of international customary water law when it comes to transboundary hydropower development.
Exercises	• Scenario using the Watercourses scope diagram[72]: Which principles of international customary water law apply here?
	• The UN Watercourses Convention has not yet entered into force. Why is it nevertheless important for transboundary hydropower development?
Additional reading and resources	Sadoff, Claudia et al. 2008: Share - Managing Water Across Boundaries. Gland: IUCN, chapter 4. Online: http://data.iucn.org/dbtw-wpd/edocs/2008-016.pdf.
	UNECE 1991: Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention). Online: http://www.unece.org/env/eia/about/eia_text.html.
	UNECE 1992: Convention on the Protection and Use of Transboundary Watercourses and International Lakes. Online: http://www.unece.org/env/water/text/text.html.

[72] Rieu-Clarke et al. 2012: 70.

	Tanzi, Attila 2000: The Relationship between the 1992 UNECE Convention on the Protection and Use of Transboundary Watercourses andInternational Lakes and the 1997 UN Convention on the Law of the Non Navigational Uses of International Watercourses. Report of the UNECE Task Force on Legal and Administrative Aspects. Geneva. Online: http://www.unece.org/fileadmin/DAM/env/water/publications/documents/conventiontotal.pdf.
	UN 1997: Convention on the Law of the Non-navigational uses of International Watercourses. Online: http://untreaty.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf.
	UN Watercourses Convention Online User's Guide. http://www.unwatercoursesconvention.org/ - Website on the UN Watercourses Convention containing fact sheets, video material and various other resources.

1.3 Introduction to transboundary hydropower development in the Mekong

Purpose	The purpose of this sub-session is to develop a first understanding of hydropower development in the Mekong region. This part of the manual brings up key issues, introduces the most important actors and provides an introduction into the provisions for transboundary hydropower development in the framework of the MRC.
Objectives	By the end of this sub-session, the trainee will: • Have an overview on the key benefits and challenges of hydropower development in the Mekong • Know the most important actors and their interests and positions • Understand the general framework for hydropower development of the MRC
Preparatory reading	MRC 2010c: Strategic Plan 2011-2015. Vientiane: MRC.
	Hirsch, Philip / Jensen, Kurt Mørck (eds.) 2006: National interests and transboundary water governance in the Mekong, Sydney: Australian Mekong Resource Centre / Danish International Development Assistance / The University of Sydney.
	Backer, Ellen B. (2007), "The Mekong River Commission: Does It Work, and How Does the Mekong Basin's Geography Influence Its Effectiveness?", Südostasien aktuell 4: 31–55.
	Browder, Greg and Leonard Ortolano (2000), "The Evolution of an International Water Resources Management Regime in the Mekong River Basin", Natural Resources Journal 40(3): 499–531.

The Mekong is the twelfth longest river in the world and the tenth largest in terms of discharge (approximately 475,000 MCM/year). The basin stretches over a land area of 795,000 square kilometres, thus making it the 21st largest basin worldwide. From Yunnan Province in China down to the delta in Vietnam, the Mekong river basin stretches over varied and dynamic landscapes. From the Tibetan Plateau, the river runs through Burma, Thailand, Lao PDR and Cambodia before flowing through southern Vietnam into the South China Sea.[73]

1.3.1 Benefits and challenges of hydropower development in the Mekong

Over the past decades, the Mekong region experienced high rates of economic growth accompanied by large increases in energy demand. From 1993 to 2005, economic growth and energy demand both increased at an average annual rate of about eight per cent.[74] This raises the question of how to feed the increasing need for energy in the region. Hydropower development is very appealing because it gives the impression of providing free and sus-

[73] Hirsch / Jensen 2006.
[74] MRC 2010a: 206.

tainable energy and also because the construction of large dams seems to symbolise "modernity and progress"[75]. Moreover, hydropower can help to serve the rapidly increasing demand for energy in the riparian countries and provides an alternative to the dependency on fossil fuels. The total hydropower potential for feasible projects in the Mekong system is estimated to amount to 53.000 MW.[76] Table 1-1 illustrates the status of hydropower development in the Mekong basin.

Hydropower development also has a large economic potential. Significant revenue benefits can be expected from electricity exports. There is also a rising importance of regional trade and investment flows, mainly coming from China, Malaysia, Thailand and Vietnam. Hydropower development can thus help to promote further economic development and welfare in the region.

However, the development of hydropower in the Mekong bears substantial risks. The construction of large dams may have adverse impacts on fisheries, agriculture or the tourism sector, to name just a few. Hydropower development can involve negative consequences not only for ecosystems and for the livelihoods of major parts of the populations but also for the overall socioeconomic (and hence political) development of riparian states and the entire region. The adverse effects of hydropower development can have implications at local scale but also at basin scale. Therefore, it is important to pay attention to sustainable hydropower development. The large number of planned and proposed hydropower projects underlines the importance to create further expertise and knowledge on this topic in the region. The primary challenge in sustainable hydropower development in the Mekong basin is to reconcile conflicts between sectoral water use strategies, between local livelihoods and national development objectives, and between the riparian states with regard to their national water use objectives.

	In operation		Under construction	Planned
Country	Capacity [MW]	Actual generation in 2008 [GWh]	Capacity [MW]	Capacity [MW]
Cambodia	12	55	193	704-1.194
China	171.000	580.000	80.000	49.000-65.000
Laos	673	3.777	2.655	2.706-13.406
Myanmar	1.541	3.866	1.600	12.710-32.000
Thailand	3.481	7.113		0
Vietnam	5.500	24.000	7.534	14.066

Table 1-2 Hydropower in the Mekong basin: Status of development at end-2008[77]

1.3.2 The riparian states and their positions on hydropower development

In the Chinese Yunnan Province, the basin landscape contains gorges and rapid drops in altitude. Therefore, hydropower development is considered to be the ideal use of the Me-

[75]Phillips et al 2006: 109.
[76]MRC 2003.
[77]Data Source: World Energy Council 2010b.

kong waters in this area. China is in the process of building a cascade of eight dams on the upper Mekong. Four of these dams are already operational. The water resources in Myanmar and northern Laos are mainly used for irrigation purposes both to sustain subsistence livelihoods and to support more advanced agricultural uses. In Laos, the Mekong and its tributaries also present a significant hydropower potential with hydropower export constituting an important income for the country's economy.[78] In Cambodia, one of the primary uses of the Mekong is fishing. Fisheries in this area are not only essential for the subsistence livelihoods of communities living near the river but also for Cambodia's economy. The Mekong delta in Vietnam is characterised by a dense population and ecological sensitivity. The water resources are mainly used for irrigation purposes, with the area responsible for generating more than half of the country's annual rice production.[79]

Thailand's interest lies in irrigating the northeast to diversify economic development away from Bangkok. Strict rules on water abstraction are perceived to hinder the Thai government to reach this aim. Thailand instead prefers a loose consultative mechanism. Thailand has also long favoured the upstream Chinese dams as these would allow it to divert additional water that is released from the Chinese reservoirs without building dams in Thailand itself. The domestic opposition to large dams in Thailand is such that the Thai government prefers to support dams in Laos and Thailand to meet its energy and irrigation goals.

The Lao government sees hydropower as a key revenue source and welcomes Thai, Chinese and Vietnamese investment into its hydropower sector. So far the largest and most controversial dam has been the Nam Theun 2 Dam, jointly financed by the World Bank and the Asian Development Bank. Now Laos' construction of Xayaburi, funded by Thai banks, has been attracting international criticism. For a more in depth analysis of Xayaburi see Sections 3.3 and 4.3 in this manual.

Vietnam also sees hydropower as a solution to its energy problems. It is actively building dams in Vietnam as well as in Laos. The Vietnamese position is particularly interesting, as Vietnam is downstream on the Mekong, but upstream on some of its tributaries. For example. Vietnam is developing hydropower stations on the Sesan and Srepok rivers, both Mekong tributaries flowing from Vietnam to Cambodia. This has provoked anger from Phnom Penh and downstream fishing communities in Cambodia because of the resultant decline of fish catch and water flow. However, Vietnam is critical of Chinese dams and holds them partly responsible for the increasing salinisation of the Mekong delta, where roughly 50 per cent of Vietnam's annual rice crop is produced. This is also why Vietnam has been open in its criticism about Laos' construction of the Xayaburi Dam. Vietnam has traditionally been in favour of a strong legal regime governing Mekong hydropower and has therefore been in direct contradiction to the Thai position.

Cambodia meanwhile is concerned about the Tonle Sap Lake, the key source of Cambodia's animal protein. Similar to Vietnam, the Cambodian government has been highly critical of the Xayaburi Dam. Concerns also exist about the Chinese dams, but these have not been voiced openly given the strong influence that China has gained in Cambodia since the late 1990s.

The consequence is that Mekong hydropower is subject to variegated national interests. While all countries view the Mekong River and its tributaries as a source of energy and com-

[78] Hirsch / Jensen 2006.
[79] Hirsch / Jensen 2006.

panies are busy investing in hydropower dams, the geographical position of the country in the river basin determines the attitude towards dams, especially on the Mekong mainstream.

Figure 1-18 Hydropower projects in the Lower Mekong basin[80]

[80]MRC 2009.

Outside of China, the Mekong River had been undammed until Laos began construction of the Xayaburi Dam. As of November 2011, of the eleven dams planned on the Lower Mekong mainstream only Xayaburi is under construction (for details on Xayaburi see sub-sessions 3.3 and 4.3 in this manual). However, in September 2013 the Lao government notified the MRC of its intention to build Don Sahong. Project developer is the Malaysian company Mega First. As with Xayaburi before, Laos claims that the dam will have no effects on the downstream in Cambodia and Vietnam. Cambodia and Vietnam have opposed both the Xayaburi Dam and the Don Sahong plans, arguing that the Lao government has not conducted in depth studies on the effects and is ignoring downstream concerns as well as concerns of international experts on the environmental effects that both Xayaburi and Don Sahong could have on the downstream countries

1.3.3 Regional players and actors

As discussed earlier, the network of actors in a river basin is becoming increasingly complex. This affects the management of collective action problems, such as sustainable hydropower development, on the regional/basin level. Riparian countries are parties to various regional organisations. The most important one is the Greater Mekong Subregion (GMS). Initiated by the ADB in 1992, the GMS is enthusiastically supported by China. The GMS aims at the cross-border economic integration of countries in the Mekong basin, for example through the construction of roads, rails and airports, transhipment centres, ease of border controls, and an integrated power grid that includes thermal and hydropower stations as its backbone[81].

The GMS is driven by regional countries. In contrast, the MRC has to date been largely driven by donor countries. This is evident in the different agendas that both organisations pursue: the IWRM mandate of the MRC focuses on the development of the Mekong's water resources and reflects the sustainability discourse of the developed North. The GMS is underpinned by the paradigm of fast-track economic development, which reflects the needs of regional countries that had emerged from the Cambodian conflict in 1991 only. As a consequence, the MRC has for some time been questioned regarding its viability vis-à-vis the dominant GMS. A refocusing of the MRC on economic development, by relaunching plans for hydropower under the former CEO Oliver Cogels, returned some viability to the MRC.[82]

Amongst the other relevant regional organisations is the Japan-driven Forum for the Comprehensive Development of Indochina (FCDI), which is partly designed to maintain Japanese influence in the region through the mobilisation of Japanese development finance. ASEAN, as wider regional organisation, plays only a minor role. The ASEAN-Mekong Basin Cooperation Programme has been lacking in finance since the Asian Financial Crisis in 1997.

It must be noted that despite the number of inter-governmental organisations, hydropower in the Mekong region is driven by private regional firms (especially Thai firms) and the large state-owned firms of China and Vietnam. The latter, however, operate largely on a commercial basis, seeking international market expansion.[83]

Key NGOs include the river-based NGOs Save the Mekong Coalition[84] and the 3S Rivers Protection Network (3SPN)[85]. A more generalist NGO is the WWF with its Greater Mekong

[81]For details see the GMS webpages at the ADB: http://www.adb.org/countries/gms/main
[82]Hensengerth 2009: 326-349. World Bank / ADB 2006.
[83]For details on the Chinese state owned enterprises see for example Downs2006. Chen 2011.
[84]www.savethemekong.org
[85]www.3spn.org

Programme[86]. The WWF has offices in Kunming[87] as well as in Laos, Thailand, Cambodia and Vietnam and is therefore able to evaluate the development of the Upper and Lower Mekong River.

The WWF also played a key role in establishing the Hydropower Sustainability Assessment Forum together with the International Hydropower Association in order to overhaul the International Hydropower Association's Hydropower Sustainability Assessment Protocol. The application of the Protocol to the context of transboundary rivers is problematic, however, not least due to the resistance by China to negotiate over its transboundary HYDROPOWER projects on the Lancang (Upper Mekong) and the Nu (Irrawaddy). The draft Protocol was trialed in China on domestic river projects. In the Mekong basin, however, the draft protocol was trialed in the 3S basin[88]. However, given that basin countries adhere largely to the absolute sovereignty principle regarding the development of water resources, the Protocol is primarily a tool to evaluate domestic hydropower projects.

Furthermore, a network of scientific organisations and NGOs across the countries in the Mekong River system – the M-Power Network[89] – has conducted extensive research on the development of the Mekong basin.

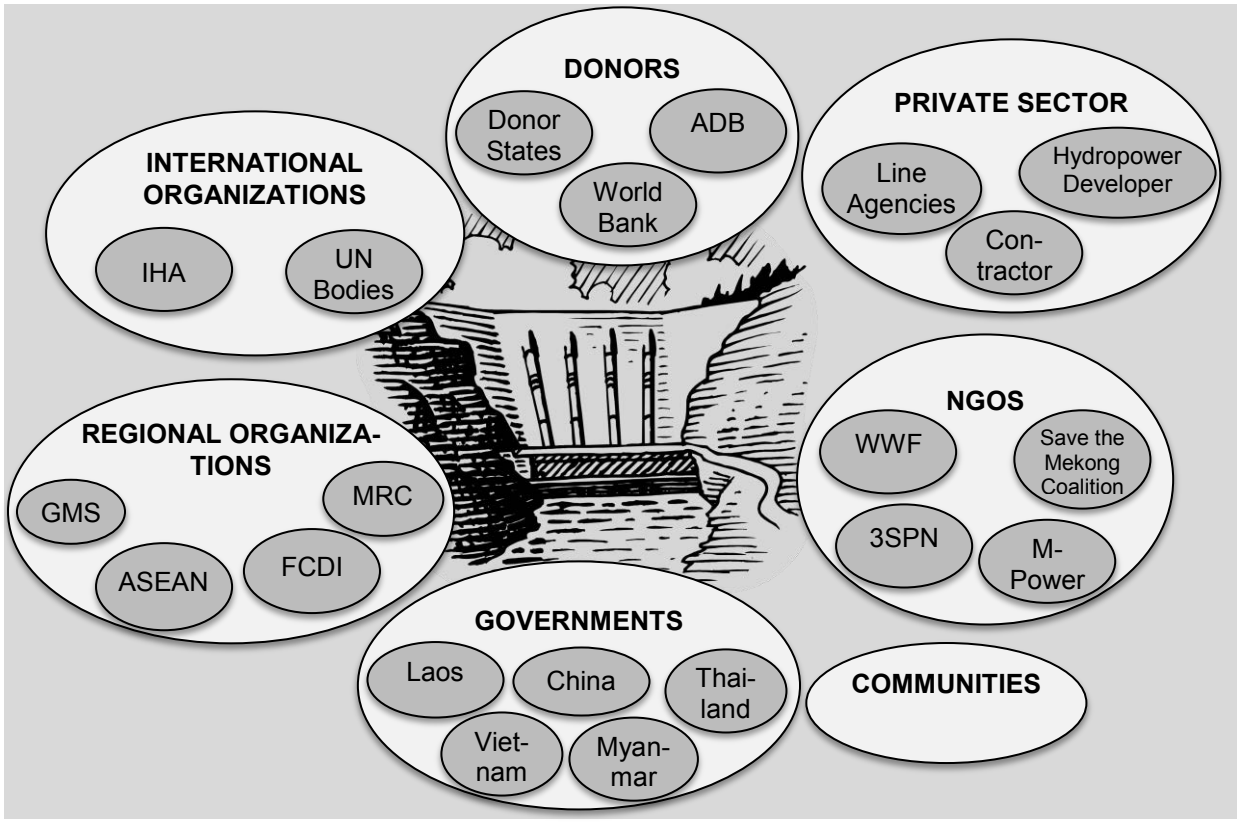


Figure 1-19 Relevant actors for transboundary hydropower development in the Mekong basin

[86] wwf.panda.org/what_we_do/where_we_work/greatermekong
[87] http://en.wwfchina.org/en/who_we_are/where_we_work/kunming_office
[88] Hydropower Sustainability Assessment Forum 2010.
[89] www.mpowernetwork.org

1.3.4 Hydropower development within the framework of the MRC[90]

i. The Initiative on Sustainable Hydropower

Hydropower development in the Mekong area is gaining momentum, with the rapidity of these developments being focused upon in connection with the MRC's implementation of the 1995 Mekong Agreement, as a part of regional efforts to prepare for the MRC Strategic Plan (2011 – 2015). The Initiative on Sustainable Hydropower (ISH) noted that the challenges faced in relation to hydropower development in the LMB require an integrated approach to hydropower sustainability. The four main outcomes of the ISH are a direct response to the objectives of the MRC Strategic Plan (2011 – 2015):

- Outcome 1: Combining the use of awareness raising and multi-stakeholder dialogue.
- Outcome 2: Knowledge management and capacity building.
- Outcome 3: Imbedding sustainable hydropower considerations in regional planning and regulatory systems.
- Outcome 4: Sustainability assessment and adoption of good practice.

It can be seen that a key objective of the ISH from 2011 - 2015 is to assist the MRC in aiding member countries to improve the integration of decisions about hydropower management and development, with basin-wide integrated water resource management (IWRM) perspectives, by means of recognized MRC mechanisms and national planning systems. Not only are these in line with the 1995 Mekong Agreement, they have led to the *NSHD-M*, which aims to support each of the four outcomes listed above.

ii. The Integrated Water Resources Development-based Basin Development Strategy

The Integrated Water Resources Development (IWRD)-based Basin Development Strategy provides initial directions for cooperative and sustainable Lower Mekong Basin development and management. The strategy is:

- The Mekong River Commission's central tool for the achievement of the objective of the 1995 Agreement for the Cooperation for the Sustainable Development of the Mekong River Basin Agreement in Article 1: 'to cooperate in all fields of sustainable development, utilization, management and conservation of the water and related resources of the Mekong river basin'.
- The MRC's primary response to Article 2, which calls for 'the formulation of a basin development plan to identify, categorize and prioritize the projects and programs'.

The strategy defines an agreed 'rolling' basin development planning process that connects regional LMB plans, made possible through transboundary cooperation, with national LMB plans. The strategy is subject to review and updating by the MRC every five years.

The LMB and the Mekong River are undergoing significant change. Economic growth and poverty reduction in the LMB require development of water resources for multiple purposes, including power, agriculture, fisheries production and navigation. They also require the management of the river and its life- and livelihood-giving ecosystems, for long-term sustainability in times of change, including demographic, economic and climate change. Developments in the Lancang-Upper Mekong basin in China and in the LMB are now changing the Me-

[90] This chapter is based on GIZ 2013a.

kong's flow regime. To meet growing demand for goods and services, the private sector is actively seeking investment opportunities, which the river can provide. The strategy is an essential and enabling response to this reality.

There are many LMB development opportunities that could bring significant benefits at national and, through cooperation, at regional levels. These opportunities also entail significant risks and costs, which must be managed and mitigated, both at the national level, and where relevant, through cooperation at transboundary level. The strategy identifies the following opportunities and risks:

- Considerable potential for further hydropower development in the tributaries of the Mekong River, particularly in Laos and Cambodia, requiring sound social and environmental standards to ensure sustainability.
- Major potential to expand and intensify irrigated agricultural production and to combat delta saline intrusion, subject to cooperation with China in the operation of the Lancang - Upper Mekong hydropower dams, to ensure increased, regulated and reliable dry season flows.
- Potential opportunity for main stem hydropower development, provided that the many uncertainties and risks are fully addressed and transboundary approval processes followed. While potential benefits are high, so are potential costs, including transboundary impacts.
- The need to define other priority water-related opportunities (for example, fisheries, navigation, flood management, tourism, and environment and ecosystem management), as well as those that go beyond the water sector (for example, other power generation options).

iii. The Strategy on Basin Development

The strategy defines a process to move from opportunities to implementation and sustainable development, including the definition of *Strategic Priorities for basin development*:

- Essential knowledge acquired to address uncertainty and minimize risks of identified development opportunities, including knowledge on migration and adaptation of fish; trapping and transport of sediments and nutrients; loss of biodiversity; and social and livelihoods impacts.
- Opportunities and risks of current developments (to 2015), including: cooperation with China to ensure increased low flows; LMB mainstream baseline low-flow agreements, and the management of risks arising from projects already committed.
- Options identified for sharing development benefits and risks.
- The expansion and intensification of irrigated agriculture for food security and poverty alleviation.
- Environmental and social sustainability of hydropower development greatly enhanced.
- Climate change adaptation options identified and implementation initiated.
- Basin planning considerations integrated into national planning and regulatory systems.

iv. The Strategy on Basin Management

The Strategy defines Strategic Priorities for basin management, an essential companion to basin development to ensure sustainability, as follows:

- Rigorous basin-wide 'environmental and social objectives' and 'baseline indicators' need to be defined.
- Clearly defined basin objectives and management strategies for water-related sectors, including fisheries and navigation, must be set.
- National-level basic water resources management processes must be strengthened, including water resources monitoring, water use licensing, and data and information management.
- Basin-level water resources and related management processes must be strengthened, including the implementation of MRC procedures, state of basin monitoring and reporting, project cycle monitoring, and enhancing stakeholder participation.
- Water resources management capacity building program must be implemented, linked to MRC's overall initiatives and complementary to national capacity building activities.

v. Implementation of the Strategy

The strategy defines a clear road map setting out priority actions, timeframes and outcomes. An early action in the road map is the preparation of LMB Regional and National Action Plans, defining activities, responsibilities, deliverables and costs. The preparation of the Regional Action Plan will be led by the MRC and implemented through the MRC Strategic Plan 2011-2015. The National Action Plans will be integrated, to the extent possible, within national long- and short-term economic and sector plans, and implemented as a core priority. A comprehensive monitoring programme of strategy activities and outcomes will be developed during the first three months of implementation.

vi. Status of the Strategy

The strategy is a product of the MRC Member Countries of Cambodia, Laos, Thailand and Vietnam, and will be implemented by them with the support and facilitation of the MRC and the financial support of their key development partners. Active and transparent involvement of all Mekong stakeholders is required so that the ambitious goals for the cooperative and sustainable management and development of the LMB are achieved, for the shared benefit of all the LMB population, particularly the poor and needy.

Discussion topics	• How is international law relevant for the Mekong Basin? • What does sustainability mean with respect to hydropower development in the Mekong Basin?
Exercises	• Small group work: Is the concept of justice realised in the Mekong Basin? Find cases (domestic or transboundary) where you see justice realised or violated by drawing up a short presentation of the case: what are the issues? Who are the involved actors, their interests and strategies? Then with reference to international law, make a case for why justice is realised or not realised.
Additional reading and resources	Hensengerth, Oliver (2008), "Vietnam's Security Cooperation in Mekong Basin Governance", Journal of Vietnamese Studies 3(2): 101–27.
	Browder, Greg (2000), "An Analysis of the Negotiations for the 1995 Mekong Agreement", International Negotiation 5(2): 237–61.

	Osborne, Milton (2000), The Mekong: Turbulent Past, Uncertain Future (St Leonards, Australia: Allen and Unwin).
	Osborne, Milton (2006), The Paramount Power: China and the Countries of Southeast Asia (Sydney: Lowy Institute for International Policy).

2 THE BENEFITS AND CHALLENGES OF COOPERATION IN TRANSBOUNDARY HYDROPOWER DEVELOPMENT

Session2: 1 The benefits and challenges of cooperation in transboundary hydropower development	
Sub-Session	**Key questions**
I. Benefits and challenges	• What are the benefits of cooperative approaches? • Which potential risks and impacts come along with hydropower projects? • How can the environmental and social impacts be avoided and mitigated?
II. Transboundary benefit sharing mechanisms	• How do national and transboundary mechanisms of benefit sharing work? • Which categories of benefit sharing mechanisms exist? • How is benefit sharing organized in different transboundary river basins worldwide? • Which international standards guide benefit sharing?
III. Transboundary benefit sharing in the framework of the MRC	• How do the regulations in the Mekong basin provide a basis for transboundary benefit sharing mechanisms? • What are examples for benefit sharing in the Mekong basin?

2.1 Benefits and challenges of cooperation

Purpose	This sub-session focuses on benefits of cooperative approaches through joint protection, management and development of water resources. It provides insights on potential risks and impacts of hydropower projects for riparian countries and the comparative advantages of joint management. For a broader discussion of cooperation see Section 5.1.
Objectives	By the end of the sub-session, the trainee will: • Be aware of the advantages and challenges of transboundary hydropower development (international and national) • Know and be able to apply relevant assessment frameworks
Readings	SADC Concept Paper on Benefit Sharing and Transboundary Water Management and Development
	Hensengerth, Oliver/Dombrowsky, Ines/Scheumann, Waltina 2012: Benefit-Sharing in Dam Projects on Shared Rivers. Discussion Paper. Bonn: Deutsches Institut für Entwicklungspolitik. Online: http://www.die-gdi.de/CMS-Homepage/openwebcms3.nsf/(ynDK_contentByKey)/ANES-8TPKLU/$FILE/DP%206.2012.pdf.
	MRC 2011: Knowledge base on benefit sharing, Volume 1 of 5, pp. 10-30. Online: http://www.mrcmekong.org/assets/Publications/Manuals-and-Toolkits/knowledge-base-benefit-sharing-vol1-of-5-Jan-2012.pdf.

2.1.1 Patterns on international rivers

In general, a pattern has emerged relating to development and international waters as follows: riparians of an international basin implement water development projects unilaterally first on water within their territory, in attempts to avoid the political intricacies of the shared resource. At some point, as impacts and change within the basin start to drift across the border, one of the riparians, generally the regional power, will implement a project which impacts at least one of its neighbours. This might be to continue to meet existing uses in the face of decreasing relative water availability, as for example Egypt's early plans for a high dam on the Nile, or Indian diversions of the Ganges to protect the port of Calcutta, or to meet new needs reflecting new agricultural policy, such as Turkey's GAP project on the Euphrates.

This project which impacts one's neighbours can, in the absence of relations or institutions conducive to conflict resolution, become a flashpoint, heightening tensions and regional instability.

Despite their complexity, water disputes do get resolved, and the resulting institutions can be very resilient, even among bitter enemies who are fighting over other issues. The resultant treaties and management bodies have often survived subsequent hostilities. The challenge for riparians and the international community is to get ahead of the “crisis curve,” to facilitate

institutional capacity and cooperation in advance of costly, time-consuming crises which, in turn, exacerbate poverty, threaten lives, regional stability and ecosystems. One successful approach has been to help riparians shift focus away from allocating fixed quantities of water, to the overall gains of allocating the benefits of cooperative water resources management.

2.1.2 Benefits, costs, and risks of hydropower

The benefits of cooperation may seem intuitive in an international basin and, if one assesses the potential benefits of cooperative development across international boundaries purely from a quantitative economic perspective, greater scale generally leads to larger potential benefits. For example, infrastructure managed collaboratively or in a coordinated manner can benefit downstream agriculture and ecosystem management. Linking broad-scale assessments of power, agriculture, and transportation networks allow each to be optimised to the benefit of the other. As discussed earlier in Chapter 2 of this manual, Sadoff and Grey suggested four categories of benefits of international water cooperation: benefits to the river, from the river, because of the river and, importantly, beyond the river.[91] This last point is especially important for the question of scale, as the “baskets of benefits” can be enhanced and grown as sectors beyond but related to water are added to the mix.

So, if greater cooperation enhances benefits and makes so much sense, it begs the question, why is there not more of it? Feitelson and Haddad pointed out that, while greater integration of scope and authority may bring greater efficiency, but it also brings greater potential for disagreements, greater infringement on sovereignty, and greater transaction costs.[92] Furthermore, Zeitoun and Mirumachi suggest that focusing on cooperation can encourage, cement, and reinforce power imbalances and injustice between riparians, which may lead less powerful riparian states to a dilemma between an imbalanced cooperative agreement with some accompanying benefits or no agreement, no accompanying benefits, but the flexibility to pursue more-just power dynamics.[93] Zeitoun and Mirumachi also explain that transboundary cooperation overlooks the needs and values of those groups and stakeholders (e.g. states, ethnic minorities, etc.) that not represented in decision-making.

One 166 of the world’s 276 international basins have no treaty provisions coverage whatsoever.[94] Moreover, only one-third of multilateral basins are entirely covered by treaty provisions, and most of those are bilateral[95] rather than multilateral- precluding the integrated basin management advocated by water policy experts.

It is clear from this global experience, and also for the Mekong countries, that the economic benefits of potential cooperation to be gained by countries as a whole are evaluated by decision-makers against the very real political risks of entering into cooperative agreements. This understanding recognizes that countries are not monolithic entities that make foreign policy decisions based solely on economic rationality, but rather are composed of a very diverse population of individuals who reflect a cornucopia of needs and values. Moreover, policy makers make these decisions at very specific points in time based on a host of external and internal considerations, most of which have nothing at all to do with the issue at hand.

[91] Sadoff and Grey 2003
[92] Feitelson and Haddad 1998
[93] Zeitoun and Mirumachi 2008
[94] TFDD 2011
[95] TFDD 2011

To weigh the economic costs and benefits against the policy risks and opportunities of potential cooperation, Subramanian et al. developed a framework, in which the former sets of considerations (economic) are represented along the X-axis and the latter (policy) along the Y-axis (see Figure 5-3, introduced in Chapter 2.1.2).[96]

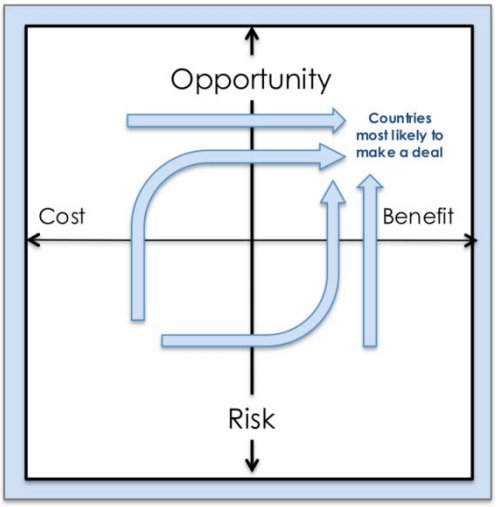


Figure 2-1 Framework for examining Costs and Benefits, Risks and Opportunities to Cooperation

Subramanian et al. describe the presence and importance of perceived economic benefits and costs, as well as five categories of risks, that influence cooperation over shared water.[97]The higher the benefits and opportunities relative to costs and risks, the greater the likelihood of sustained cooperation. Figure 5-3 illustrates how perceptions of risks and opportunities (y-axis) might influence country decisions over cooperation, and how risk reduction and opportunity enhancement (black arrows) might change those perceptions over time. The top-right quadrant depicts the balance of costs/benefits and risks/ opportunities most conducive to cooperation. The study posits that when risks are perceived as too high, appropriate risk reduction or opportunity enhancing actions may move countries to a point where they decide to cooperate. Action by countries or third parties moves countries upward on the (y) axis of the analytical framework. Risk reduction factors into cooperation decisions over water in that country or third party actions reduce the level of perceived risk, which increases the attractiveness of the cooperative offer at hand.

2.1.3 Why should countries cooperate on transboundary hydropower projects?

Cooperating in the planning and implementation of hydropower projects helps to make the most of the comparative advantage of the river basin, in order to achieve an efficient and optimal resource use, and given that hydropower generation potential and energy demand are geographically imbalanced.

Joint mechanisms implemented from the start of a cooperative hydropower project can help to prevent, mitigate and monitor adverse effects, such as the consequences on ecosystems integrity and diversity (aquatic, terrestrial, hydrological dynamics and sediment/nutrient

[96]Subramanian et al. 2012
[97]Subramanian et al. (2012

transport) and on social systems (because of the negative impacts on fisheries, agriculture and food security) and ensure that nonetheless emerging adverse effects (as well as gains) are shared in a fair and equal manner among the countries.

Whether or not these benefits and risks emerge depends on a number of factors: first, the proposed use of dams. Second, the geographical position of the dam in relation to the political border (hydro-political constellation). Third, mechanisms to avoid or mitigate environmental and social impacts:

First, proposed uses of dams and externalities, for example[98]:

- use for hydropower can exacerbate peak floods and droughts in downstream countries, change sedimentation regimes, and block fish passages
- use for irrigation and drinking water can exacerbate droughts in downstream countries, change sedimentation regimes, and block fish passages. However, it might regularize downstream flow regimes.
- use for flood control can help flood prevention in downstream countries and regularize flow regimes. However, it can change sedimentation regimes and block fish passages
- any multipurpose use can amplify the effects downstream.

Second, the geographical position of the dam in relation to the political border (hydro-political constellation). Hensengerth et al. identified four possible hydro-political constellations[99]:

- The dam is located in upstream state A and produces positive and/or negative externalities in downstream state B (e.g. Senegal River Manantali Dam, Lesotho Highlands Water Project).
- The dam is located in the downstream state close to the international border, which causes externalities in the upstream state in that it inundates land in the upstream state (e.g. Aswan High Dam).
- The dam is located where a river flows from state A to state B (e.g. friendship dams on the Turkish-Syrian border).
- The dam is located on a border-forming river. Externalities will therefore affect both states (e.g. Itaipu Dam).

Third, the application of mechanisms to mitigate or avoid environmental and social risks:

- Mechanisms during project planning to foresee environmental impacts to address the question if the project should proceed, then during construction and operation mechanisms to monitor and mitigate environmental impacts: Strategic Environmental Assessments (SEA) / Environmental Impact Assessments (EIA), establishing environmental flow regimes, providing fish hatcheries/passes/ladders, aforestation measures for sedimentation control, etc.
- Mechanisms to monitor and mitigate social impacts: Social Impact Assessments (SIA), comprehensive resettlement programmes, grievance procedures, compensations for lost assets, creating new income opportunities, electrification and social infrastructure programmes, issuing of fishing rights, etc.

[98] Hensengerth et al. 2012.
[99] Hensengerth et al. 2012.

If well applied, transboundary hydropower cooperation can result in a number of benefits but also challenges as a result of this cooperation. Some of these are related directly to the water resource, but also go beyond the water resource. The following table is adapted from Sadoff and Grey's original article[100]:

		Benefits	Challenges
Benefits and challenges of cooperation directly related to the water resource	Ecology	Improved water quality, soil conservation, biodiversity and overall sustainability	Degraded water quality in watersheds, wetlands and biodiversity
	Economics and health	Improved water management for agriculture, hydropower, flood-drought management, navigation, environmental conservation, water quality and recreation	Increasing demands for water, sub-optimal water resources management and development
Benefits and challenges of cooperation beyond the water resource	Politics and economics	Policy shifts: from dispute/conflict to cooperation/development; from food and energy self-sufficiency to food and energy security; reduced risk of conflicts and military expenditure; integration of regional infrastructure, markets and trade	Tense regional relations and political economy impacts; regional fragmentation

Table 2-1 Benefits and challenges of cooperation[101]

There is no development without water – from human beings to a country's or a region's macro-economic development. All activity depends on water: from everyday personal hygiene to energy production and industrial manufacturing processes. While Table 2-1 suggests that some benefits – mostly those in the ecology category – apply to rivers, while other benefits apply to people, people's wellbeing depends on intact ecosystems. There cannot be a prioritisation of benefits. Both ecological and development benefits need to be considered at the same time. The concepts of Integrated Water Resources Management, and the more recent concept of the water-food-energy nexus, are tools that assist the simultaneous consideration of ecological and economic development benefits. These must be integrated into decision-making processes for the economic development of a river system.

[100] Sadoff /Grey 2002.
[101] Adapted from Sadoff /Grey 2002: Table 1.

Focusing more on social, economic and political aspects of cooperation (but also including environmental aspects), the Southern African Development Community (SADC) has developed a Benefit Wheel:

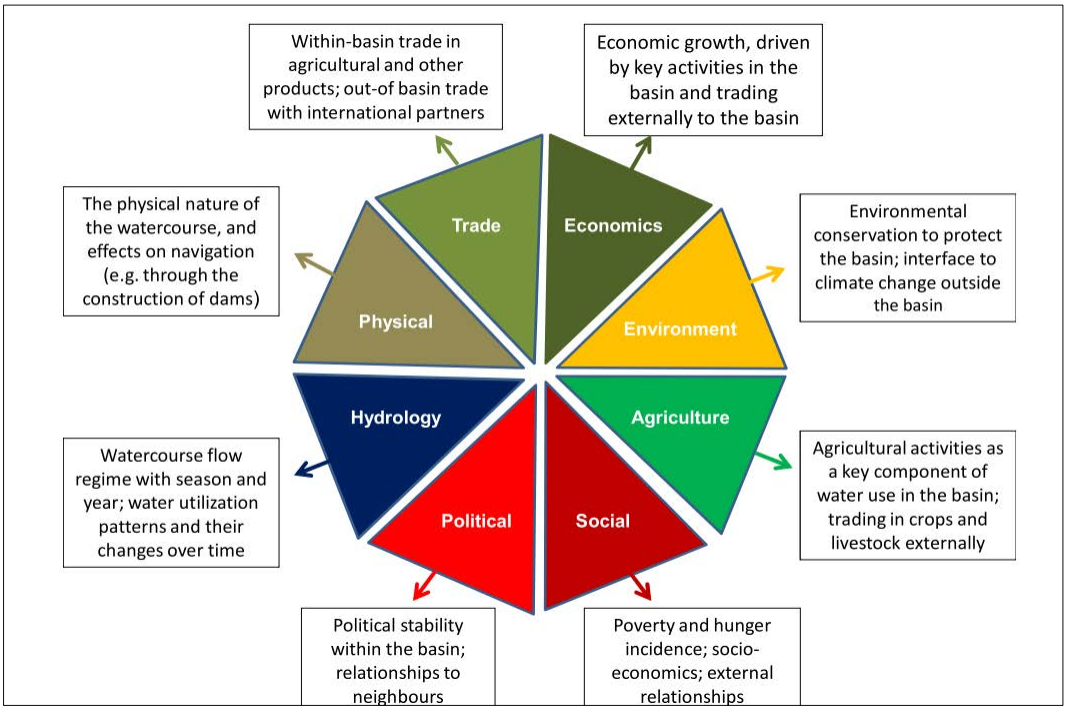


Figure 2-2 Types and examples of benefits[102]

The range of benefits that can be generated means that countries need to forego unilateral action in favour of joint action. However, joint action is only possible if countries perceive the benefits from cooperation to be higher when compared with unilateral action. But even then, cooperation can be difficult and must be substantive in order to be successful.

Sadoff and Grey's[103] cooperation continuum illustrates this. They describe levels of cooperation along a "continuum" ranging from unilateral action without any cooperation or communication, to joint action involving joint ownership and management of infrastructure investments (Figure 2-2). It appears from this that there is no "ideal" type of cooperation. Actors in each international river basin will have to find the optimal level and mode of cooperation, depending on individual characteristics, including mainly hydrologic and investment opportunities as well as the consequent potential benefit-sharing mechanisms prevailing in the river basin. Riparian states will decide to cooperate over their shared river basins only if the expected benefits that can be reached through cooperation are higher than through unilateral action.

[102] SADC (n.d).
[103] Sadoff/Grey2005.

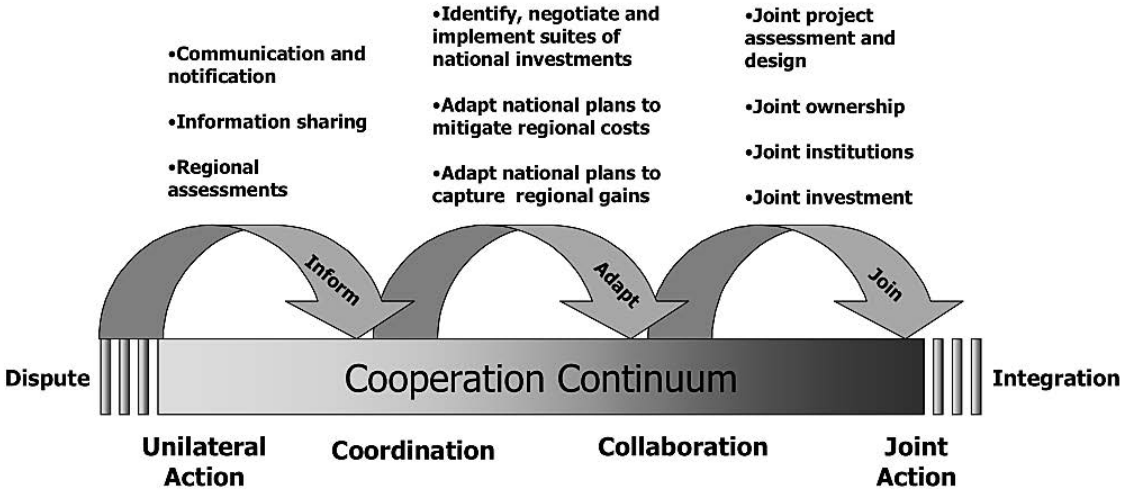


Figure 2-3 The cooperation continuum[104]

In order to illustrate this framework in the context of transboundary hydropower development, Figure 2-3 classifies some cases of RBOs carrying out transboundary hydropower development along the cooperation continuum.

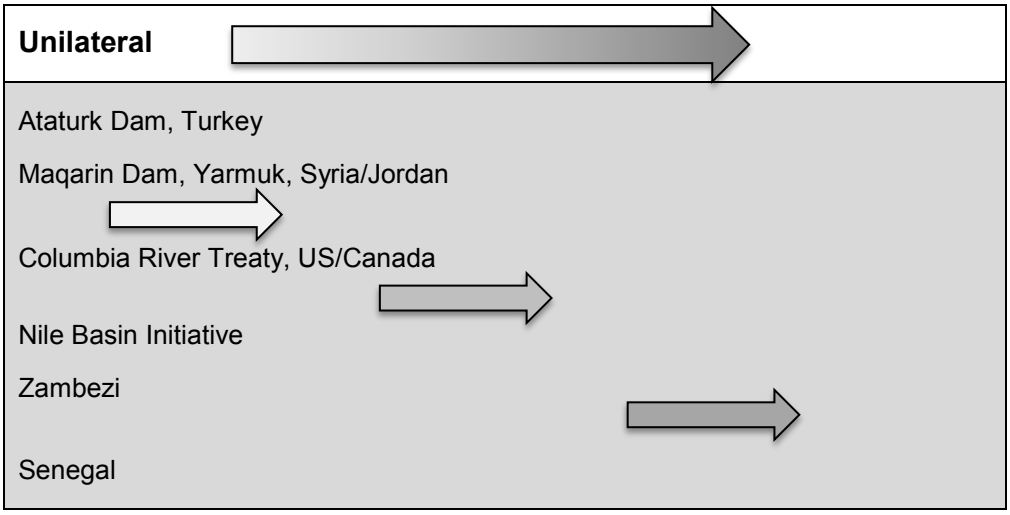


Figure 2-4 Types of cooperation – some examples relating to transboundary hydropower development[105]

In order to design benefit sharing mechanisms, countries need to go beyond information sharing. They have to be willing to negotiate over national development plans, including irrigated agriculture, hydropower, flood protection and navigation – depending on the use of the dam. Countries also need to negotiate over dam location, design, release schedules etc. in an effort to accommodate the development needs of other riparians.

[104] Adapted from Sadoff /Grey2005.
[105] Compiled by the authors, based on the framework by Sadoff / Grey 2005

The starting point for transboundary benefit sharing is the identification of the national interest in developing the water resources of the basin. Negotiations over water resources planning amount to negotiations over national development plans as governments may want to use water to meet food, energy and other development needs. Thus hydropower stations are directly connected to national development interests and therefore the issue of national sovereignty (Hensengerth et al. 2012: 5-6). If governments decide that cooperation will make them better off, then cooperation can be possible. This means that as a first step in the negotiation process, all parties must perceive that net benefits can be derived from cooperation. Some parties may feel that cooperation will make them worse off, or they see neither gains nor losses. Such parties might be induced into cooperation with side payments or issue linkages that need to do more than just compensate them for potential losses. Again, the party in question must feel that it can gain net benefits from cooperation (Hensengerth et al. 2012: 9-10). Once this has been achieved, parties can devise mechanisms for the sharing of costs and benefits with the end result that all parties are better off (Hensengerth et al. 2012: 10). Some mechanisms that have been developed in river basins around the world will be introduced in the next section. This, for instance, includes the construction of an incentive structure that induces upstream states to cooperate (such as in the cases of the Columbia riverbasin or the Lesotho Highlands Water Project).

Indeed, a particular problem is the engagement of upstream countries, especially when the control of the water resources coincides with political, economic and military power. This is for example the case for the Mekong basin where China controls the source and is the most powerful country in the basin. However, there are river basins where geography and power do not coincide. In the Nile, for example, Egypt is the dominant country, but it is downstream. This situation might require different strategies for engaging the upstream country (or the most powerful country). In the past, Egypt threatened upstream Ethiopia with military intervention should Ethiopia decide to build a dam. Egypt's agriculture and therefore food security is entirely dependent on the Nile. As a consequence, any upstream activity might threaten Egypt's food supply. Nevertheless, Ethiopia is now building the Renaissance Dam to feed its own agricultural production. This has led to considerable concerns in Egypt.

As will be discussed below when looking at mechanisms in some detail, the engagement of upstream (or powerful) countries can be considered if these countries are generally willing to cooperate. Cooperation can be induced in a number of ways, including various compensation mechanisms and issue linkages of financial and in kind nature. The key is that the country must perceive itself to be better off with cooperation than without, as otherwise there is no incentive to cooperate.

If the country entirely resists cooperation, political pressure might be brought onto it from within other basin countries. This was the case with the Chinese decision to enlarge cooperation with the MRC following the 2010 drought. The drought led to strong hostility in downstream countries, especially amongst Lao and Thai fishermen as well as media outlets in downstream countries who blamed the Chinese dams for the extreme drought. Eventually, the Thai foreign ministry intervened with the Chinese foreign ministry. This triggered a rethink in the Chinese government to at least temporarily cooperate with the Mekong River Commission not only during the dry season, but also during the wet season.

If there is no option for political pressure, then countries could co-operate on a sub-basin level. This, however, carries potential problems for the rest of the basin as sub-basin cooperation could ignore the interests of other riparians, or lead to conflict with states that are unwilling to cooperate but see their interests threatened by sub-basin cooperation.

As a consequence, most of the areas that will be negotiated are – or can be – politically sensitive as national sovereignty is involved and some countries might see significant risks in cooperation, as the introduction to this chapter has made clear. As shown above, the benefits can be enormous and include trade facilitation and enhanced political stability in the region following the creation of trust that can emerge from long-term cooperation. As a consequence, cooperation is generally easier in river basins that already have high levels of institutionalisation as institutions are often able to absorb conflict. In contrast violent conflict over water resources is more likely in basins where multilateral institutions are lacking.

Discussion topics	• Why is it difficult for countries to enter into benefit sharing agreements?
Exercises	• Small group activity (10-15 minutes), followed by plenum discussion: How can the Sadoff and Grey categories be applied to hydropower projects?
Additional Reading	GIZ 2012: Assessment of RBO-Level Mechanisms for Sustainable Hydropower Development and Management. Vientiane: GIZ. Online: http://www.icp-confluence-sadc.org/sites/default/files/RBO_Mechanisms_SustainableHydropower_Report_MRC-GIZ_final.pdf
	Skinner, Jamie/Niasse, Madiodio/Haas; Lawrence 2009: Sharing the benefits of large dams in West Africa. Edinburgh: International Institute for Environment and Development.
	Sadoff, Claudia W./Grey, David 2005: Cooperation on International Rivers: A Continuum for Securing and Sharing Benefits. In: Water International 30(4).
	UNEP Dams and Development Project 2007: Dams and Development: Relevant practices for improved decision-making.
	Nesheim, Ingrid/McNeill, Desmond/Joy, K J/Manasi, S/Nhung, Dang Thi Kim/Portela, Maria Manuela 2010: The challenge and status of IWRM in four river basins in Europe and Asia. In: Irrigation and Drainage Systems 24(3): 205-221.

2.2 Transboundary benefit sharing mechanisms

Purpose	This sub-session provides an overview of different mechanisms and incentives for countries to enter into benefit sharing agreements. After a conceptual input on benefit sharing with particular focus on joint hydropower development, real-life examples will illustrate the application of the concept in practice. Important aspects are in particular the discussion of the difference of the Benefit Sharing concept on the local and national levels as well as regarding interstate negotiations.
Objectives	By the end of the sub-session, the trainee will: • Understand different concepts and mechanisms of transboundary benefit sharing • Understand incentives for entering into benefit sharing agreements • Be aware of international standards for benefit sharing
Preparatory reading	Dombrowsky, Ines 2009: Revisiting the Potential for Benefit-sharing in the Management of Transboundary Rivers. In: Water Policy 11(2): 125-140
	Hensengerth, Oliver/Dombrowsky, Ines/Scheumann, Waltina 2012: Benefit-Sharing in Dam Projects on Shared Rivers. Discussion Paper. Bonn: Deutsches Institut für Entwicklungspolitik. Online: http://www.die-gdi.de/CMS-Homepage/openwebcms3.nsf/(ynDK_contentByKey)/ANES-8TPKLU/$FILE/DP%206.2012.pdf.

2.2.1 What is benefit sharing?

While the manual focuses on transboundary hydropower and therefore transboundary forms of benefit sharing, these must be distinguished from national forms of benefit sharing. However, as international projects impact on local populations, it is important that both national and international forms of benefit sharing are linked as the local dimension of resettlement and environmental damage incurs significant costs that need to be reflected in the project design. This will also ensure that international hydropower projects are legitimized in the national context and find broader acceptance with the affected population.

In the following, both dimensions will be explained in more detail, starting with national benefit sharing.

i. National benefit sharing

National forms involve sharing benefits of hydropower among national and subnational levels in a particular country. Certain benefits may be shared with river basin residents at pro-

vincial, distinct, municipal and local levels or a combination of these[106]. In the national context, benefit sharing must be distinguished from benefit sharing as compensation comprises merely a monetary or non-monetary recompense to project-affected communities for lost assets (houses, land, livestock, access to fishing grounds etc.), but it does not make them better off. In addition, compensation constitutes a one-off payment from the project budget.

Benefit sharing meanwhile is a constant stream of benefits from project revenues to the local community and can therefore be seen as revenue sharing. Its aim is to restore and improve livelihoods compared to the situation before relocation. In addition, it can also benefit people that have not been relocated but suffer from impacts, such as downstream communities that are affected by changes in river flows.

Compensation	Monetary	Financial payments from the project budget
	In-kind	Allocation of new land, new houses, etc.
Benefit sharing	Monetary	Revenue sharing with local or regional authorities through royalties tied to the output of the project (e.g. power generation), or through water charges
		Preferential electricity rates or water use fees for irrigation and drinking water for the project affected population
		Taxing the infrastructure operators based on the project's property value
		Equity sharing of local communities in the project. This however entails sharing of the operational risks (e.g. should the project go bankrupt)
		Development funds financed from power sales and water charges to foster economic development in the project-affected area
	Non-monetary	Livelihood restoration and enhancement by securing income, for example through employment in the construction and in the operation of the project. Depending on the benefits of the water infrastructure, employment can be also offered in the agricultural, fishery or recreational sectors
		Increased access to primary services, such as domestic water supply and electrification, transportation, health and education
		Catchment development and allocation of fishing rights in the reservoir

Table 2-2 Different forms of compensation and benefit sharing mechanisms[107]

ii. Transboundary benefit sharing

The main idea of transboundary benefit sharing is that riparian states should not seek to share the water itself, but instead share various benefits from the water. By refocusing from

[106]MRC 2011a.
[107]UNEP Dams and Development Project 2007.Égré et al. 2002. Égré et al. 2008.

the sharing of water (quantities) to the sharing of benefits from the water, a zero-sum game of water sharing is being replaced by a positive sum game of benefit sharing.[108] The concept therefore aims at shifting the focus from the allocation of the water resource to benefits derived from the use of water.

As a result, through the sharing of costs and benefits, win-win situations can be created and additional advantages can be generated that could not be achieved if each riparian acted unilaterally.[109]

Transboundary benefit sharing is based on principles embodied in IWRM practice, negotiation and agreements (see MRC Knowledge Base on Benefit Sharing). The particular challenge for transboundary benefit sharing is that it depends on the willingness of countries to cooperate. As a result, it cannot – differently from national benefit sharing – be enforced by the government of one state only.

For transboundary benefit sharing, the literature generally identifies two main mechanisms: compensation and issue-linkage.[110]

Compensation mechanisms are direct and project-oriented incentives for cooperation. The idea is to alter the payoff structure of the players by sharing the benefits that result directly from the project itself. Two forms of compensation mechanisms exist:

- Monetary compensation mechanisms such as (1) international financial transfers; (2) joint funding of projects; (3) payment for water use rights; (4) acquisition of shareholdings/ joint ventures/ direct investments; (5) price- and quantity-agreements for water and energy supply and
- Nonmonetary compensation mechanisms comprise the allocation of water use and energy delivery agreements.

Issue-linkage is an indirect and non-project-oriented incentive for cooperation. The idea is to alter the payoff structure of the players by linking different projects with each other. Two forms of issue linkages are often identified:

Intra-water issue-linkages address the linkage of projects within the water sector. The starting point is the assumption that activities in the upstream and downstream sections of the river have effects on the riparians, for instance regarding water quantity and quality and regulation (e.g. flood control/ guarantee of minimal flows through storage upstream; improved navigability e.g. through channel works downstream; reduced flow through water abstraction and pollution through wastewater discharge upstream; hampered fish migration by river works downstream and dam flooding upstream through river works downstream).

To facilitate cooperation, these externalities can be linked in two ways: In *upstream-downstream linkages*, effects directed downstream are linked with effects directed upstream (e.g. improved navigability through channel works by state B with the reduction of wastewater discharge by state A); in *spatial linkages*, effects directed downstream in river 1 are linked with effects directed downstream in river 2 where riparian positions are reversed (e.g. dam construction in river 1 by state A with dam construction in river two by state B).

[108]Dombrowksy 2009.
[109]GIZ 2012.
[110]The following is based on Klaphake 2005.Dombrowksy 2009.

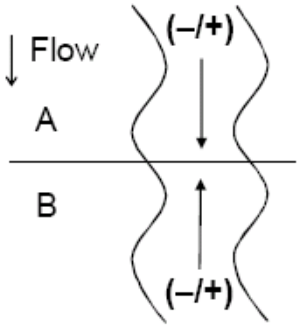


Figure 2-5 Upstream-downstream linkages[111]

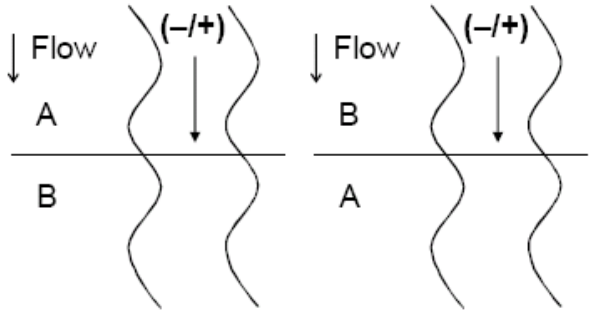


Figure 2-6 Spatial linkages[112]

In addition, *extra-water* issue-linkages can occur. This addresses the linkage of projects within the water sector with projects outside the water sector. Negotiations on hydropower projects could for instance be linked to negotiations on trade facilitations or the relaxation of immigration and border controls. This broadens the issues that can be included in the negotiations and therefore also broadens the basket of benefits, as seen in the SADC Benefit Wheel. Such wide-ranging negotiations can also address the wider social, political and economic environment of the river basin and address the specific development needs to basin countries.

2.2.2 How can benefits be shared? Incentive structures and mechanisms from real-life examples

As transboundary benefit sharing occurs between sovereign states, the key for benefit sharing is that countries are willing to cooperate on their hydropower programmes. Apart from this political condition, states must perceive an economic interest in cooperation. The key ingredient is that all involved states must perceive that benefits to cooperation are greater than unilateral dam building. Hensengerth et al. (2012) reviewed benefit sharing mechanisms in the Senegal river basin, the Columbia river basin, the Itaipu Dam, and in the Leso-

[111] Dombrowksy 2009.
[112] Dombrowksy 2009.

tho Highlands Water Projects in order to understand incentive structures and to advance an initial categorization of the cost and benefit streams. In the reviewed projects, incentive structures for cooperation comprise.[113] For the purpose of this training manual, the Kosi project is also here included:

Incentive structures:

- financial and economic constraints, i.e. states are either unable to finance dams unilaterally, or the costs would outweigh the benefits. States therefore seek the cooperation of other basin states to overcome these constraints (e.g. as occurred between Mauretania, Senegal and Mali in the Senegal river basin).
- the downstream state is interested in upstream dams (e.g. Lesotho Highlands Water Project, Columbia River Treaty) and persuades the upstream country to either build dams (Lesotho Highlands Water Project, Kosi) or to change already existing dam designs (Columbia River Treaty). These changes to the upstream flow increase aggregated net benefits.
- basin countries have a common interest in the mutual exploitation of dams located at the border of states (Turkish-Syrian friendship dams, Itaipu Dam). This enables the realization of mutual benefits.

In these projects, three different types of benefit-sharing mechanisms can be observed:

(A) costs are shared in relation to the expected benefits from the jointly owned dams (Senegal river basin, Itaipu Dam);

(B) the party altering its unilateral dam design is compensated for losses incurred as a result of this alteration, and net benefits of cooperation are shared (Columbia River Treaty);

(C) the downstream state convinces the upstream state to build a dam, and covers the costs and shares the net benefits of the dam (Lesotho Highlands Water Project, Kosi).[114]

i. Transboundary benefit sharing in other river basins

The following pages provide five case studies illustrating benefit sharing mechanisms in hydropower development.[115]

[113] Hensengerth et al. 2012.
[114] Hensengerth et al. 2012.
[115] The case studies are based onGIZ 2012.

Case Study
Manantali Dam – co-owned infrastructure with cost and benefit sharing based on expected use of multiple benefits

Senegal river basin

Basin area
289,000 km²

Riparian countries
- Guinea, Mali (upstream)
- Senegal, Mauritania (downstream)

Main treaty/organisation
- Convention portant création de l'organization pour la mise en valeur du Fleuve Sénégal (1972)
- Established the OMVS

Members to agreement
- Senegal, Mail, Mauritania (Guinea joined 2006)

Case study dams
Manantali 1988, 200MW

Main goals of the project
- Irrigation
- Hydropower
- Navigation

Main mechanisms
- Dams are co-owned by member states
- A co-owned company is responsible for management of the dam
- Costs and benefits are allocated according to projected use of benefits (clé de répartition)
- Environmental flow regime established to enable smallholder recessional agriculture

Cooperation background

- In 1963 Guinea, Mali, Senegal and Mauritania signed the Bamako Convention. The Convention declared the Senegal to be an international river. The riparian countries had complementary interests in developing the river for navigation, irrigation and hydropower generation
- In 1972 against the backdrop of the Sahel drought, Senegal, Mauritania and Mali signed the Convention portant création de l'organization pour la mise en valeur du Fleuve Sénégal, which created the Organization pour la mise en valeur du Fleuve Sénégal (OMVS). Guinea did not participate because of political difficulties internally and within the region, but joined the Convention in 2006.

Joint planning and dam management mechanisms

- Two additional conventions lay down the legal basis for dam operation: the 1978 Convention on the Legal Status of the Jointly-Owned Structures, and the 1982 Convention on the Financing of the Jointly-Owned Structures. The most important stipulations are:
  - The members co-own the dams and all other structures;
  - Investment costs and operating expenses are allocated to the co-owners according to their use of the benefits generated from the dams;
  - The co-owners guarantee repayment of loans extended to the OMVS;
  - Two dams, Diama in the delta and Manantali upstream, are operated jointly to maximize irrigation in the middle valley. Apart from that, Diama is designed for delta irrigation and prevention of saltwater intrusion in the delta. Diama has also a ship lock to enable navigation. Manantali is designed for irrigation, navigation and hydropower generation.

Source: World Water Assessment Programme 2003: 451

- The dams are operated by separate entities, which are again co-owned by the OMVS members: the Société de Gestion de l'Énergie de Manantali (SOGEM) operates Manantali, and the

Société de Gestion et d'Exploitation de Diama (SOGED) operates the Diama Dam.

- Energy production was contracted to Eskom Energie Manantali (EEM), a subsidiary of South Africa's utility Eskom; EEM withdrew from this contract in 2011.
- EEM transferred the income from the energy sales from Manantali to SOGEM, minus the management fees. This makes up SOGEM's revenue.

Specific provisions/measures

Cost and benefit sharing

- The international status of the Senegal River implicates that riparian countries forego volumetric water allocation and move directly to the allocation of benefits from water use.
- Costs and benefits are allocated in the 'clé de répartition', which reflects the anticipated usage of the benefits by each member country:

Benefit allocation	Mauritania	Mali	Senegal
Irrigation potential	31%	11%	58%
Hydropower potential	15%	52%	33%
Navigation potential	12%	82%	6%
Total cost allocation	**22.6%**	**35.3%**	**42.1%**

Impact monitoring/mitigation

- Manantali necessitated the relocation of 10,000 people. Resettlement was funded by UNDP, USAID and the government of Mali and included electrification and poverty reduction measures such as micro subsidies.
- The triple goal of irrigation, hydropower and navigation is based on the cessation of the naturally occurring floods. However, farmers downstream resisted this since the opportunities for local farmers declined as a negative consequence of the dam while the development of large scale corporate irrigation facilities could not keep up. OMVS therefore changed the management of Manantali to release one annual artificial flood to enable flood recessional agriculture.
- Under donor encouragement, OMVS set up an environmental monitoring programme (PASIE) in 1998. PASIE developed a basin management plan, including a multi-stakeholder Environmental Observatory and a Health Plan.
- The Environmental Observatory has the general tasks to monitor environmental effects of basin development and to design mitigation measures. In addition, it ensured the continuation of the annual artificial floods for smallholder recessional agriculture and therefore the permanent institutionalisation of an environmental flow regime. The Health Plan is designed to mitigate the increase in diarrhoea, schistosomiasis and malaria.

Imprint:
This Fact Sheet is based on the report "Assessing RBO-Level Mechanisms for Sustainable Hydropower Development and Management" prepared by adelphi for the MRC-GIZ Cooperation Programme.

MRC-GIZ Cooperation Programme
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
c/o Lao German House
P.O. Box 9233
Vientiane
Lao PDR

Case Study
Itaipu Dam – Bi-national public company owns and manages dam with benefit sharing through power sales

Parana river basin

Basin area
2,582,672 km²

Riparian countries
- Brazil (upstream)
- Paraguay, Argentina (downstream)

Main treaty/organisation
- Itaipu Treaty (1973)
- Established Itaipu Binacional

Members to agreement
Brazil, Paraguay

Case study dams
Itaipu Dam 1984, 1,400MW

Main goals of the project
Hydropower

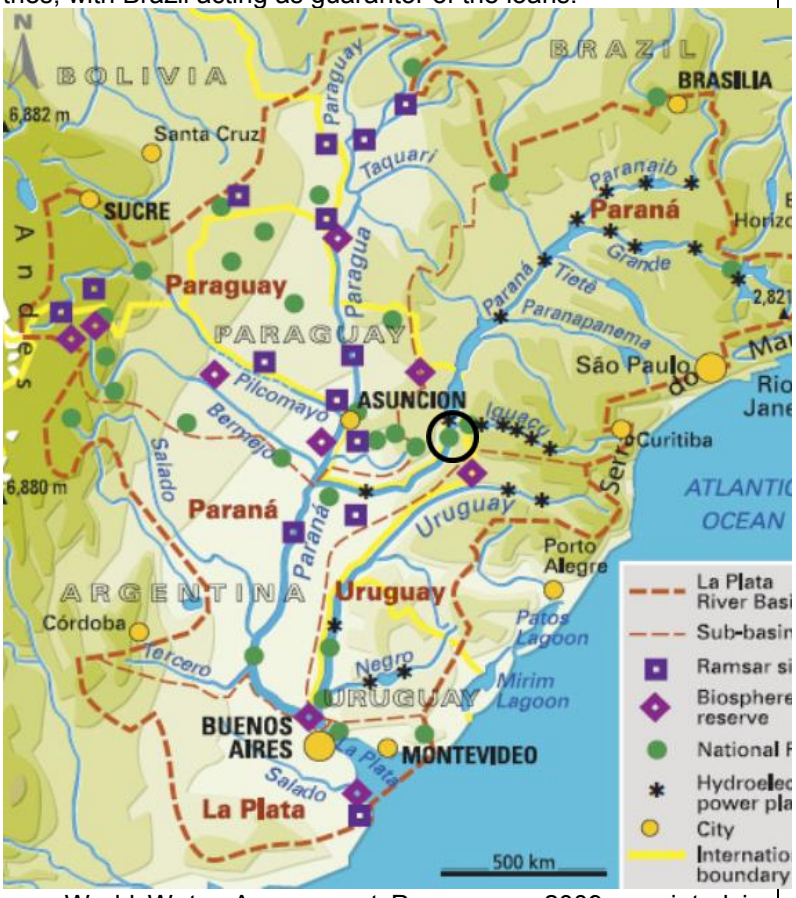
Main mechanisms
- Managed by a bi-national company, Itaipu Binacional
- Costs, hydropower benefits and social and environmental mitigation measures are split equally between Brazil and Paraguay
- Unused energy must be sold to the other party
- Itaipu Binacional pays monthly royalties to both governments for the use of the hydraulic resource
- In Brazil, the royalties are used for an extensive revenue sharing programme with localities affected by the dam
- Itaipu Binacional runs extensive environmental and social mitigation programmes

Cooperation background

- There is no river basin management for the Parana river. However, an umbrella treaty, the Rio de la Plata Treaty, in theory provides for integrated river basin planning of the entire Rio de la Plata basin, of which the Parana river forms a part.
- Brazil and Paraguay have a common interest in hydropower development on the Parana River. This is why in 1966 both countries signed the Act of Iguazu, which provided for detailed studies on creating a hydropower dam.
- In 1973, both countries signed the Itaipu Treaty for the Itaipu Dam. This dam has no connection to the Rio de la Plata Basin Treaty.
- In terms of basin-wide collaboration, an agreement with Argentina was concluded to maintain stable water levels that would not endanger downstream electricity generation in Argentina.

Joint planning and dam management mechanisms

- The Itaipu Treaty established the company Itaipu Binacional, which is co-owned by both governments; through their national utilities, the governments appoint the board of directors in equal portions.
- The investment costs for the dam were split between both countries, with Brazil acting as guarantor of the loans.



Source: World Water Assessment Programme 2009, reprinted in Flinker 2012

Specific provisions/measures

Cost and benefit sharing

- The installed capacity of 14,000MW is shared 50/50 between both countries. The party that does not use its share of the energy must sell it to the other party. The buying party in addition pays compensation for the additional benefits it receives from using the other's hydraulic resource entitlement.
- In reality, this means that Paraguay has sold/sells its unused share of the energy to Brazil. In addition, Brazil paid/pays compensation to Paraguay.
- The terms of the sales and compensation agreement were renegotiated in 2009 on the insistence of Paraguay. Since then, Paraguay receives higher compensation payments. Furthermore the two parties have been negotiating whether Paraguay should be allowed to sell its unused energy directly to the Brazilian market instead of selling it to the Brazilian utility for fixed prices.
- Itaipu Binacional also pays monthly royalties to both governments for the use of the hydraulic resource.

Impact monitoring/mitigation

- When Itaipu was established, both countries were ruled by military regimes that did not have environmental and social impact legislation in place. The resettlement of 40,000 people on the Brazilian side and of 25,000 people in Paraguay resulted in widespread poverty among the resettled populations. The legal situation changed after the transition of both countries to democracy.
- On the Brazilian side, the royalties are used for an extensive revenue sharing programme with localities affected by Itaipu. This procedure followed Brazilian legislation stipulating that royalties from energy generation must by law be paid to central and local government agencies following a distribution key. This ensures that the localities most affected also receive the most royalties from the energy project.
- In Paraguay, royalties are paid to the national treasury and then used according to current government policy.
- Itaipu Binacional itself runs extensive environmental and social mitigation programmes. Expenses must be equal on the Brazilian and Paraguayan sides. Pushes by the Paraguayan government to increase social and environmental spending therefore had to be matched by Brazil. This resulted in a large budget of Itaipu Binacional for social and environmental monitoring programmes.
- Itaipu Binacional regularly cooperates in the implementation of its programmes with local communities, researchers and government agencies.
- The fish supply in the reservoir could be increased by measures such as the introduction of e.g. a spawning channel, germplasm bank, aquaculture and a seasonal prohibition of fishing.

Imprint:
This Fact Sheet is based on the report "Assessing RBO-Level Mechanisms for Sustainable Hydropower Development and Management" prepared by adelphi for the MRC-GIZ Cooperation Programme.

MRC-GIZ Cooperation Programme
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
c/o Lao German House
P.O. Box 9233
Vientiane
Lao PDR

Case Study
Kosi Project – Downstream riparian responsible for construction and operation of infrastructure, sharing of power generated

Kosi river basin

Basin area
69,300 km²

Riparian countries
- China (upstream)
- Nepal (midstream)
- India (downstream)

Main treaty/organisation
- Kosi Agreement (1954, amended 1966)
- Established the Coordination Committee for Kosi Project

Members to agreement
India, Nepal

Case study dams
- Kosi Project (barrage 20MW /embankments), 1963,
- Sapta Kosi High Dam, 3,000MW, planned for 2013

Main goals of the project
- Flood control
- Hydropower
- Irrigation

Main mechanisms
- Nepal had the right to obtain up to 50% of the hydroelectric power generated by India at fixed tariff rates.
- Compensation payments for losses/damages/used material due to the project/inundation
- Payment of royalties for generated power

Cooperation background

- India and Nepal have both been interested in exploiting the high potential that Nepalese water resources provide for hydropower generation and irrigation. Since Nepal has limited capacities to develop its water resources, India supported Nepal financially and technologically, though with limited success. Major flood events have repeatedly triggered cooperation.
- In 1954, the Kosi Agreement covering the Kosi Project (barrage and embankments) was signed (amended in 1966). The project was planned to reduce the devastating floods in this area, to anchor the wayward of the riverbed that had migrated tremendously in the last 250 years, and to generate hydropower.
- Bilateral cooperation between Nepal and India on water resources management has further taken place, e.g. within the framework of the Gandak irrigation and power project (agreed 1959) and the 1996 Mahakali Treaty on the construction of the multipurpose Pancheswar Dam.
- In the beginning of the 2000s both countries further agreed on joint field investigations, studies and the preparation of project reports for the Sapta Kosi High Dam Multipurpose Project and the Sun Kosi Storage-cum-Diversion Scheme, which are additional elements to the earlier Kosi Project.
- To manage the common water resources of both countries, a three tier mechanism at the level of Ministers, Secretaries and technical staff was established in the last decade.

Source: South Asia Network on Dams, Rivers and People

Joint planning and dam management mechanisms

- The amended Kosi Agreement provides that any construction

and other undertaking by India in connection with the Kosi Project need to be planned and carried out in consultation with Nepal. Also, a prior approval of Nepal is required.

- The Government of the Indian State of Bihar was designated as the Chief Engineer of the Kosi project. Thus, India was responsible for the design, construction and operation of the barrage/embankments. The Government of Bihar constituted the Kosi High Level Committee to implement the Kosi Project (barrage and embankments).
- Moreover, a Coordination Committee was established to manage the Kosi Project (barrage and embankments).
- In 2004 a Joint Project Office (JPO) was set up to carry out prefeasibility studies for the planned Sapta Kosi High Dam.

Specific provisions/measures

Cost and benefit sharing

- Nepal had the right to obtain up to 50% of the hydroelectric power generated by India in any power house in the vicinity of the barrage. The tariff rates for electricity for Nepal were fixed later in a mutual agreement. However, due to the heavy silt production by the river the barrage produced energy only for a short period.
- Nepal received royalties at agreed rates for power generated with water from the barrage and utilized in India. No royalties were paid for the power sold to Nepal.
- India paid compensation for the loss of lands, houses and/or other immovable property flooded or damaged by the Kosi project (barrage/embankments) as well as for material from Nepalese territory used by India for construction or maintenance of the project.
- India also constructed transmission lines to the Nepal-Indian border for the transfer to Nepal of power generated in India.
- The Nepalese land on which the project was built is leased to India for a period of 199 years at an annual nominal rate.

Imprint:
This Fact Sheet is based on the report “Assessing RBO-Level Mechanisms for Sustainable Hydropower Development and Management” prepared by adelphi for the MRC-GIZ Cooperation Programme.

MRC-GIZ Cooperation Programme
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
c/o Lao German House
P.O. Box 9233
Vientiane
Lao PDR

Case Study
Columbia River Project – Coordinated management of national dams with compensation payments for downstream benefits and upstream costs

Columbia river basin

Basin area
668,400 km²

Riparian countries
- Canada (up-/downstream)
- USA (up-/downstream)

Main treaty
Columbia River Treaty (1964)

Members to agreement
Canada, USA

Case study dams
- Mica (CA), 1973, 1,805MW
- Keenlyeside (CA), 1969, 185MW
- Duncan (CA), 1968
- Libby (US), 1973, 600MW

Main goals of the project
- Flood control
- Hydropower

Main mechanisms
- Compensation payments for downstream benefits, damages due to inundation, and flood prevention, respectively
- National agencies coordinate management of dams in joint committees and operation plans
- Possibility of additional operational agreements to stay flexible and to consider extra benefits/mitigate impacts
- National compensation for social and environmental impacts through the Columbia Basin Trust

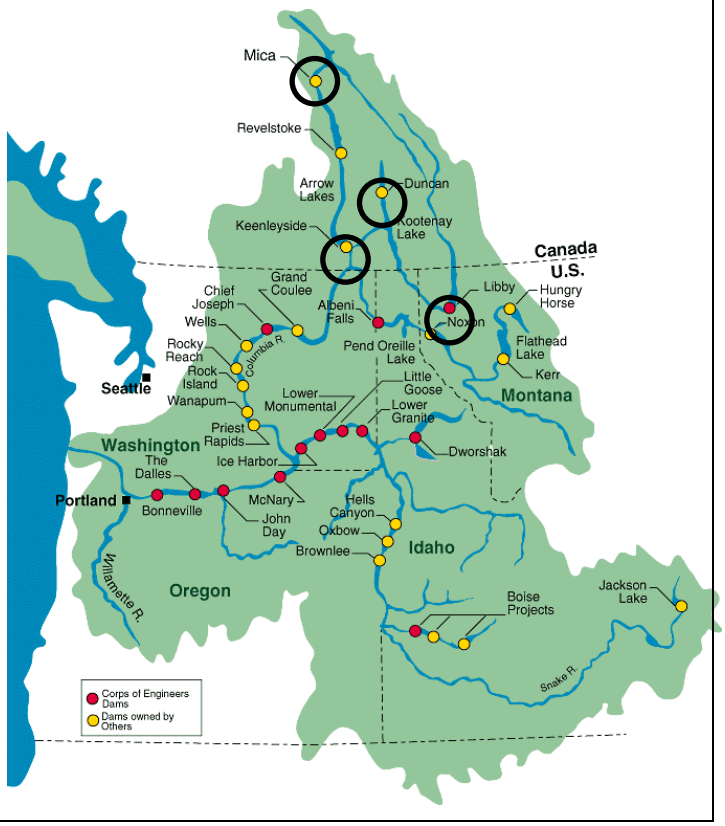
Source: Hyde, John 2011

Cooperation background

- In 1909 the Boundary Waters Treaty was signed between Canada and the USA. It provides principles and mechanisms to resolve and prevent disputes regarding transboundary water resources. The treaty further established the International Joint Commission.
- In view of the high hydropower potential of the Columbia River the USA and Canada began negotiations on energy production in the 1940s. Flood prevention was the second main concern of the countries, playing out especially after the devastating flood of 1948.
- Preliminary investigations and negotiations resulted in 1961 in the Columbia River Treaty (CRT) (implemented in 1964). The agreement includes the construction of four dams, obligations for flood control as well as stipulations on cost and benefit sharing. It is valid for 60 years.
- A range of treaties, conventions and agreements regarding other transboundary rivers have further been signed by Canada and the USA.

Joint planning and dam management mechanisms

- One U.S. and one Canadian Entity were designated as in charge of implementing the CRT. The U.S. side is represented by Bonneville Power Administration and the U.S. Army Corps of Engineers, which is responsible for operating the Libby Dam; the Canadian Entity is represented by British Columbia Hydro and Power Authority, which is responsible for operating the Canadian treaty dams.



- The duties of the Entities include: coordination of plans and exchange of information; periodic calculation of compensations and benefits; establishment and operation of a hydro-meteorological system; preparation of hydroelectric operating plans and flood control operating plans for the Canadian storage; etc.
- The Entities coordinate weekly on planned storage discharge and to take corrective measures if necessary due to specific reasons.
- Under the treaty, two main operating plans guide system operations: the Assured Operating Plan (AOP), which is developed by the Entities for a six-year period to guide flood control and power generation operations, and the Detailed Operating Plan (DOP), which is prepared annually.
- The treaty allows Canada substantial flexibility to operate its individual projects as long as the net flow requirement at the border of the USA is met.

Specific provisions/measures

Cost and benefit sharing

- Canada paid/pays for the construction and operation of the three Canadian project dams, whereas the USA covers costs for the Libby Dam.
- The USA share with Canada one-half of the estimated increase in U.S. downstream power benefits (called the 'Canadian Entitlement'). Canada sold this Entitlement for US$254 million to a consortium of U.S. utilities for a period of 30 years. Since the agreement expired in 2003 the power benefits are delivered on a daily schedule to the Province of British Columbia.
- The USA further paid Canada one-half of the value of the estimated future flood damages prevented in the USA during the first 60 years of the treaty. Canada chose to receive a lump sum payment (in total US$64.4 million). In addition, the U.S. Entity can call upon Canada to operate additional storage for additional compensation payments by the USA ('Called Upon' flood control).
- The USA compensated for the costs for resettlement and relocation of transport infrastructure in Canada for the inundation caused by the Libby reservoir.

Impact monitoring/mitigation

- The Entities regularly adopt Supplemental Operating Agreements (SOA) to address national environmental and social concerns (such as fish flow and recreation water level requirements, wildlife and vegetation issues, heritage site protection), and to gain additional power benefits during the operating year. Within this framework it is e.g. possible to adjust storage releases in both countries, either on a mutual basis or with one side receiving compensation for incurred power losses in return for adapted storage releases.
- In Canada the Columbia Basin Trust was set up in 1995 to compensate people affected in the basin for social and environmental impacts. The trust was endowed by the Province of British Columbia with CAN$295 million and CAN$2 million annually for 16 years. This Trust also runs social and environmental monitoring programmes.

Imprint:
This Fact Sheet is based on the report "Assessing RBO-Level Mechanisms for Sustainable Hydropower Development and Management" prepared by adelphi for the MRC-GIZ Cooperation Programme.

MRC-GIZ Cooperation Programme
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
c/o Lao German House
P.O. Box 9233
Vientiane
Lao PDR

Case Study
Kariba Dam – Co-owned dam with cost-sharing based on actual water use for national power generation

Zambezi river basin

Basin area
1,350,000km²

Riparian countries
Zambia (source), Angola, Namibia, Botswana, Zimbabwe, Malawi, Mozambique (delta)

Main treaty/organisation
- Zambezi River Authority Act (1987)
- Established the Zambezi River Authority

Members to agreement
- Zambia, Zimbabwe

Case study dams
- Kariba Dam 1960 (south bank power station), 1975 (north bank power station)
- North Bank: 720MW
- South Bank: 750MW

Main goals of the project
Hydropower

Main mechanisms
- The bi-national Zambezi River Authority only manages Kariba Dam. It is co-owned by both governments
- The power houses on the north bank and the south bank are managed by the national utilities of Zambia (north bank) and Zimbabwe (south bank)
- ZRA is funded by both government based on the water that the national utilities use for energy production

Cooperation background

- Kariba was planned and built by British authorities in the Central African Federation. The governments of two of the federal territories, Northern and Southern Rhodesia had interests in hydropower development, but differed in choice of location. The Federal government decided in favour of Kariba in 1955.
- Basin-wide cooperation dates back to 1987, when riparians adopted the Zambezi Action Plan (ZACPLAN) to establish a Zambezi Watercourse Commission (ZAMCOM). However, a lack of political will hampered implementation of the ZACPLAN.
- Negotiations on ZACPLAN led the already established Southern African Development Community (SADC) to adopt the SADC Water Protocol. The SADC Water Protocol effectively functioned as ZAMCOM Agreement surrogate. All further planning for ZAMCOM were coordinated by the SADC Water Division.
- Only in May 2011, an Interim ZAMCOM Secretariat was established and the work transferred from SADC to the Interim Secretariat.
- However, Kariba, Cahora Bassa and other dams on the Zambezi and its tributaries continue to be operated as individual projects.

Joint planning and dam management mechanisms

- Kariba was first managed by a Federal Power Board, then after independence by the Central African Power Corporation (CAPCO). CAPCO's wide mandate included electricity sales and power-related investment.
- Conflicts between post-independence Zambia and Zimbabwe led to CAPCO being replaced by the bilateral Zambezi River Authority (ZRA) in 1987. ZRA's mandate is confined to managing the dam, while the power houses are operated by the national utilities.

Source: Encyclopaedia Britannica, http://www.britannica.com/EBchecked/media/206/The-Zambezi-River-basin-and-its-drainage-network

Specific provisions/measures

Cost and benefit sharing

- ZRA is funded by both states through their national utilities. When the ZRA was founded, the funding arrangement was that both governments would contribute equal amounts. The arrangement was later altered to even out perceived imbalances. Now, payments are made based on the actual water use by the utilities for energy generation. The water tariff itself is reviewed annually by a Joint Operations Committee.

Impact monitoring/mitigation

- As for the environment, the colonial authorities launched Operation Noah, a large-scale programme to rescue wildlife from the inundating reservoir.
- While the 1950s feasibility study made no mention of resettlement, some efforts were made: The resettlement procedure was the responsibility of the governments in the Central African Federation: Northern Rhodesia resettled members of the Gwembe Tonga tribe on the north bank, Southern Rhodesia the south bank Gwembe Tonga.
- North bank resettlement focussed on reservoir resettlement and was comparatively well planned, but shortage of funds, time and staff as well as the suspicion of the Gwembe Tonga led to widespread impoverishment, particularly a decline in agriculture and cattle grazing.
- Reservoir fisheries were successfully established.
- In the 1990s, the ZRA began compensation procedures for the Zimbabwean resettlers. The move was matched on the Zambian side by Zambia's national utility ZESCO with funding from the World Bank and the Southern African Development Bank.
- In 1998, the ZRA started an Environmental Monitoring Programme with funding from SIDA.
- To advance dam harmonization between the Kariba, Kafue and Cahora Bassa dams, a Joint Operations Technical Committee (JOTC) was created, including authorities and operators responsible for operating those dams. In this framework, also discussions to experiment with environmental flows at Kariba and Cahora Bassa are being held between SADC and the JOTC.
- A project on Dam Synchronization and Flood Releases in the Zambezi river basin, is further currently ongoing under the auspices of SADC and funded by GIZ, DFID and AusAID.

Imprint:
This Fact Sheet is based on the report "Assessing RBO-Level Mechanisms for Sustainable Hydropower Development and Management" prepared by adelphi for the MRC-GIZ Cooperation Programme.

MRC-GIZ Cooperation Programme
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
c/o Lao German House
P.O. Box 9233
Vientiane
Lao PDR

ii. Discussion of the case studies

The cases show that the rationales and drivers for creating benefit sharing mechanisms comprise advantages for national development and therefore the perception that cooperation has concrete advantages that would be impossible to gain with unilateral action. Governments therefore perceived that they gain from each other. This gain can consist of financial benefits or in kind benefits (e.g. electricity or flood control); it can also consist of improved relations and trust. However, conflicts can emerge over time, such as in the case of Itaipu (see fact sheet above) as one party may come to perceive the original agreement as unfair and insist on a renegotiation of the agreement.

This means that agreements and institutions based on these agreements need to be flexible enough to absorb future conflicts and allow for a conflict resolution mechanism to resolve grievances that may emerge in the future. Challenges therefore may come up at any time before, during and after the negotiation of benefit sharing agreements.

Perhaps the key challenge to be overcome in order to enter into negotiations for benefit sharing agreements is that parties will need to negotiate over their national development plans i.e. domestic plans for the economic development of water resources to meet national development goals. This addresses the problem of sovereignty. Traditionally, nation states assume absolute sovereignty over their territory and the resources within. This includes the domestic stretches of an internal river. Therefore, in order to create a successful benefit sharing mechanism, the concept of relative sovereignty is important. The key norms of no harm, freedom of navigation and equitable utilisation are important here. States will need to be aware that their actions have consequences beyond their national boundaries. Therefore, states need to be willing to negotiate over their national development strategies. This requires the creation of an incentive structure that must make all states better off than they were without negotiation. This raises important questions with relevance to Laos's willingness to negotiate over its mainstream dam plans.

In addition, in order to successfully negotiate, the involved parties must be clear about each other's development plans. Policies, statistical data, planning documents etc. need to be made available as without information disclosure the creation of trust is difficult. Only then who needs how much of the water resource and for what purpose can also be determined. And only with this information can cost-benefit streams between the parties appropriately be arranged.

The process of negotiating benefit sharing mechanisms is therefore inherently political. While the concept of benefit sharing proposes to look at water rationally in terms of economic benefits, prevailing distrust between basin states and a lack of political will makes it impossible to move ahead with benefit sharing.

It is important to note that each basin is different – regarding aspects such as hydrology, geography, regional and national economic development, political relations between basin states, or the level of institutionalisation of river basin cooperation. However, international experience shows that higher levels of institutionalisation can prevent conflict. This is important in the Mekong basin as an institution already exists in the form of the Mekong River Commission.

Indeed, the above examples show that the development of governance structures and mechanisms to jointly develop and manage transboundary hydropower is possible. In order to do so, legal frameworks and institutional structures need to be developed where none are in place:

- Legal frameworks: Where basin-wide or at least multilateral agreements on transboundary water resources management exist, these usually can also provide the basis for cooperation in hydropower development and management; otherwise, bilateral treaties have often been concluded to regulate cooperation on water resources management in general, or on hydropower development and management in particular.
- Institutional frameworks: Existing multi- or bilateral institutions can provide a suitable frame for planning and developing joint hydropower projects; otherwise establishment of project-specific institutions for the operation and maintenance of hydropower projects are advisable.

Where river basin organisations already exist, their governance structures can be used to develop such mechanisms. River basin organisations are particularly well suited to develop mechanisms for benefit sharing. While some RBOs have only coordination functions, those with a wider mandate such as MRC have legal frameworks and institutional structures are designed to develop the river for the benefit of the riparians. When properly staffed and managed, such RBOs are able to assist countries during the entire project cycle from planning to post-construction monitoring.

iii. Further case studies

The following table provides a list of references and documents which offer further insights into benefit sharing processes in other river basins. They may prove helpful for the application of the theoretical concepts presented in this manual.

Basin	Riparian countries	Reference
Nile	Ethiopia, Sudan, Egypt, Uganda, Democratic Republic of the Congo, Kenya, Tanzania, Rwanda, Burundi, South Sudan	Hensengerth, Oliver/Dombrowsky, Ines/Scheumann, Waltina 2012: Benefit-Sharing in Dam Projects on Shared Rivers. Discussion Paper. Bonn: Deutsches Institut für Entwicklungspolitik, pp. 21-23.
Senqu-Orange	Lesotho, South Africa, Namibia	Hensengerth et al.: pp. 18-20.
Zambezi	Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia, Zimbabwe	Hensengerth et al.: pp. 23-25,
Fictitious case studies	/	Dombrowsky, Ines 2009: Revisiting the Potential for Benefit-sharing in the Management of Transboundary Rivers. In: *Water Policy* 11 (2): pp. 125-140.
		Rieu-Clarke, Alistair/Moyinihan, Ruby/Masgig, Bjørn-Oliver. 2012: UN Watercourses Convention User's Guide. IHP-HELP Center for Water Law, pp. 243, 247-248.

2.2.3 International standards for benefit sharing

Benefit sharing norms and principles are set by a range of public and private international actors, including private companies and international organisations.[116]

i. United Nations bodies and affiliates

UNEP, World Commission on Dams and DDP

The World Commission on Dams (2000) in its final Report Dams and Development: A New Framework for Decision-Making captures emerging trends in benefit sharing in two of its seven strategic priorities:

- SP-5 "Recognizing entitlements and sharing benefits", on sharing with local communities; and,
- SP-7 "Sharing rivers for peace and development", on sharing between riparian states.

One policy principle of Strategic Priority 7 of the WCD reads: "Riparian States go beyond looking at water as a finite commodity to be divided and embrace an approach that equitably allocates not the water, but the benefits that can be derived from it. Where appropriate, negotiations include benefits outside the river basin and other sectors of mutual interest".

The UNDP sponsored Dams and Development Project (DDP) was a follow-up to the WCD. It highlighted regional experience in benefit sharing on hydropower projects.

CBD & RAMSAR

The UN Convention of Biodiversity CBD and other UN-supported or accredited bodies such as RAMSAR provide a range of guidance CBD focusing on access and benefit sharing (ABS) relating to plant genetic resources. The CBD is supporting a number of global and regional initiatives to develop the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity.

- The CBD describes the Nagoya Protocol as "an international agreement to share benefits from use of genetic resources in a fair and equitable way, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding, thereby contributing to the conservation of biological diversity and the sustainable use of its components."
- The Protocol was adopted by the Conference of the Parties to the CBD at its tenth meeting on 29 October 2010 in Nagoya, Japan.

RAMSAR also has a focus on benefit sharing related to the management of wetland areas and IWRM river basin management, and also looks holistically at opportunities such as benefit sharing with local communities in wetland-related ecotourism.

Other UN affiliates such as the FAO support the introduction of benefit sharing in forestry, ecotourism, fisheries and agriculture sectors. The FAO indicates it is actively working to address some of the shortcomings that have arisen in the new multilateral system for ABS relating to the FAO International Treaty on Plant Genetic Resources for Food and Agriculture

[116]The following is directly taken from MRC 2011a: 66-70.

(ITPGRFA). This underlined the complexity of some forms of regional and international benefit sharing, and the time it takes to reach Agreements

ii. International NGOs, CSOs and industry associations

A number of international CSO and NGOs are proactively promoting benefit sharing in various resource sectors. These initiatives are important in early stage awareness raising and knowledge dissemination and to help catalyse and support government action. To illustrate:

NGO/CSOs

- WWF is supporting international efforts in all sectors. In the Mekong, WWF is providing financial support to the grant programme of the Viet Nam benefit sharing trial on the A'Vuong hydropower project seeking to bring upstream and downstream issues into the picture.
- IUCN is active in benefit sharing in all resource sectors. In the water sector, in 2008 IUCN produced a guideline book called "Share" as part of the Water and Nature Initiative (WANI) series. As the IUCN website on this notes:
- "SHARE uses case studies from around the world to describe the benefits to be gained from cooperation and the challenges of constructing legal frameworks, institutions, management processes and financing, and partnership strategies to govern transboundary waters equitably and sustainably.
- Share presents practical tools in plain language to help practitioners and stakeholders conceptualise and implement cooperative, participatory and sustainable water management. It emphasises the value of information, communication, institutions and adaptability.
- Share also underscores the broad range of benefits that can be derived through cooperative management of international rivers and the need for equity in benefit sharing, particularly with regard to project-affected people."
- The International Institute for Environment and Development (IIED) is supporting a process of awareness raising on benefit sharing on large dams in West Africa, with a view to helping to establish the first pilot project in that region

The International Hydropower Association (IHA)

The IHA is a UN affiliate body formed under the auspices of the UNESCO 1995. The IHA has members in more than 80 countries drawn from organisations and individuals in industry, international organisations, governments, scientific and academic institutions, and civil society.

- IHA states one of its purposes is to "address the role of hydropower in meeting the world's growing water and energy needs as a clean, renewable and sustainable technology".
- The Hydropower Sustainability Assessment Protocol is accepted as one of the main, new tools to assess what makes hydropower sustainable. The Protocol was first developed by the International Hydropower Association (IHA) in 2004, and then elaborated in a multi-stakeholder international process in 2010.
- The Protocol assesses the four main stages of hydropower development: Early Stage, Preparation, Implementation and Operation. The assessments rely on objective evidence to create a sustainability profile against some 20 topics depending on the relevant stage of hydropower, covering all aspects of sustainability.
- As one of the topics, the Protocol assesses what additional benefits derive from hydropower projects and the degree of sharing of benefits, which is defined as going beyond

one-time compensation payments or resettlement support for project affected communities.

- The Protocol defines benefit sharing in terms of (i) equitable access to electricity services ii) non-monetary entitlements to enhance resource access, and (iii) revenue sharing.
- The IHA notes that intention of the Protocol is that opportunities for additional benefits and benefit sharing are evaluated and implemented, in dialogue with local communities and basin residents, so that benefits are delivered in a manner that enhances public acceptance.

Other intergovernmental organisations

Groups such as the International Commission on Large Dams (ICOLD), the International Commission on Irrigation Development (ICID) and the International Energy Agency (IEA) actively support benefit sharing on hydropower projects as good practice.

- The IEA refers to good practice on benefit sharing in hydropower.
- ICOLD and CHCOLD (the China branch of ICOLD) noted benefit sharing with local communities was key to sustainable hydropower in the Beijing Declaration adopted at the UN Symposium on Hydropower and Sustainable Development, Beijing, China, 29 October 2004
- The reference to benefit sharing was in relation to resolutions on how to implement sustainable hydropower policy: “With respect to social aspects, we note that the key ingredients of successful resettlement include minimization of resettlement, commitment to the objectives of the resettlement by the developer, rigorous resettlement planning with full participation of affected communities, with particular attention to vulnerable communities. We are encouraged by the trend of some governments to go beyond good practice resettlement by providing benefit sharing with host communities, and call on governments to consider incorporating such approaches in their legal and regulatory frameworks. We further call upon Governments and regional and local authorities to accord special consideration to culturally sensitive areas.”

These organisations see benefit sharing mechanisms as a way to advance public acceptance of sustainable hydropower projects, rather than hinder infrastructure strategies of countries.

iii. International development and financial community

The international financial community involved in project lending for hydropower is supportive of benefit sharing and support benefit sharing mechanisms adoption in various ways from policy to practice, as part of their operations.

International financial institutions

World Bank: The World Bank has helped to catalyse national efforts on World Bank-supported dam projects in the past decade. These include the formative Bumbuna Trust in Sierra Leone and Lesotho Fund for Community Development (LFCD). These initiatives are valuable not only in offering good practice, but also offering practices to avoid, such as ensuring revenue sharing fund have genuine multi-stakeholder governance as in the Lesotho Highland example.

Other activities of the World Bank objectives include:

- The World Bank has been compiling and disseminating emerging good practice. One example is the desk study, 'Benefit Sharing from Dam Projects', in 2002 that drew on 11

case studies from Canada, China, Latin America, Norway and Southern Africa. Most are hydropower projects. The principal author updated the desk study in 2007 as input to the DDP Compendium.

- More recently, as part of scaling-up its investments in hydropower projects globally the World Bank has embarked on a new program of case studies and preparation of a toolkit for operational staff and client governments. In 2009 the World Bank publication "Directions in Hydropower" identified the sharing of the hydropower benefits of development across all stakeholders as a key criterion for sustainable hydropower

Asian Development Bank: The ADB is supporting knowledge development and dissemination on a number of aspects of benefit sharing.

- The ADB has Technical Assistance Projects to help Asian region countries introduce benefit sharing mechanisms for people adversely affected by hydropower projects
- The ADB is also collaborating with MRC and WWF on the RSAT [for RSAT see Section 4.3 in this training manual] where benefit sharing is one of the 11 assessment topics, namely "TOPIC 8: Sharing of benefits and use of innovative financing measures for sustainability (local and transboundary).

OECD Bilateral Agencies: these development organisations directly and by virtue of support for WCD in EU Directives embrace and promote benefit sharing mechanisms in a number of sectors

Pandal basin exercises(see fictitious case in Annex IV)

2.2 Exercise 1, Part 1 (Benefits): Pass out packets of post-it notes to participants. Ask the participants to work in their country teams to write one use or benefit of water on each post-it note. Optionally, ask that participants write uses/needs/values on one color post-it and benefits from the river on another color post-it note. Direct participants to generate ideas as a group and to refer to the country descriptions as needed. After participants have generated a series of uses and benefits, project an image of the Pandal basin with the borders removed. Then, ask all teams to stick their post-it notes onto the image of the basin in the area where that benefit or need exists. For instance, "hydropower" as a benefit may be posted in the headwaters, while "power" as a need may be posted in areas where cities exist. Ask participants to discuss what they see and to move or add new post-it notes as needed. Debrief.

2.2 Exercise 1, Part 2 (Benefit Sharing): Leave the post-its displayed on the map without borders. Ask the ministers from each country to group together (e.g. all of the ministers of energy in one corner, all of the agricultural ministers in another, etc.). Ask them to discuss the benefits and needs in their sector for the whole map, and then come forward and connect benefit post-it notes to needs post-it notes using string and tape (or dry erase markers if projecting onto dry-erase board). Once all groups have identified connections between needs and benefits, switch the projection to show the map with borders. Ask ministers to return to their country groupings and discuss (in their small groups) what their country can give and what they might receive from sharing benefits with neighboring countries. Then, the facilitator should ask all of the groups to generate a list of potential benefits from transboundary cooperation. The facilitator should keep track of these ideas on a sheet of flipchart paper. Debrief.

Discussion topics	• Are the different standards for benefit sharing complementary or contradictory?
	• Why are RBOs beneficial for the construction of benefit sharing mechanisms? Are they the best option, or one of many equally good options?
	• Why are there so many different benefit sharing mechanisms, and not just one standard mechanism?
Exercises	• River Basin Game
	• Role play: benefit sharing in the Pandal river basin (see fictitious case in Annex IV)
	• Group work (this can follow the role play): what information do negotiating parties need from each other in order to devise successful benefit sharing mechanisms (examples of information: proposed dam location, purpose of dams, national development plans, who is in charge of negotiating what etc.)?
Additional Reading	Dore, John / Lebel, Louis 2010: Gaining Public Acceptance: A Critical Strategic Priority of the World Commission on Dams. In: Water Alternatives 3(2): 142-141.
	World Commission on Dams 2000: Dams and Development: A New Framework for Decision-Making.
	Égré D 2007: UNEP Dams and Development Project: Compendium on Relevant Practices, 2nd Stage. Revised Final Report, Benefit Sharing Issue. UNEP: no place.
	Égré D / Roquet V / Durocher C 2002: Benefit Sharing from Dam Projects. Phase 1: Desk Study. Final Report. World Bank: Washington
	Égré D / Roquet V / Durocher C 2008: Benefit Sharing to Supplement Compensation in Resource Extractive Activities: The Case of Dams. In: Cernea M / Mathur H (eds.): Can Compensation Prevent Impoverishment? Reforming Resettlement through Investments and Benefit-Sharing. Oxford: Oxford University Press, pp 317-357.

2.3 Transboundary benefit sharing in the framework of the MRC

Purpose	This sub-session introduces the potential for benefit sharing and actual benefit sharing mechanisms that exist in the Mekong river basin.
Objectives	By the end of this sub-session, trainees will: • Be able to critically evaluate the role of the Mekong River Commission in regional benefit sharing mechanisms • Assess the potential for transboundary benefit sharing mechanisms in the Mekong river basin
Preparatory reading	MRC 2011: Knowledge base on benefit sharing, Volume 1 of 5, pp. 10-30. Online: http://www.mrcmekong.org/assets/Publications/Manuals-and-Toolkits/knowledge-base-benefit-sharing-vol1-of-5-Jan-2012.pdf.
	1995 Mekong Agreement and Procedures, http://www.mrcmekong.org/assets/Publications/policies/MRC-1995-Agreement-n-procedures.pdf.
	MRC 2011: Basin Development Strategy, http://www.mrcmekong.org/assets/Publications/strategies-workprog/BDP-Strategic-Plan-2011.pdf.

2.3.1 Provisions for benefit sharing in the Mekong Region

Although there is no full benefit sharing mechanism in place at transboundary level in the Mekong river basin, the 1995 Mekong Agreement includes principles that allow for transboundary benefit sharing:

- Equitable and Reasonable Utilization (Articles 5 and 6)
- No Harm (Articles 7 and 8), and
- Freedom of Navigation (Article 9)

Furthermore, the 2011 Basin Development Strategy directly refers to benefit sharing as a principle of the joint development of the Lower Mekong basin. In detail, the Basin Development Strategy clarifies that benefit sharing should be an integral part of the Development Opportunity Space (DOS) for developing the Lower Mekong basin. The DOS defines the scope of Lower Mekong basin development and includes: tributary hydropower projects, expansion of irrigated agriculture, mainstream hydropower development, and other opportunities (fisheries, navigation, flood and drought management, as well as opportunities beyond the water sector such as alternative power generation options, trade or transport) [for more details on the Development Opportunity Space see Section 3.3 in this training manual].

In order to achieve this, the Basin Development Strategy emphasizes the need for a transparent process that "(i) explores joint and mutually beneficial development opportunities that are beyond national plans, within and outside the water sector; and (ii) closes knowledge gap and develops mitigation measures that will facilitate the review and decision making for future development opportunities"[117]. The DOS therefore does not only define the scope of work, but it also constitutes a cooperation space or negotiation space within which mutually beneficial options can be explored.

This allows the development of a range of indirect and additional benefits, and the need for attention to "detailed identification of impacts and of mitigation and benefit-sharing measures, and to coordination between LMB countries on tributary dam operation and with China on Lancang dam operation, to: ensure certainty and security of LMB dry season flows, reduce flood peaks, and minimize loss of wetland and sediment and nutrient supply."[118]

In determining the effects of dam development in the Mekong River system, the Basin Development Strategy addresses both Mekong basin dams in general, but also differentiates between tributary and mainstream dams. For dams in general the Basin Development Strategy points the interaction between positive and negative effects:

- "The large Lancang storage dams and 26 existing or committed LMB tributary dams, if operated as expected to optimize power generation, would reduce wet and increase dry season flows, changing mainstream river flows substantially, most evidently upstream of Vientiane. This potential redistribution would provide sufficient dry season flows to meet all LMB consumptive water demands projected in national 20 year plans, without contravening the baseline flow regime. Nevertheless, there is a risk that storage dam releases do not meet expectations; releases to meet extreme situations could lead to increased flood peaks and reduced dry season flows.

[117] MRC 2011b: 6.
[118] MRC 2011b: 18.

- Economic benefits expected from hydropower development include reduction of flood damage, reduced salinity intrusion, and increased reservoir fisheries. Employment opportunities (370,000 new jobs estimated) will be generated, primarily in the hydropower and fisheries sectors.
- However, inevitable and irreversible flow changes will have substantial impacts, including a reduction of wetlands, reduced flow reversal into Tonle Sap, and reductions in sediment flows causing irreversible river bed incision and bank erosion, affecting Delta-shaping processes. Reduced sedimentation will reduce wetland and agricultural productivity and sediment and associated nutrient discharge to coastal waters, affecting marine fisheries. Capture fisheries will reduce by 7%, primarily as a result of LMB tributary dams, two environmental hotspots will be highly impacted, and the livelihoods of a million vulnerable people will be at risk.
- The Strategy recognizes that changes are inevitable as a result of past decisions and that there is an urgent need for collaboration to capture the opportunities and address the impacts of the ongoing development. The Strategy gives immediate attention to detailed identification of impacts and of mitigation and benefit-sharing measures, and to coordination between LMB countries on tributary dam operation and with China on Lancang dam operation, to: ensure certainty and security of LMB dry season flows, reduce flood peaks, and minimize loss of wetland and sediment and nutrient supply."[119]

With regard to tributary dams, the Basin Development Strategy argues that all countries would benefit from opportunities arising from regional power trade, irrigated agriculture and better flood management. Impacts coming from the additional thirty dams that are planned over the next twenty years on the tributaries in Laos, Cambodia and Vietnam 'are mostly felt in these countries.'[120]

For risks arising from mainstream dams, the MRC's 2011 Basin Development Strategy points out that Cambodia and Vietnam would be most affected. This includes reduced capture fisheries and sediment transport. At the same time, the arising opportunities – irrigated agriculture, fisheries development, reduced flood damages, increased river-borne trade and tourism – 'are more evenly distributed'. As a consequence, in order to distribute risks and benefits evenly, coordination and cooperation of countries on cross-border issues is needed.[121]

2.3.2 Case study of benefit sharing in the region: the Nam Theun 2 Dam in Laos

The purpose of the Nam Theun 2 Dam is to earn revenues for the government of Laos by selling the generated electricity to Thailand. The key benefit sharing mechanism is that these revenues are used for poverty alleviation (and environmental protection) programmes.

The Nam Theun 2 Dam is generally considered to have largely effective social and environmental impact measures in place. It must also be pointed out, however, that as the dam was funded predominantly by the World Bank and the Asian Development Bank. Therefore, the government of Laos was forced into complying with international social and environmental

[119]MRC 2011b: 18.
[120]MRC 2011b: 21.
[121]MRC 2011b: 22.

standards. Following the construction of Nam Theun 2, the government announced that it would not comply with such strict international standards for projects where the Banks are not involved. Hence, Nam Theun 2 cannot be considered an ordinary example of dam-building in Laos.

Planning for Nam Theun 2 has included an unprecedented amount of consultations with affected people, all of who were ethnic minorities. Apart from paying cash compensation, the project company Nam Theun 2 Power Company was responsible for building villages for communities that had to be resettled. These villages were built following intensive consultations with relocatees, including on issues such as design, location and materials for construction in order build houses that were adequate for the livelihoods of the ethnic minorities. The health environment improved, including improved access to drinking water and sanitation and regular health checks. In terms of income opportunities, villagers received expert advice on how to increase agricultural incomes and how best to use their cash compensation, as experience shows that cash compensation is often quickly spent for consumer products rather than invested for long-term benefits.

The summary of the environmental and social impact assessment details the measures put in place to ensure a resettlement process that safeguarded the livelihoods of affected people:

a Resettlement Action Plan and Ethnic Minorities Development Plan for the Nakai plateau; a Resettlement Action Plan and Ethnic Minorities Development Plan for Xe Bang Fai and downstream Nam Theun; a Project Lands Resettlement Action Plan; Social and Environment Management Framework and First Operational Plan (SEMFOP); a Public Health Action Plan; and a Human Trafficking and Safe Migration Awareness Program.

The Lao government also committed to the following legal rights of the ethnic minorities on the Nakai plateau, detailed in Schedule 4, Part 1 of the concession agreement of Nam Theun 2 Power Company:

Legal entitlements for affected people on the Nakai plateau[122]

Housing

- The labor and transportation cost associated with the dismantling of existing house and constructing new one
- Provision of new materials for construction of new house
- Electrical wiring and basic fixtures
- Minimum housing area not less than existing area or 42 square meters (m2), whichever is the greater
- Households of seven or more persons containing two families have the option to have two houses
- Sheds, other outbuildings, and fencing will be provided to the household

House/Farm Land

- 0.5 hectares (ha) per household
- Up to 0.15 ha of riceland per household in off-village location, to be developed / allocated on a community basis. In the event less land is available, other livelihood options will provide replacement

[122]Nam Theun Second Power Company 2004.

- Land provided with survey, and joint title to husband and wife
- House to be constructed in location acceptable to owner

Infrastructure

- Irrigation to rice lands
- Year-round household water supply
- Electricity to the house
- Irrigation water to the house/farm lot boundary and distribution system
- Road access to house/farm lot
- School access within 3 kilometers (km)
- Clinic access within 5 km

Services

- Transportation of all household assets to new location
- Health check of all household members prior to and after move
- Access to the resettlement management unit (RMU) for advice
- Access to grievance procedures for complaints

Cash

- One-time allowance to cover moving time, disturbance of $1 5/person
- Compensation for fruit trees lost at district prevailing market prices in case no acceptable replacement trees provided, compensation for standing crops at market prices

Production Assistance

- Effective access to a range of feasible production and income generation options to meet predetermined household income target, including production forest and reservoir fisheries
- Tools to work the farm and forest land
- Planting materials for **3** years after preparation of farm lot, including fruit tree saplings
- Fertilizer and other agro-chemicals for **3** years after preparation of farm lot
- Training in farming, forest management, and fisheries techniques
- Agricultural advice for 5 years after preparation of farm lot
- Access to identified forests for collection of non-timber forest products
- Access to identified reservoir drawdown areas
- Skills training for wage labor jobs
- Household budgeting training
- Income support program during implementation period at 440 kilograms (kg) of rice per person
- Households with economically inactive members and other vulnerable households to participate in the production benefits from communal forests through provision of a basic needs allowance as determined by the village

Those wishing to permanently leave the district and not move to a resettlement site will receive a one-time payment for the value of land, trees, production, and structures lost, plus transportation and disturbance allowances.

Thus, the Lao government has agreed to substantial improvements in livelihoods and is therefore in compliance with international resettlement standards that demand that liveli-

hoods following resettlement must be at least as high as they were before relocation. To fund activities on a continuous basis, a village level micro finance mechanism was established. The resettlement process is scheduled to be completed by April 2016.[123]

In terms of the environment, revenues from the project also go towards the improved management of three protected areas (Nakai-Nam Theun, the Hin Nam Nor and the Phou Hin Poun National Biodiversity Conservation Areas) that altogether exceed by roughly ten times the area flooded by the reservoir. Further measures included fish surveys, management plans for Asian elephants, and the establishment of a Water Management Protection Authority to manage the reservoir area.

The World Bank has commissioned an environmental and social panel of experts that since 1997 has regularly reported on the progress and the implementation of the social and environmental measures. The latest report was published in 2013. [124]

[123] McDowell et al 2013.
[124] McDowell et al 2013.

Discussion Topics	• Debate the options for transboundary benefit sharing in the Mekong basin.
	• Are there dams that would be suitable for benefit sharing?
Exercises	• Debate: pro and contra international practice as a model for creating benefit sharing in the Mekong basin Divide the class in two groups. One group develops arguments in favour of using international examples, the other group develops arguments against using international examples. Time for argument development: 15-20 minutes. Then both groups introduce their arguments to the other group, led by a debate leader. This is followed by both groups defending their arguments vis-à-vis the other group.
	• Small group work: How are international frameworks introduced in Section 2.2 relevant for the Mekong basin?
Additional Reading	McDowell, David / Scudder, Thayer / Talbot, Lee M. 2013: *Laos - Nam Theun 2 Multipurpose Development Project: environmental and social panel of experts*. Washington DC: World Bank. http://documents.worldbank.org/curated/en/2013/02/17524947/laos-nam-theun-2-multipurpose-development-project-environmental-social-panel-experts
	ICEM 2010: Strategic Environmental Assessment of Hydropower on the Mekong Mainstream: Final Report. Glen Iris, Victoria: ICEM.
	MRC 2008: Regional Multi-Stakeholder Consultation on the MRC Hydropower Programme
	Hirsch, Philip 2006: Water Governance Reform and Catchment Management in the Mekong Region. In: Journal of Environment and Development 15(2).
	Mirumachi, Naho and Torriti, Jacopo 2012: The use of public participation and economic appraisal for public involvement in large-scale hydropower projects: Case study of the Nam Theun 2 Hydropower Project. In: Energy Policy 47: 125-132.

3 THE ROLE OF RBOS FOR TRANSBOUNDARY HYDROPOWER DEVELOPMENT

Session 3: The role of RBOs for transboundary hydropower development	
Sub-Session	**Key questions**
I. The role of RBOs	• To what extent can RBOs play a facilitating role in transboundary hydropower development?
II. Examples from other river basins	• How are other RBOs organised? • What is the mandate of different RBOs in the field of hydropower development?
III. The role and mandate of the MRC	• What is the role and function of the MRC in hydropower development? • Which structures and capacities for transboundary hydropower development exist?

3.1 The role of RBOs

Purpose	This sub-session introduces important theories and concepts relevant to describe the roles, means and mechanisms available to RBOs to support cooperative governance and in particular, it explains how hydropower development is usually done by RBOs.
Objectives	By the end of this sub-session, the trainee will: • Be aware of the advantages of RBOs for transboundary hydropower development • Know different roles that RBOs can take in transboundary hydropower development
Preparatory reading	Mostert, Erik 2003: Conflict and Co-operation in International Freshwater Management: A Global Review. In: International Journal of River Basin Management 1(3), pp. 1-12.
	GIZ 2012: Assessment of RBO-Level Mechanisms for Sustainable Hydropower Development and Management. Vientiane: GIZ, pp.2-6, 39-49. Online: http://www.icp-confluence-sadc.org/sites/default/files/RBO_Mechanisms_SustainableHydropower_Report_MRC-GIZ_final.pdf.
	Sadoff, Claudia et al 2008: Share - Managing Water Across Boundaries. Gland: IUCN, Chapter 5. Online: http://data.iucn.org/dbtw-wpd/edocs/2008-016.pdf.

3.1.1 Important factors towards cooperation

As shown in Figure 3-1 below, many agreements on transboundary water resources relate to cooperation on hydropower. In this section, we will present important concepts that have been developed in order to help understand which factors are important for cooperation in general and for transboundary hydropower development in particular (see also Section 2 on benefit sharing in this manual).

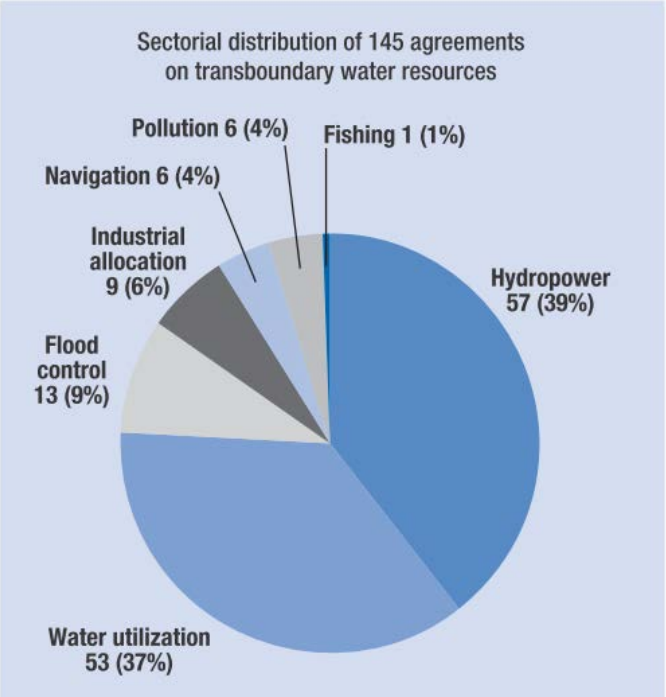


Figure 3-1 Sectorial distribution of 145 agreements on transboundary water resources[125]

Figure 3-2 describes a variety of institutional mechanisms and a simple range of options ranging from low power/authority to high power/authority to allocate water. To the left of the spectrum, power to allocate based solely on individual sovereign right is represented. To the right, one finds regional, comprehensive authority for decisions in the water resources field. Moving from individual autonomy towards regional authority, a variety of approaches are noted: individual studies, regional study centres, treaties, conventions, and river basin authorities, up to comprehensive regional authority.

[125]UNDP 2006:222.

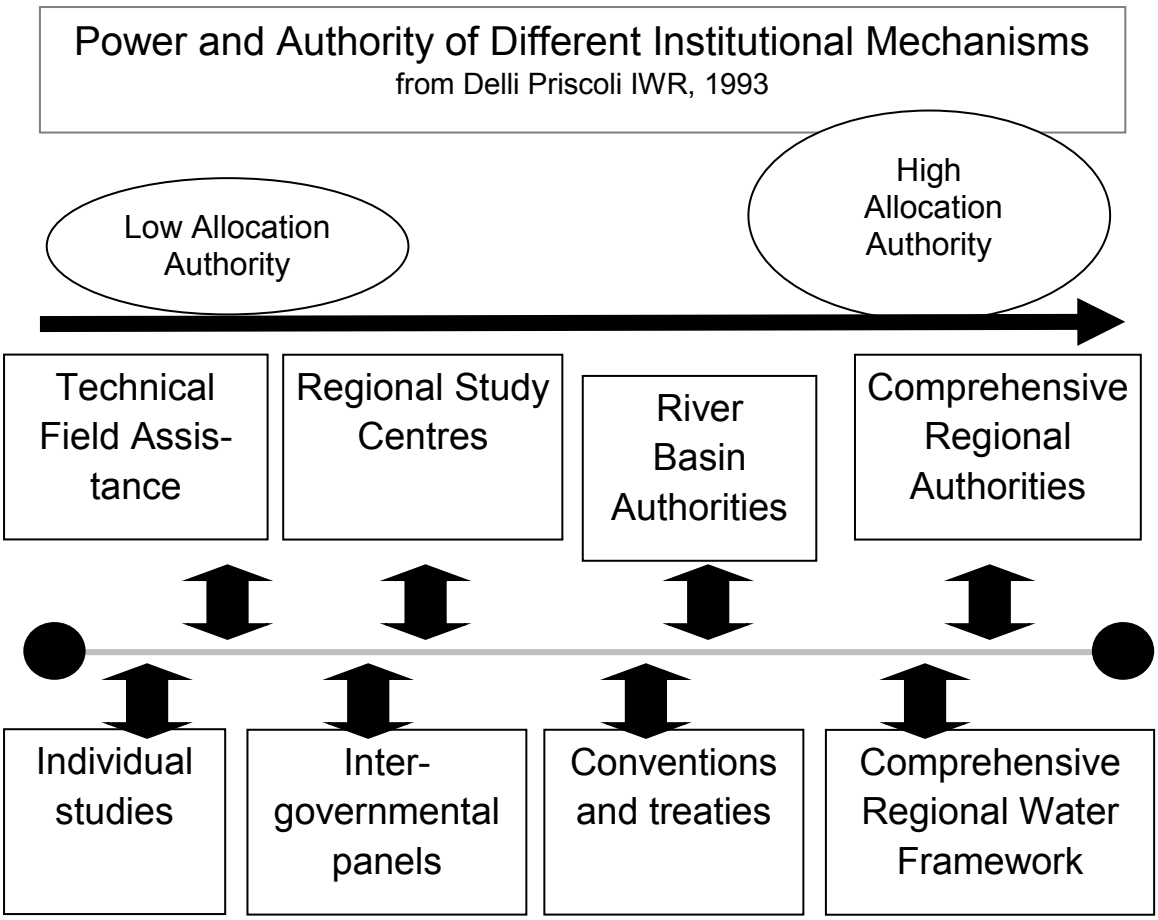


Figure 3-2 Institutional mechanisms and options[126]

According to Sadoff et al. (2008), one of the main challenges of institutional design when creating a RBO is finding scope for cooperation, meaning overcoming the geographic, economic and political power asymmetries typical between riparian states[127].

Another framework currently used to discuss important factors of cooperation is the TWINS (Transboundary Waters Interaction NexuS) concept by Mirumachi and Allan (2007)[128]. The authors argue that for successful water allocation and management, there must be consideration about how the intensities of conflict and cooperation in transboundary relations and development of the political economy change over time. Figure 3-3 shows how different intensities of co-existing conflict and cooperation can be sequenced using the TWINS approach. In the graph, it is shown that conflict intensity over transboundary waters increases as issues become more of threat to the states. The levels of cooperation intensity depend on the existence of the following factors: common goals, joint action, intention of contributing to collective action and the belief in others' contribution to collective action. The third dimension in the TWINS approach, the level of robustness of political economy, enables to include oth-

[126] UNESCO 2003.
[127] Sadoff et al 2008: chapter 5.
[128] Mirumachi/Allan 2007: 7.

er institutional qualities such as the strength of the economy (e.g. in terms of GDP per head). This framework can then be used to plot the state of transboundary relations at a point in time as well as through different phases of a relationship.

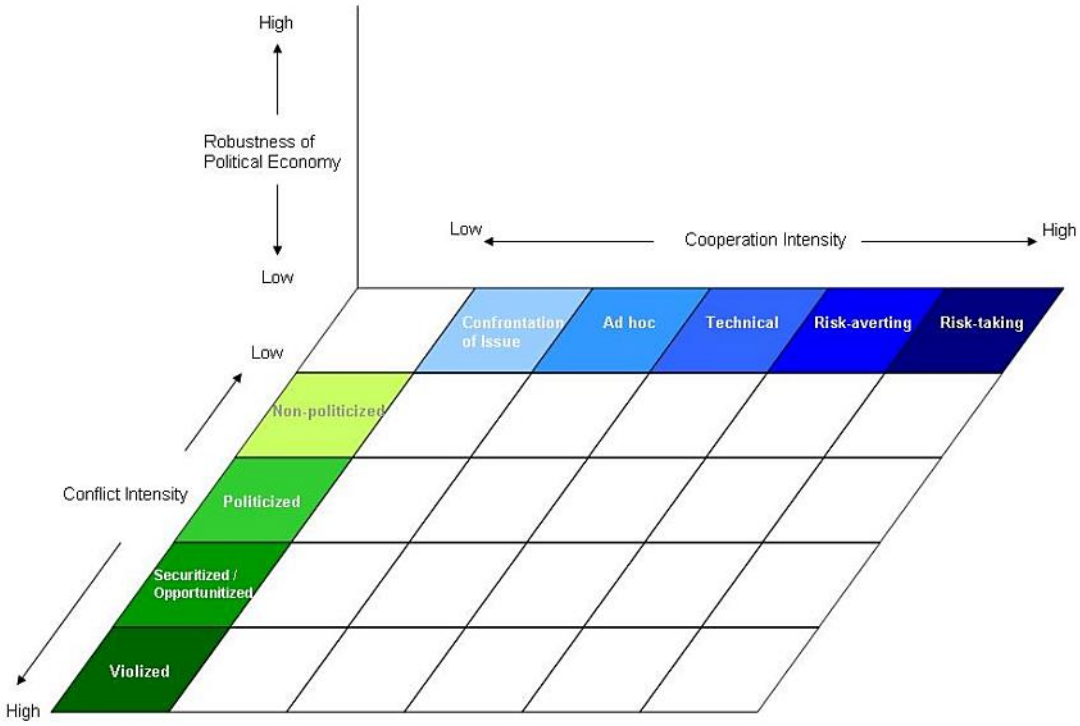


Figure 3-3 TWINS conceptual approach[129]

3.1.2 Institutional set up of RBOs

In order to ensure a coordinated development and management of water resources, transboundary water cooperation is required between countries sharing water resources. Among the provisions of the UN 1997 Convention is mentioned the creation of a joint organisation, as a means of planning for the sustainable use and protection of watercourses[130]. River basin organisations (RBOs) are established by a treaty or an agreement between river basin states that should include the following minimum considerations[131]:

- Objective and purpose;
- Nature and composition;
- Form and duration;
- Legal status;
- Areas of operation;
- Roles and responsibilities;
- Financial provisions.

[129] Mirumachi/Allan 2007: 7.
[130] A/51/869: UN Convention on the Law of the Non-Navigational Uses of International Watercourses, adopted by the General Assembly, New York, 21 May 1997, Article 24.
[131] International Law Association, Berlin Conference (2004) Water Resources Law, Article 65. Based on the overview provided in: Aguilar / Iza 2011.

It is further stipulated that a joint management mechanism at the water basin level must be competent, inter alia, in the following areas:

- The coordination of scientific and technical research programmes;
- The establishment of harmonised, coordinated and unified networks for observation and continuous monitoring;
- The establishment of quality, harmonised objectives and standards for the whole basin or for a significant part of it.

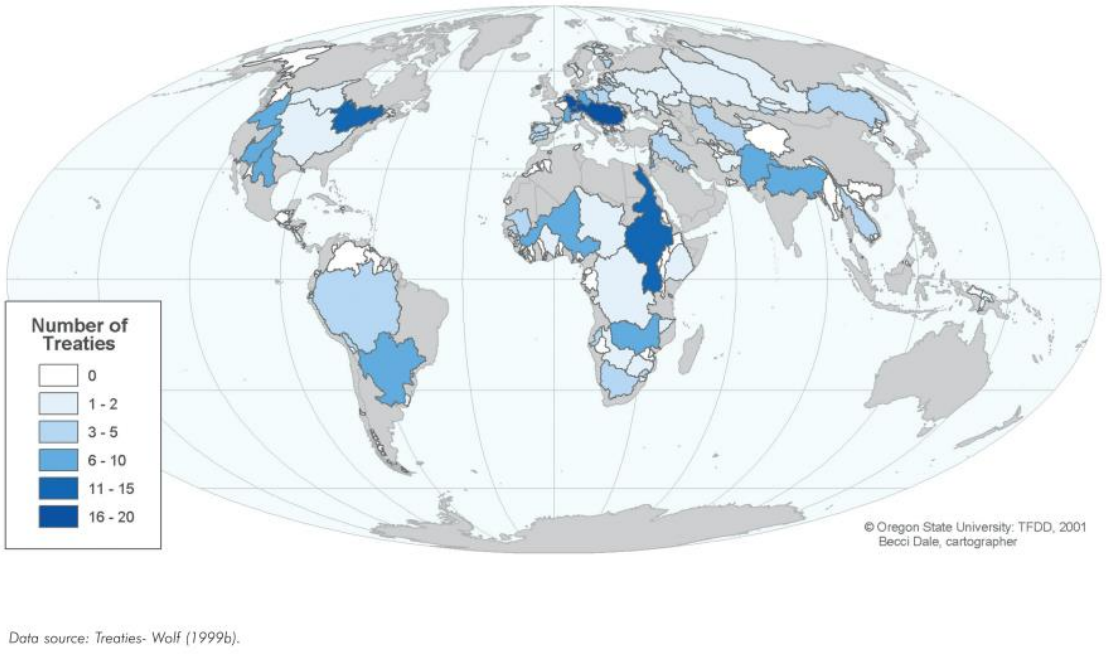


Figure 3-4 International basins of the world and the number of associated treaties[132]

When focusing on transboundary hydropower development, riparian countries have developed diverse institutional structures and organisational settings for joint hydropower development and management. Depending on the main hydropower concerns to be tackled, existing cooperation and riparian relationships in the basin provide important context factors that can benefit or hinder cooperation (see also Section 2 on benefit sharing in this manual). Existing multi- or bilateral institutions can provide a suitable frame for planning and developing joint hydropower projects, ideally covering large parts or the whole river basin. Even where no basin-wide cooperative frameworks exist, project-specific institutions are regularly established for the operation and maintenance of hydropower projects. These can take the legal form of a company owned by the riparian states or the form of a bilateral or multilateral authority[133].

The coordinated planning and operation of multiple hydropower schemes however appears to be essential in order to achieve a combination of optimal hydropower output in the whole basin (rather than for individual projects) and harmonised requirements for environmental and social mitigation. This involves conducting coordinated pre-feasibility studies as well as

[132] Wolf2002.
[133] GIZ 2012.

knowledge sharing between the riparian countries. However when coordinated planning and cooperation is not possible, other options also allow for sustainable hydropower.

Mostert (2003) identifies three main types of RBOs[134]:

- RBOs dealing with the *integrated development of a river basin*: found mostly in the developing world, often co-ordinate donor financing and typically large.
  Example: Mekong River Commission.
- RBOs dealing with the *integrated protection of river basins or other freshwater resources*: found mostly in the developed world.
  Example: European commissions, such as the Rhine, Danube, Meuse, Scheldt commissions.
- RBOs with *very specific tasks*: may have significant regulatory powers, tend to be quite small.
  Example: Permanent Indus Commission.

These types of RBOs differ in their scope of work and in their function. Different types of RBOs were created to fulfil different aims, resulting in different institutional designs. Another typology is provided by Schmeier (2010), who identifies two types of RBOs, namely *implementation-oriented* and *coordination-oriented RBOs.* The following table summarises respective characteristics regarding their typical role, organisational structure, relations to member states and financial requirement. These characteristics represent "ideal" types of RBOs, however there is a broad continuum between the two prototypes and an RBO can rank anywhere between them, depending on the specific challenges in the river basin and the preferences of riparian states[135].

[134]These RBO categories are based on Mostert 2003.
[135] Schmeier2010.

	Implementation-oriented RBO	Coordination-oriented RBO
Role and Responsibilities	- Focus on the implementation of programs and projects in the basin, often beyond pure water resources management (development focus)	- Focus on coordination of member states' activities in water resources management (independent from development needs of members)
Organizational Structure	- Rather large, with different organizational bodies in charge of the different tasks and activities - High degree of centralization	- Rather small, with limited number of subsidiary bodies - Strongly decentralized
Secretariat	- Rather large with various subsidiary departments - Fulfills large number of tasks (beyond administrative services) - Maintains large amount of centralized data and information	- Rather small, with limited number of departments and small number of staff - Provides administrative and technical services and facilitates work of member states
Links to Member States	- Needs to be maintained through specific links - Complexity of operation makes ownership difficult - If managed efficiently, strong links can develop due to implementation	- Ensured through decentralized Working and Expert Groups and national implementation - Links are based on personnel exchange and interaction on all governance levels
Financial Requirements	- High financial needs due to complex structure and many tasks (including implementation - Program/project structure allows for acquisition of external funding	- Relatively low financial needs due to limited number of tasks carried out on the transboundary level
Advantages	- High level of engagement in river basin development - Centralization of knowledge on the basin	- Short decision-making channels - High efficiency in management
Disadvantages	- Long decision-making channels with many intermediary bodies - High financial needs for programs and projects	- Focus on water resources management only (i.e. no development focus) - Requires high human, financial and technical capacities in member states
Examples	LCBC, NBA, NBI, OMVS, ZRA	ICPDR, ICPER, ICPR, OKACOM

Table 3-1 Comparison between implementation- and coordination-oriented RBOs.[136]

[136] Schmeier 2010: 47.

3.1.3 Linkages of RBOs in the region (e.g. to RECs) and anchorage in countries

i. Linkage to regional bodies

Good transboundary governance takes place at multiple scales. Thus, interaction with other existing institutions at all levels is essential to achieve an effective transboundary organisation. There are three different ways how a RBO can be linked to other organisations existing in the region[137].

- First, RBOs can be a *direct part* of an overarching regional organisation. In most cases, the larger organisation created the RBO as a subsidiary body. This is true for the Lake Victoria Basin Commission (LVBC) and the Lake Victoria Fisheries Organization (LVFO), which are both parts of the East African Community (EAC).
- Secondly, there are RBOs which are *legally independent* from existing regional organisations, but nonetheless connected to them because the RBO member states are part of the regional organisation and transferred parts of their national sovereignty to that international body. For instance in Southern Africa, the SADC Protocol on Shared Watercourses establishes principles to guide water resources management in the region and calls for the creation of watercourses institutions (Article 5 of the Revised SADC Protocol). In consequence, already existing RBOs in Southern Africa (e.g. OKACOM) have been modified to fulfil the requirements of the Protocol. Moreover, new watercourse institutions (e.g. ORASECOM for the Orange-Senqu River and ZAMCOM for the Zambezi Watercourse) have been established.
  The European Union's (EU) framework for cooperation in the management of water resources even has a more obligatory character. The EU established the EU-Water Framework Directive (WFD) that contains binding principles for water resources management. A number of subsidiary bodies (e.g. ICPDR for the Danube River, ICPER for the Elbe River, ICPR for the Rhine River) that are co-owned by the EU and its member states are responsible for the implementation of these principles.
- Thirdly, there are RBOs which are *completely independent* from other regional organisations.

The Framework for Water Security and Climate Resilience of AMCOW[138] provides some useful information on how to facilitate dialogue and cooperation on a number of different planning levels relevant to show linkages that can exist between RBOs in a region and how such organisations can be anchored in the member countries. Figure 3-5 illustrates the framework for the African context. On the regional level, there are RBOs and Regional Economics Communities (RECs). On the national level, there usually exist a number of bodies including ministries and their departments in various sectors relevant to water management and planning, local communities as well as stakeholder platforms and other civil society organisations. All these should be brought together in different levels of dialogue in order to make use of the existing thinking and planning tools, as well as of interdisciplinary teams. Mapping these existing bodies and defining how dialogue should work between them will be useful in order to define the level where questions relating for instance to transboundary hydropower development are best dealt with and developed.

[137] Information for this part of the chapter is adapted from Schmeier2010.
[138] AMCOW 2012.

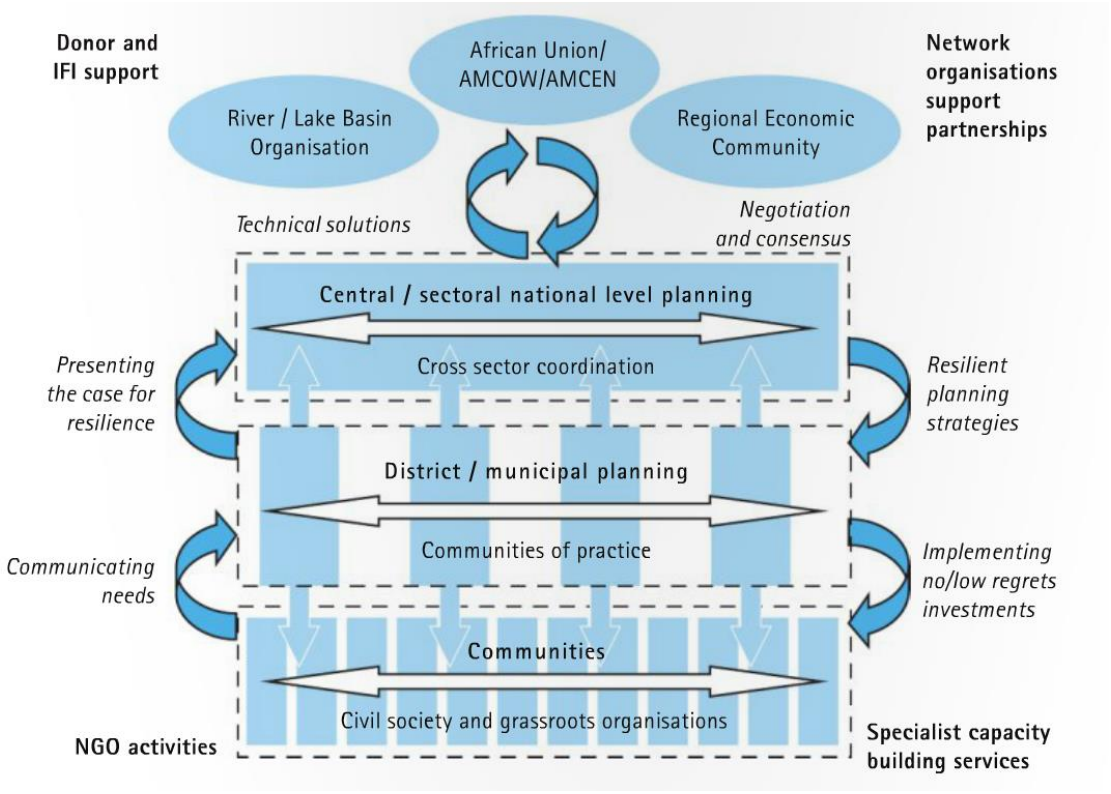


Figure 3-5 Conceptualization of the dialogues across sectors and scales[139]

ii. Linkage to the national level

Another important topic is how RBOs can be anchored in their member countries. Schmeier (2010)[140] provides insights on possible linkages between organisational and national levels based on international examples. We have seen in section 1 that RBOs appear to be the most efficient way of resolving collective action problems and that different starting points for the creation of RBOs result in different institutional designs. As a result, there are also various ways of how RBOs are integrated with national institutions of their member countries, ranging from decentralised structures to strongly centralised structures.

In decentralised RBOs, implementation takes place entirely on the national level and is being carried out by line agencies, political actors in province, local communities or NGOs. This is for example the case for ICPER and ICPR. Centralized RBOs (please also refer to Table 3-1 above), on the other hand, are engaged in all levels of river basin management. Examples here are NBA or OMVS (please refer to the Box below for more information).

Box: Examples of different degrees of decentralization across RBOs in the management of data and information[141]

Centralized approach:

The OMVS relies on a very centralized approach to data and information management. The

[139] AMCOW 2012.
[140] Information for this part of the chapter is adapted from Schmeier2010.
[141] Information adapted from Schmeier 2010

institution itself has established and maintains the required infrastructure for data gathering (measuring stations and database), analyses the data and disseminates it to member states and, more importantly, uses the data for its own programs and projects which rank vey prominently in the river basin. However, the OMVS has received increasing criticism for its data policy, particularly for almost exclusively focusing on hydrological data needed for the maintenance of its infrastructure projects, neglecting environmental and human dimensions of water resources management in the Senegal river basin.

Decentralized approach:

ICPR, relies on very decentralised mechanisms: While the centralised RBO-level is responsible for the coordination of member states' activities only, member states already agree in the Rhine Convention to "implement in their territory the international measuring programs and the studies of the Rhine ecosystem agreed upon by the Commission and to inform the Commission of the results" (Art. 5 Rhine Convention). However, it needs to be acknowledged that such a high degree of national implementation requires sufficient capacity in the member states.

The decision on the degree of (de)centralisation of responsibilities of RBOs results from a balancing process between how to benefit from decentralisation-related efficiency gains and how to maintain the transboundary element for which RBOs have been established in the first place. This process is linked to the principle of subsidiarity, which refers to assigning responsibilities for different tasks to the lowest possible level (at the most decentralised level as possible), however without moving too low to still benefit from the advantages of joint institutionalised management (referring to the centralised level). The decision on which degree of (de)centralisation applies to carrying out certain tasks mainly depends on the definition of the role and responsibilities member states aim to assign to the institution: RBOs that have been assigned a large number of tasks, including the implementation of projects on the ground, unavoidably require a larger degree of centralised management than RBOs in charge of coordination only.

The remaining question when dealing with anchorage of RBOs at the national level is how RBOs are connected to member states in terms of organisational bodies. Most RBOs have established some sort of internal mechanism to link the centralised RBO level to the respective member states, e.g. through Working or Expert Groups, national implementation mechanisms that are coordinated on the central level. However, some RBOs have established specific organisational bodies, called National Committees in the LVFO, Permanent National Commissions (PNCs) in the OCTA, National Coordination Committees in the OMVS and National Focal Points in the NBI. Their role is, however, not very strong in the RBOs and whether they can ensure efficient coordination between the different governance levels might be questioned and has to be further strengthened.

A key problem is that national ownership especially of donor-driven RBOs can be weak. In such cases, although institutional links between the RBO and the national level exist, the national institutions can be very weak and without much influence on national government policy.

3.1.4 Key factors for the success of an RBO

From the concepts relating to the institutional set-up of RBOs, linkages of RBOs in the region and in the countries and important factors of cooperation, the following key factors for the success of an RBO can be identified:

- Political and financial commitment on the part of the member state;
- Clear definition of what the member states require from the RBO;
- Well-focused objectives which concentrate on projects that form common goals;
- Defined procedures for interactions between the RBO and the national agencies;
- Staff for the RBO that is compatible with its responsibilities and its legal status.

Moreover, it can be said that a good cooperation framework may covers activities such as:

- Data collection;
- Planning;
- Water allocation;
- Raining funds for studies and project implementation;
- Project cost and benefit procedures;
- Implementation of joint projects;
- Operation and maintenance of joint projects;
- Monitoring water utilisation and means for its optimal use;
- Control of pollution and preserving of the ecosystem.

Primary functions of RBOs may be:

- Policy formulation and cooperation
- Strategic planning
- Water resources management
- Knowledge management
- Communication (external)
- Capacity building
- Water resources development

3.1.5 Implementation of shared infrastructure projects within RBOs

If the mandate of RBOs includes the implementation of shared infrastructure projects, international requirements have to be met. Aside of procedural aspects and international best practice, legal aspects as discussed in Section 1.2 have to be sufficiently reflected. Moreover, particular capacities and resources requirements of implementation units are needed. Some of these aspects will be further explored in Section 4 of this manual.

3.1.6 Forms of public private partnerships in the water sector

Often, the implementation of infrastructure projects is outsourced to specialized companies. Reasons for Public Private Partnerships (PPP) for infrastructure projects (US survey) are:[142]

- Cost savings 40.9%
- Lack of in-house personnel and expertise 32.5%
- Lack of State support of political leadership 30.8%
- Flexibility and less red tape 23.8%
- Speedy implementation 21.4%
- Increased innovations 20.4%
- High quality of service 18.5%
- Other 10.6%

[142] (US survey): In a 1998 survey by the U.S. Council of State Governments, respondents were asked the reasons they used public-private partnerships over the past 5 years.

Partnership refers to an entire spectrum of relationships where private sector resources are used in the delivery of services or facilities for public use. The private sector may be called upon to provide one or more of the following functions:

- Project initiation and planning;
- Design;
- Financing;
- Construction;
- Ownership;
- Operation; and
- Revenue collection.

The nature of the partnership is defined by the distribution of those roles in a service or project. The continuum goes from full public responsibility (standard public services) to full private responsibility (commercialisation/privatization) as follows (Seadler):

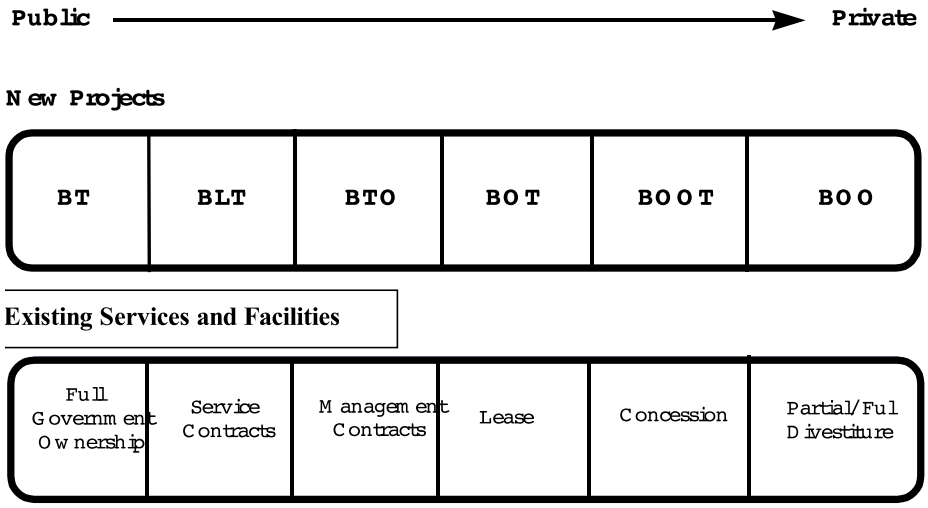


Figure 3-6 Forms of public-private partnerships

Most of the infrastructure projects in hydropower development utilise PPP for the implementation of their projects. In later sections of the Manual reference will be made to either of the above mentioned forms of partnerships.

Pandal basin exercises(see fictitious case in Annex IV)

3.1 Exercise 1, Part 1 (Institutions): The facilitator should ask the ministers from each country to group together (e.g. all of the ministers of energy in one corner, all of the agricultural ministers in another, etc.). Ask that each group of ministers discuss how basin benefits might be shared across borders. Specifically, the ministers should generate ideas for institutional mechanisms that support the flow of information, communication, and benefits across borders. Ask the ministers to consider the objective of the institution, composition, formality (legal status), roles and responsibilities, and financial provisions. Ask them to consider what support and capacity is needed to maintain this institutional arrangement. Also ask that they consider how the arrangement can be resilient over time to biophysical stresses, geopolitical stresses, and socioeconomic stresses. Aim for generating a list of “best practices” by sector. At the end of the exercise, have each group of ministers elect a member to share their conclusions and best practices with the other groups. Debrief.

3.1 Exercise 1, Part 2 (Institutions): Now that each group of ministers has shared its institutional ideas and best practices, ask the ministers to return to their country groupings. Ask the groups to think beyond individual sectors to generate ideas for a holistic basin management plan. How might the best practices from each sector be combined under one institutional umbrella? To do this, country groups should discuss potential synergies between sectors. For instance, how could food, power, flood control, etc. be linked to generate additional benefits? Once countries have generated ideas, ask them to consider what they need in order to institutionalise this type of arrangement within their home countries. Optionally, host a facilitated discussion between the heads of state. Ask them to collaboratively negotiate an institutional structure, guiding the discussion to consider the objective, composition, formality, roles/responsibilities, capacity/finances, and resilience. The facilitator should capture ideas with the announced intention of generating a document that can be the basis of a draft written agreement. Debrief.

Discussion topics	• Discuss the advantages and challenges of cooperation between riparian states. How can a RBO help in addressing these challenges?
	• Discuss the different roles a RBO can take in transboundary hydropower development. Should the RBO be responsible for implementation and management of the project or is it more appropriate if it fulfils a coordinating role? Discuss advantages and disadvantages.
Exercises	• Role play: benefit sharing in the Pandal river basin (see fictitious case in Anney IV)
	• Develop a roadmap for future cooperation in the Mekong basin. Where should cooperation move in the future and what are the necessary steps?
Additional reading and resources	Mirumachi, Naho/Allan, J.A. 2007: Revisiting Transboundary Water Governance: Power, Conflict, Cooperation and the Political Economy, p.7
	Schmeier, Susanne 2010: The Organizational Structure of River Basin Organizations. Lessons Learned and Recommendations for the Mekong River Commission (MRC). Technical Background Paper Prepared for the MRC. Online: http://www.mrcmekong.org/assets/Publications/governance/MRC-Technical-Paper-Org-Structure-of-RBOs.pdf.

3.2 Examples from other river basins

Purpose	Three international examples of RBOs with their role and strategy in supporting sustainable hydropower development in their river basin are presented in this sub-session.
Objectives	By the end of this sub-session, the trainee will: • Know the role and mandate of several RBOs in hydropower development
Preparatory reading	GIZ 2012: Assessment of RBO-Level Mechanisms for Sustainable Hydropower Development and Management. Vientiane: GIZ. Online: http://www.icp-confluence-sadc.org/sites/default/files/RBO_Mechanisms_SustainableHydropower_Report_MRC-GIZ_final.pdf.

In this section, three case studies of international river basins carrying out transboundary hydropower development projects will be presented. As previously explained in section 2.1, but also stressed in section 3.1, each river basin has its specificities affecting the degree of cooperation between its member countries and thus the legal framework and mandate underlying it. This is also decisive for the hydropower management mechanism adopted in each river basin.

3.2.1 Cooperation in the Nile basin

Name of the RBO	Nile Basin Initiative
Member States	Burundi, the Democratic Republic of Congo, Egypt, Ethiopia, Kenya, Rwanda, South Sudan, Sudan, Tanzania, Uganda. Observer status: Eritrea

i. Milestones of the cooperation

The NBI was launched in February 1999 by the water ministers of the countries that share the river—Egypt, Sudan, Ethiopia, Uganda, Kenya, Tanzania, Burundi, Rwanda, the Democratic Republic of Congo, and Eritrea (which participates as an observer).The NBI seeks to develop the river in a cooperative manner, share substantial socioeconomic benefits, and promote regional peace and security and to provide an institutional mechanism, a shared vision, and a set of agreed policy guidelines to provide a basin-wide framework for cooperative action. In November 2008, the NBI Member States signed the non-binding Khartoum Declaration, which declared the support of the NBI Member States for the clear environment functions of the future permanent Nile River Basin Organization that include, among other things: harmonization of environment management policies; data and information exchange; environmental impact assessment; policy, institutional, and legal analysis; and a coordinating role in climate change issues. A goal of the NBI has been to establish a cooperative framework agreement (CFA) to replace earlier bilateral treaties and to formalize the transformation of the Nile Basin Initiative into a permanent Nile River Basin Commission. In April 2010, seven of the Nile basin states agreed to open the CFA for signature. Egypt and Sudan rejected this proposition, suggesting instead that all of the riparian countries issue a presi-

dential declaration to launch the River Nile Basin Commission as negotiations on the CFA continue. Despite these disagreements, the Agreement on the Nile River Basin Cooperative Framework was officially opened for signature on 14 May 2010. Ethiopia, Rwanda, Tanzania and Uganda signed the CFA immediately; it will remain open for signature by other states until 13 May 2011.[143]

ii. Organisational structure and type of cooperation

The Nile-COM is the highest decision-making body of and provides policy guidance to the NBI. The Chairpersonship of the Nile-COM rotates on an annual basis. The Technical Advisory Committee (Nile-TAC), established in 1998, renders technical advice and assistance to Nile-COM, and the Nile-SEC, established in 1999, renders administrative services to both Nile-COM and Nile-TAC. Nile-SEC's core functions are self-financed by the NBI Member States.[144]

The ENSAP and NELSAP programmes support NBI cooperative investment projects. ENSAP includes Egypt, Ethiopia and Sudan, while NELSAP includes Burundi, the Democratic Republic of Congo, Kenya, Rwanda, Tanzania and Uganda, as well as Egypt and Sudan. ENSAP is led by the Eastern Nile Council of Ministers (ENCOM), comprised of the Water Ministers in the three Eastern Nile countries, and an ENSAP Team (ENSAPT) formed of three technical country teams. ENSAP's objective is to achieve joint action on the ground in order to promote poverty alleviation, economic growth and reversal of environmental degradation. ENCOM established the Eastern Nile Technical Regional Office (ENTRO) in 2001.ENTRO, based in Addis Ababa, Ethiopia, manages and coordinates ENSAP projects.[145]

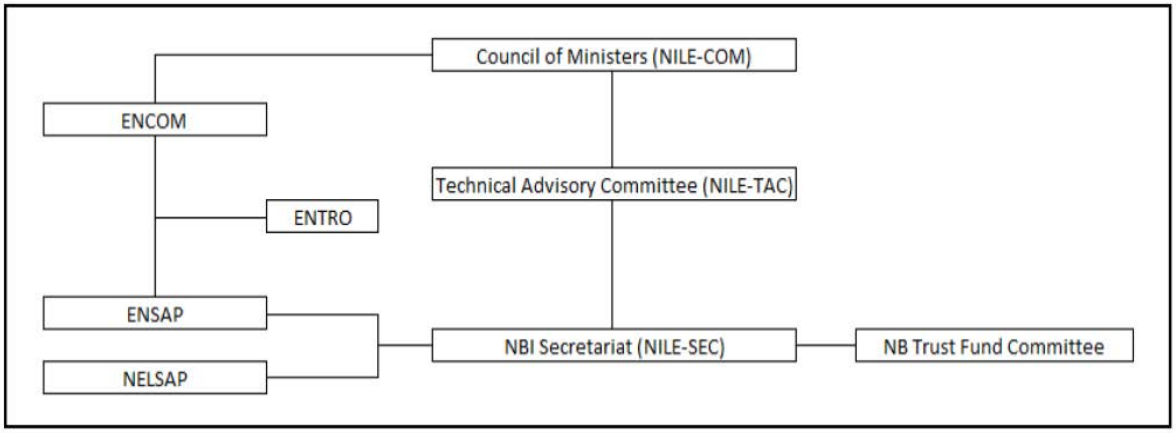


Figure 3-7 Organisational chart of the NBI[146]

The Shared Vision Programme is a basin-wide programme that focuses on building institutions, sharing data and information, providing training and creating avenues for dialogue and region-wide networks needed for joint problem-solving, collaborative development, and developing multi-sector and multi-country programs of investment to develop water resources

[143]UNDP 2011: 200-202.
[144]UNDP 2011: 206.
[145]UNDP 2011: 203-205.
[146] Schmeier 2010: 61.

in a sustainable way. The Nile-SEC coordinates the SVP projects, which are hosted in several NBI Member States.

iii. Type of RBO / core functions

According to NBI, its primary objectives are to develop the Nile basin water resources in a sustainable and equitable way to ensure prosperity, security, and peace for all its peoples; to ensure efficient water management and optimal use of the resources; to ensure cooperation and joint action between the riparian countries; to seek win-win gains; to target poverty eradication and promote economic integration; and to ensure that the program results in a move from planning to action.

The Strategic Action Program is intended to achieve these objectives by translating this shared vision into concrete activities through a two-fold, complementary approach, namely the Shared Vision Program (SVP) and investment in sub-basin activities such as the Eastern Nile (ENSAP) and Nile Equatorial Lakes (NELSAP)programs.

iv. Linkages of RBO in the region and links to member states

The SVP projects are hosted in several NBI member states. A variety of currently implemented projects are carried out under the Eastern Nile (ENSAP) and Nile Equatorial Lakes(NELSAP)programs, which are umbrella programs under which investment in sub-basin activities is taking place.

v. Hydropower development activities

Hydropower development takes place within the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) of the NVI: *Regional Rusumo Falls Hydroelectric Project* (joint development by Burundi, Rwanda and Tanzania). This project is intended to be implemented through a publicly financed, privately managed mechanism. The company is co-owned by the three governments to oversee the implementation and operation of the project; until the enterprise is established NELSAP will act as the implementing agency.

3.2.2 Cooperation in the Zambezi River basin

Name of the RBO	Zambezi Watercourse Commission (ZAMCOM)
Member States	Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia, Zimbabwe

i. Milestones of the cooperation[147]

The process of creating a basin-wide organisation was started in 1987 with the inauguration of the Zambezi Action Plan (ZACPLAN). ZACPLAN was largely a donor-driven initiative and guided by United Nations Environment Programme (UNEP). The riparians adopted ZACPLAN in 1987, upon which it was also adopted by SADC. However, due to a lack of political will, implementation was sluggish, with the lack of funding and leadership as the twin causes. ZACPLAN comprises 19 projects (ZACPLAN projects, or ZACPROs), which were sup-

[147] GIZ 2012: 34-35.

posed to be finished by 1996. However, by then none of the projects had been completed[148]. Of the 19 projects, ZACPRO 6 was designed to develop an integrated water management plan for the Zambezi River.[149]

In detail, ZACPRO aimed at setting up a Zambezi Watercourse Commission (ZAMCOM), a water resources management system (including models and joint planning guidelines), and a basin-wide IWRM strategy. Assistance for ZACPRO 6 came from the Swedish International Development Cooperation Agency (SIDA), the Norwegian Agency for Development Cooperation (NORAD) and the Danish International Development Agency (DANIDA)[150]. Phase II of ZACPRO 6, executed by the Zambezi River Authority (ZRA) on behalf of SADC, started in 2001. It focused on the establishment of an Interim ZAMCOM Secretariat.

In 1995, the SADC states adopted the 1995 Protocol on Shared Watercourse Systems (henceforth: SADC Water Protocol), which was the result of ZACPRO 2 (Development of Regional Legislation for the Zambezi river basin). Institutionally, ZACPLAN is implemented by the SADC Water Division[151]. The SADC Water Protocol also guided the implementation of ZACPRO 6[152]. Apart from the SADC Water Protocol, all riparians are also members of the 2008 Zambezi river basin Integrated Water Resources Management Strategy and Plan[153].

In 2004, seven of the eight riparian countries signed the ZAMCOM agreement with the provision that it would enter into force when two-thirds of the riparian states have ratified the agreement through their parliaments[154]. It was only in May 2011 that the Interim ZAMCOM Secretariat was established to begin the institutional build-up for ZAMCOM. Until then, the SADC Water Protocol functioned as a "surrogate basin-wide agreement". Of the countries in the Zambezi basin, Malawi has signed but not ratified the ZAMCOM agreement, and Zambia has neither signed nor ratified it (interview with Anthony Turton, 24 May 2012).

ii. Organisational structure and type of cooperation[155]

Despite the establishment of the Interim ZAMCOM Secretariat in 2011, hydropower projects are still operated as individual projects with no coordination between them[156]. In addition, dams, whether for hydropower or other uses, are operated to fulfil their primary function but "do not generally incorporate the environmental and social needs downstream and upstream" (ibid: 2). There is also no basin-wide flow forecasting system, which is essential to achieve coordinated management of all basin dams. Flow forecasting has so far been on a national or bilateral basis for the purpose of operating single projects (ibid: 6). Furthermore, riparian water policies "are not harmonized" with each other or with the SADC water protocol, policies and strategies, or the ZAMCOM agreement. There is also a "lack of trust and confidence" (ibid: 8).

In addition to the SADC Water Protocol and the now established Interim ZAMCOM Secretariat, there are many bi- and multilateral agreements between riparian states, the oldest being

[148]Shela 2000.
[149]ZRA (n.d.)a. Tumbare 1999.
[150]ZRA (n.d.)b.
[151]Shela 2000.
[152]Tumbare 1999.
[153]SADC 2011.
[154]Turton 2008.
[155]GIZ 2012: 35.
[156]SADC 2011.

the agreement that established the ZRA between Zambia and Zimbabwe for the management of the Kariba Dam[157]. The ZRA dates back to 1987 when it replaced the Central African Power Corporation (CAPCO) that had been in charge of managing the Kariba Dam since 1963. The history of Kariba is bedevilled by the competition and distrust between Zambia and Zimbabwe. The ZRA was founded by "two identical Zambezi River Authority Acts of parliament in 1987, one for Zambia and the other for Zimbabwe"[158]. It is governed by a Council of Ministers and a Board of Directors, which are staffed by ministers and permanent secretaries from the Ministries of Energy and Finance. The 1999 Zambezi River Authority Amendment Act provided for the recruitment of more Zambians to junior-level positions in the ZRA Operational Station at Kariba in order to equalise the dominance of Zimbabweans in junior-level positions[159].

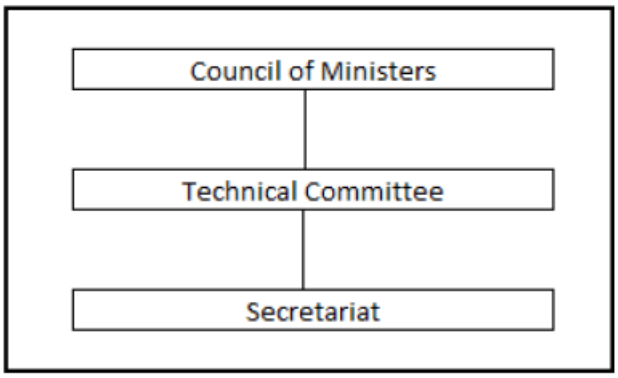


Figure 3-8 The organisational chart of ZAMCOM[160]

iii. Hydropower development activities[161]

Hydropower is generated at the mainstream at Kariba and Cahora Bassa, as well as on tributaries, particularly at the Itezhi-Tezhi and Kafue Dams on the Kafue River in Zambia and the Kamuzu Barrage on the Shire River. In 2010, Mozambique authorized construction of the Mphanda Nkuwa Dam on the Zambezi, located 60 km downstream from Cahora Bassa[162].

The crucial issue here is that the initiatives on environmental and social mitigation and integrated river basin management are all donor initiatives. One of the most recent projects to achieve integrated management of the Zambezi is the project on Dam Synchronization and Flood Releases in the Zambezi river basin. It is funded by GIZ, DFID and AusAid[163] and looks at the entire stretch of the Zambezi basin. This is urgently needed as more projects are being planned and built along the Zambezi and its tributaries, without much regard for coordinated management.

Positive are recent events which could contribute to greater environmental protection, particularly the establishment of the Joint Operations Technical Committee and the MoU. The res-

[157] Turton 2008.
[158] Shela 2000.
[159] Mukosa / Mwiinga 2008.
[160] Schmeier 2010: 62.
[161] GIZ 2012: 33.
[162] Agencia de Informacao de Mocambique 2010.
[163] SADC 2011.

ervoir fishery in Zambia and the Power Rehabilitation Project that included a resettlement rehabilitation programme for the Zambian Gwembe Tonga are also positive developments.

Another positive event is the SADC-coordinated establishment of an Interim ZAMCOM Secretariat in May 2011. While the lack of political will and commitment was evident, leading to a 24-year time span between the adoption of ZACPLAN and the Interim ZAMCOM Secretariat, its final inauguration precisely can be considered a success and the basis for a centralized and coordinated dam management in the Zambezi river basin.

The case of the Kariba Dam[164]

Kariba Dam (1,320 MW) was financed by a number of actors, including the World Bank, mining companies and Barclays and Standard Banks as well as the Commonwealth Development Corporation[165]. Kariba led to the resettlement of 57,000 people of the Gwenge Tonga tribe, which was the responsibility of the authorities of the territories of Northern and Southern Rhodesia. Self-governing Rhodesia had already decided to relocate the Tonga away from the reservoir area, while the system of indirect rule of Northern Rhodesia included participation of the Tonga in choosing resettlement sites. In the end, the time pressure to complete Kariba due to soaring energy demand in Northern and Southern Rhodesia led to a hasty process. A well-intended resettlement plan therefore resulted in wide impoverishment of the resettled population in Northern Rhodesia/Zambia (ibid).

The decision to build Kariba was made by the Central African Federation. The purpose of Kariba was to produce energy for the copper mines in Northern Rhodesia and for the industrial urban centres in Southern Rhodesia. Following the break-up of the Central African Federation in the 1960s, the United Kingdom established CAPCO in 1963 “to take over the functions, staff and assets of the Federal Power Board and a Higher Authority for Power to approve major policy decisions”[166]. During Stage 1 of the project until 1960, power installations were built on the southern bank. To insulate itself against dependence on the power stations in Southern Rhodesia after the break-up of the Federation, Zambia commissioned two hydropower plants, one on the northern bank of the Zambezi near the Victoria Falls, and the Kafue Project that was completed in 1971. In 1970, Zambia went ahead with planning for Stage 2 of the Kariba Project that was to install power facilities on the northern bank. When the northern bank power stations were completed in 1975, Zambia’s demand for power had stagnated while Rhodesia’s power demand soared. When Rhodesia became Zimbabwe in 1980, relations between both countries remained strained. In particular: In Zambia, the authorities believed that the Kariba project was yielding more benefits to Zimbabwe. Because CAPCO bought electricity at cost, including that generated in Zambia with funds independent of CAPCO’s, profit from Zambia’s major energy investments went to an organisation that not only allocated significantly more joint revenue for extending the transmission system in Zimbabwe than in Zambia, but also sold more electricity to Zimbabwe from joint facilities due to that country’s higher growth rate during the 1980s. Such problems led to CAPCO being replaced in 1988 by the ZRA with a more restricted mandate. Though still responsible for running the Kariba facilities and for planning and implementing additional dams on the Zambezi, the distribution of power as well as budgetary authority had been handed over to the appropriate ministries in the two countries (ibid).

[164] GIZ 2012: 35-40.
[165] Scudder2005.
[166] Scudder 2005.

The Zambezi River Authority is therefore left with the responsibility of operating and maintaining the dam structure as well as with studying new potential dam sites. The power stations are operated by the national utilities of Zambia (north bank power station) and Zimbabwe (south bank power station).

The project's purpose, namely to generate energy, has certainly been accomplished, even though this came at a cost: the haste in north bank resettlement, the suspicion between Zambia and Zimbabwe and their colonial predecessors, a perceived imbalance of costs and benefits on the side of Zambia, and a lack of political will to institute environmental programmes have all weighed negatively on the project.

3.2.3 Cooperation in the Danube basin

Name of the RBO	International Commission for the Protection of the Danube River (ICPDR)
Member States	Germany, Austria, Czech Republic, Slovakia, Hungary, Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro, Romania, Bulgaria, Moldova, Ukraine

i. Milestones of the cooperation[167]

The Danube River basin has been governed by multilateral agreements and various forms of international administration almost continuously since 1856. The history of bilateral treaties governing the basin stretches back even further. These historical treaties and agreements largely focused on improving navigation, flood control, hydro power, and commerce along the region's waterways.

Currently, the non-navigational use of waterways in the Danube River basin is governed by the Convention on Cooperation for the Protection and Sustainable Use of the Danube (the Convention or DRPC), signed on 29 June 1994 in Sofia, Bulgaria. The DRPC, which entered into force in October 1998, is the overall legal instrument for cooperation and transboundary water management in the Danube River basin, with the main objective of ensuring that the surface waters and groundwater within the Danube River basin are managed and used on a sustainable and equitable basis. To accomplish these objectives, the DRPC established the International Commission for the Protection of the Danube River (ICPDR or Commission).

Overall, the DRPC was an outgrowth of earlier commitments made by the riparian states to address the region's environmental problems. These commitments began with the 1985 Bucharest Declaration, which committed the states to developing an integrated water management system. Six years later, further commitments were made to strengthen cooperation in the basin through the Environmental Programme for the Danube River basin (EPDRB), a programme requiring each state to adopt or define uniform monitoring systems, laws on liability for cross-border pollution, rules for the protection of wetland environments, and guidelines for the conservation of areas of ecological or aesthetic importance or value. The EPDRB also required the development and maintenance of a Strategic Action Plan (SAP) listing concrete measures and short-term goals. When this plan was completed, the newly-

[167] UNDP 2011: 118-119.

established ICPDR was entrusted with its implementation. In addition to the ICPDR, states in the Danube River basin are also signatories to the Ramsar Convention on Wetlands, the Espoo Convention, the U.N. Convention on the Protection and Use of Transboundary Watercourses and International Lakes, the European Agreement on Main Inland Waterways of International Importance (AGN), and the European Union(EU) Water Framework Directive (WFD).

ii. Organisational structure, type of cooperation, linkages of RBO in the region and links to member states[168]

Danube riparian states have very different interests in the use and the protection of the river, due to a complex political situation, economic and social changes and to the fact that huge difference can be noted between upstream and downstream states in terms of socioeconomic development levels. The situation is further complicated by the fact that the Danube is the most international river in the world with 19 riparian countries.

TheIDPDRhasbeenestablishedin1994bytheConventiononCooperationforthe Protection and the Sustainable Use of the Danube River. Its main goal is to ensure the sustainable and equitable use of waters and related resources in the river basin.

The ICPDR has a very specific organisational structure (see Figure 3-9): Its highest-level body is the Conference of Parties, uniting representatives of the Contracting Parties to the Danube Convention in order to discuss policy issues concerning the implementation of the Convention. Cooperation through this Conference of Parties is institutionalised in the form of the Commission that meets regularly once per year and translates general policy decisions into operationalised strategies. The operational work of the organisation is coordinated by the Standing Working Group, in which delegates from various parties meet regularly and coordinate the work of the institution and the activities of the different technical bodies.

The Permanent Secretariat performs administrative functions, including the preparation and distribution of reports on ICPDR activities, the preparation of the organisation's budget, the coordination with external actors, or the management of data and information (particularly on the basis of the joint data management system DANUBIS. Its mandate and tasks are defined relatively narrowly, exactly matching the needs of the river basin and the expectations of member states, which see the ICPDR as a transboundary coordination mechanism fulfilling exactly those functions that should be fulfilled on the international level while delegating but still coordinating activities that can be carried out by member states. Based on such a clear subsidiary principle, the ICPDR Secretariat manages to fulfil its tasks with 14 permanent staff and a limited bureaucratic structure only.

[168] Schmeier2010: 17-19.

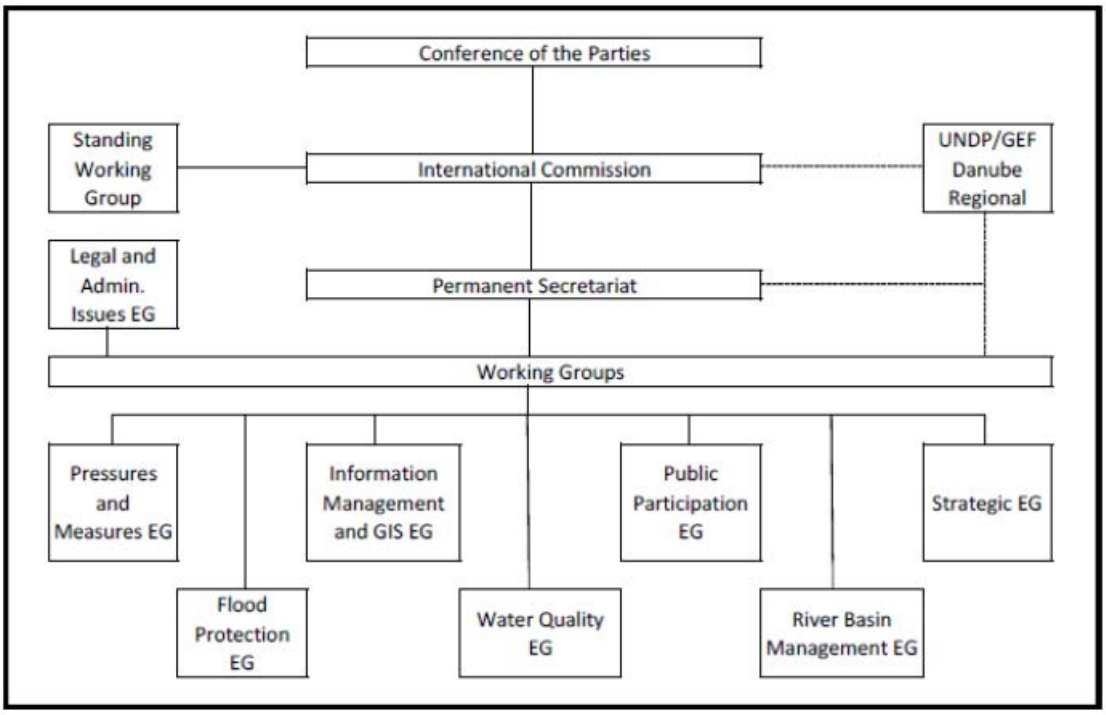


Figure 3-9 The organisational structure of the ICPDR[169]

iii. Type of RBO / core functions

The ICPDR is tasked with implementing the DRPC and its goals generally include: protecting the Danube basin's water resources for future generations by preserving the natural balance of those waters, addressing risks from toxic chemicals, preventing the environmental and ecological damages caused by floods, and maintaining the heath and sustainability of the region's river systems.

iv. Hydropower development activities[170]

The development of further renewable energy in line with the implementation of the EU Renewable Energy Directive[171] represents a significant driver for the development of hydropower generation in the countries of the Danube River basin. At the same time, Danube countries are committed to the implementation of water, climate, nature and other environmental legislation. Specifically the EU Water Framework Directive (WFD)[172] plays a leading role and is the key tool for water policy in the Danube River basin, specifying water protection targets in balance with economic interests. A considerable number of new infrastructure projects, including hydropower development, are at different stages of planning and preparation throughout the entire Danube River basin. These projects provoke pressures and can dete-

[169]Schmeier 2010: 19.
[170] ICPDR 2013.
[171]Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.
[172]Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.

riorate water status, but are at the same time beneficial in terms of socio-economic aspects and climate change mitigation. This can be in particular the case for multifunctional use of hydropower plants serving different purposes for people and communities, including the mitigation of floods and droughts and ensuring water resources for different water users by the seasonal and/or multiannual regulation of water flows. The Ministers of the Danube countries asked in 2010 for the development of Guiding Principles on integrating environmental aspects in the use of hydropower in order to ensure a balanced and integrated development, dealing with the potential conflict of interest from the beginning.

Discussion topics	• Discuss which of the organisational set-ups and hydropower provisions existing in other RBOs might be useful in the MRC context as well.
Exercise	• Small group work: divide into 3 small groups, each group working on one of the questions 1, 2 or 3 mentioned below. Briefly present the answers to questions 1 to 3 to the other groups and discuss question 4 in the plenum. *Small group work questions:* 1. What can be said on cooperation within these river basins when referring to the concepts by Sadoff/Grey (2005, see section 2.1), Mirumachi/Allan (2007, see section 3.1)? o Where are these RBOs situated on the "continuum of cooperation"? o What is the level of cooperation intensity? 2. What "type" of RBOs can be identified within these river basins when referring to the classifications suggested by Mostert (2003) and Schmeier (2010)? o What are the core functions of these RBOs? o What is the scope of their work and why were they created? o Why do we see different forms of RBOs here? 3. How are these RBOs linked in the region (to other regional organisations) and how are they anchored in their member countries? o How is the level of political trust within the river basin? o Can these RBOs enforce their mandate? *Question to guide plenum discussion:* 4. Use the insights gained from the questions above in order to assess the context of hydropower development mechanisms in these river basins: o What implications should the level of cooperation, type of RBOs, linkages of the RBOs in the region and with their member states have for hydropower development in these river basins? o How is the actual political practice?

Additional reading and resources	ICPDR 2013: Guiding Principles on Sustainable Hydropower. Online: http://www.icpdr.org/main/sites/default/files/nodes/documents/guiding_principles_sustainable_hydropower_-_public.pdf.
	NBI 2011: Nile Basin Sustainability Framework.
	SADC 2011: Transboundary Water Management in SADC: Dam Synchronisation and Flood Releases in The Zambezi River Basin Project.
	Mukosa, Clement / Mwiinga, Pherry 2008: Transboundary issues on Sustainable Hydropower Development in the Zambezi River Basin in the Eyes of the Zambezi River Authority.

3.3 The role and mandate of the MRC

Purpose	This sub-session specifies the role and mandate of the MRC in terms of functions, capacities and guidelines that are available to support transboundary hydropower development in the Lower Mekong basin. It explains who is planning, building and operating hydropower projects in the MRC, as well as how hydropower schemes are financed.
Objectives	By the end of this sub-session, the trainee will be able to: • Evaluate the role of the MRC in transboundary hydropower development • Understand who builds and owns hydropower projects in the Lower Mekong basin • Understand the challenges and problems with the current management of hydropower
Preparatory reading	Johns, Fleur / Saul, Ben / Hirsch, Philip / Stephens, Tim / Boer, Ben 2010: Law and the Mekong River basin: A Social-Legal Research Agenda on the Role of Hard and Soft Law in Regulating Transboundary Water Resources. In: Melbourne Journal of International Law 11(1).
	Schmeier, Susanne 2010: The Organizational Structure of River basin Organizations: Lessons Learned and Recommendations for the Mekong River Commission (MRC).
	1995 Mekong Agreement and Procedures, http://www.mrcmekong.org/assets/Publications/policies/MRC-1995-Agreement-n-procedures.pdf.
	MRC 2004/5: The MRC basin Development Plan: Stakeholder Participation. July 2004, revised November 2005.
	MRC 2011: basin Development Strategy, http://www.mrcmekong.org/assets/Publications/strategies-workprog/BDP-Strategic-Plan-2011.pdf.
	Initiative for Sustainable Hydropower (ISH), http://www.mrcmekong.org/about-the-mrc/programmes/initiative-on-sustainable-hydropower/.
	MRC no date: Strategic Plan 2011-2015, http://www.mrcmekong.org/assets/Publications/strategies-workprog/Stratigic-Plan-2011-2015-council-approved25012011-final-.pdf.
	Xayaburi PNPCA process: http://www.mrcmekong.org/news-and-events/consultations/xayaburi-hydropower-project-prior-consultation-process/. Please also familiarise yourself with the documents that can be downloaded from this website and that will illuminate the process

	and the contentious issues in more detail.
	PNPCA Working Group: http://www.mrcmekong.org/news-and-events/consultations/xayaburi-hydropower-project-prior-consultation-process/pnpca-working-group/.

3.3.1 What is the MRC mandate?

The central task of the MRC is to assist countries in the sustainable development of the Mekong River basin. Articles 1 and 2 of the 1995 Mekong Agreement detail this:

Article 1:

'To cooperate in all fields of sustainable development, utilization, management and conservation of the water and related resources of the Mekong River basin including, but not limited to irrigation, hydro-power, navigation, flood control, fisheries, timber floating, recreation and tourism, in a manner to optimize the multiple-use and mutual benefits of all riparians and to minimize the harmful effects that might result from natural occurrences and man-made activities.'

Article 2:

'To promote, support, cooperate and coordinate in the development of the full potential of sustainable benefits to all riparian States and the prevention of wasteful use of Mekong River basin waters, with emphasis and preference on joint and/or basin-wide development projects and basin programs through the formulation of a basin development plan, that would be used to identify, categorize and prioritize the projects and programs to seek assistance for and to implement at the basin level.'

In order to do this work, the MRC has been given a wide mandate by its member states, including planning, coordination and implementation of projects. Therefore, when we look back at the concepts discussed in Section 3.1, we can characterise the MRC as an implementation-orientated RBO.

This is reflected in the structure of the MRC Secretariat, which is the independent technical body that possesses the tools and the technical expertise for comprehensive basin planning.

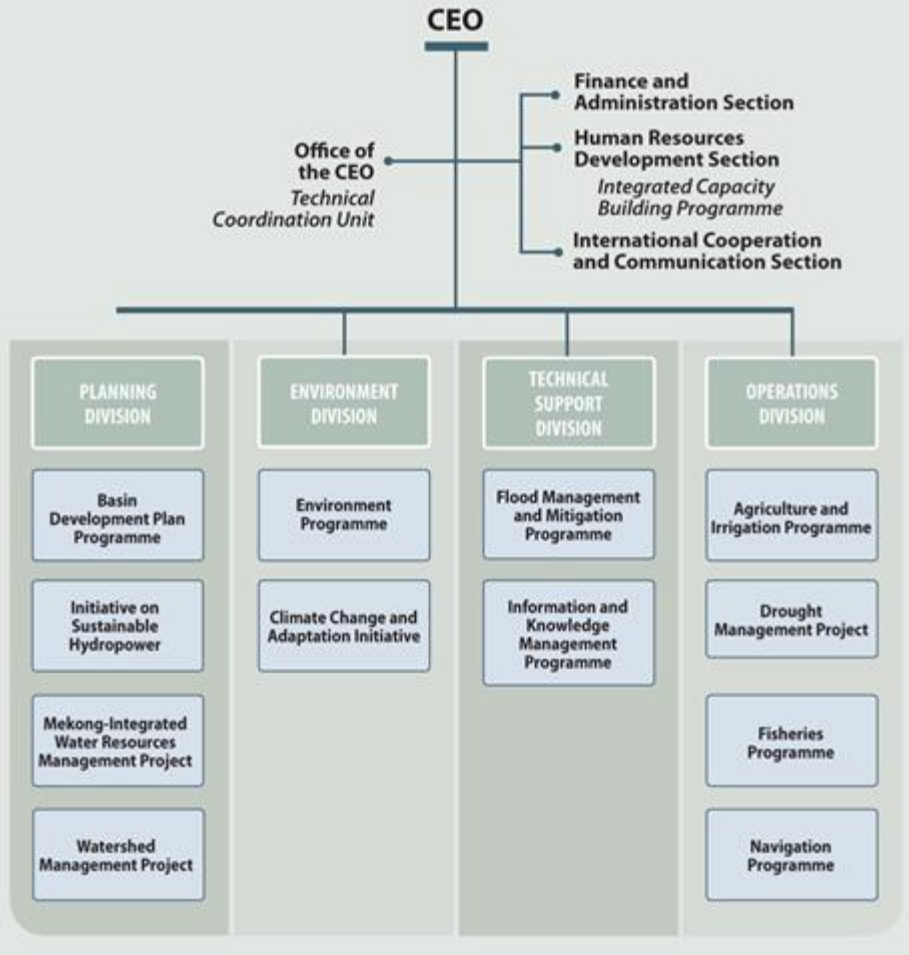


Figure 3-10 MRC Secretariat Operational Structure

The MRC Secretariat is currently undergoing a process of repatriating some of its activities to the member states and maintaining coordinating core functions as outlined in Chapter 2 and in Annex 2 of the 2011-2015 Strategic Plan. As a transboundary organisation, the MRC Secretariat will maintain a central coordinating and conflict resolution role for transboundary projects. The 2011-2015 Strategic Plan states that "[i]n the long-term, the MRCS [MRC Secretariat] will have a 'facilitation, coordination and advisory' role in the management of the Mekong River basin and will provide technical assistance of regional and basin-wide dimensions".[173] Following the concepts introduced in Section 3.1 above, this will move the MRC from a centralized RBO to a more decentralized RBO.

It is important to note that the process of decentralisation does not aim at redefining the mandate of the MRC or at reducing its mandate. Decentralization is about redefining who does what within the mandate. This means that the mandate remains the same. What is redefined is the allocation of tasks that emerge from this mandate, based on the subsidiarity principle (see also Section 3.1 above).

The subsidiarity principle[174]:

"Subsidiarity refers to assigning responsibilities for different tasks to the lowest possible lev-

[173] MRC 2010c.
[174] Schmeier2010.

el, that is, to dealing with issues at the most decentralized level as possible, however without moving too low to still benefit from the advantages of joint institutionalized management. Some responsibilities related to the general political maintenance of long-term cooperation need to be performed on the highest institutional level (e.g. decision-making, agenda setting, coordination, monitoring), while tasks related to the implementation of jointly agreed upon policies, strategies and measures can be transferred to lower governance levels (e.g. program and project implementation). This shows that a prerequisite for defining the level of (de-)centralization an RBO aims to achieve is a clear definition of the role and responsibilities member states aim to assign to the institution. RBOs that have been assigned a large number of tasks, including the implementation of projects on the ground, unavoidably require a larger degree of centralized management than RBOs in charge of coordination only."

The MRC Secretariat has no decision-making power. Decision-making rests with the member governments who are represented in the Joint Committee and the Council.

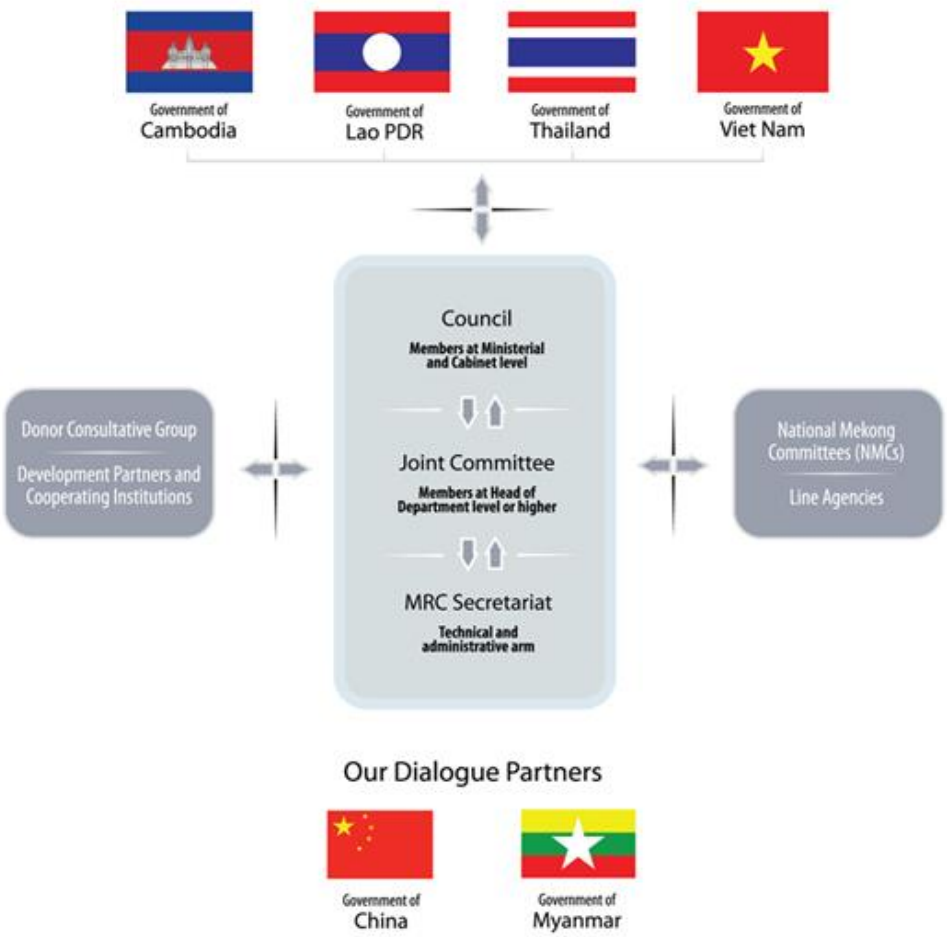


Figure 3-11 MRC Governance Structure

The Council is the highest decision-making organ of the MRC. It meets once a year. According to Article 18 of the 1995 Mekong Agreement, the functions of the Council are to 'make policies and decisions and provide other necessary guidance' for joint basin development, to 'decide any other policy-making matters and make decisions necessary to successfully im-

plement' the 1995 Mekong Agreement, and to 'entertain, address and resolve issues, differences and disputes referred to it by any Council member, the Joint Committee, or any member State on matters arising under this Agreement.'

The Joint Committee, following Article 24 of the Mekong Agreement, implements policies and decisions of the Council. This includes the development of the basin development plan (which is approved by the Council), information exchange, execution of studies and assessments to maintain the ecological balance of the river, to supervise the Secretariat, and to propose to the Council modifications to the Secretariat's structure.

The National Mekong Committees and their secretariats are the national contact points for the Secretariat, as they are the national coordinating authorities for each member country, including national level, provincial and sub-provincial authorities. Currently, the chairpersons of the National Mekong Committees are also the members of the Council.

To implement its wide-ranging mandate, the MRC has a number of core functions. These range from administration of the organisation to basin management, capacity and tool development, and advisory and consulting services:

Categories	Description	Examples of functions
(I) Secretariat administrative and management functions	Functions of a routine and recurrent nature that provide for the management and administration of the Secretariat and support to MRC governance processes as well as support to non-technical processes under the 1995 Mekong Agreement.	• Governance of the MRC • Financial and administrative management • Personnel management • International cooperation • Communications
(Ii) River basin management functions	Functions of the MRC through which it routinely engages in water resources development and management issues at different scales in the Mekong basin	• Data acquisition, exchange and monitoring • Analysis, modelling and assessment • Planning support • Forecasting, warning and emergency response • Implementing MRC Procedures • Promoting Dialogue and Coordination • Reporting and Dissemination
(Iii) Capacity building and tools development functions	Functions providing for continuous capacity building at the MRCS, NMC Secretariats and line agencies and maintenance, and updating of data holdings, processing capacity and analytic capability.	• Capacity building for Member Countries and MRCS across all themes • State of the art tool development
(Iv) Consulting and advisory services functions	Functions that make available the technical expertise, databases, modelling capacities, and expert networks of MRCS to support studies and assessments commissioned by others for sustainable water resources development, both at the project level, and at the basin wide	• Consulting services • Commissioned studies • Expert advice

	and cumulative level.	
Adapted from synthesis in MRC EP 2011-2015 Documents, August 2010		

Table 3-2 Description of MRC Core Functions Categories

Based on the wide mandate and the Core Functions, the MRC has established specific procedures and principles for basin development in general and hydropower in particular. The next section will look at this in detail.

3.3.2 What procedures and principles are in place to implement the mandate?

Looking at the 1995 Mekong Agreement, we can find a number of provisions and principles that address hydropower directly and indirectly:

Section in the 1995 Agreement	**Detail and relevance to hydropower considerations**
Explicit references to hydropower	
Article 1	**Areas of Cooperation** - … all fields of sustainable development, utilization, management and conservation of the water and related resources … including, but not limited to irrigation, **hydro-power**, navigation, flood control, fisheries, timber floating, recreation and tourism, in a manner to optimize the multiple-use and mutual benefits of all riparian's and to minimize the harmful effects that might result from natural occurrences and man-made activities.
Article 5	**Reasonable and Equitable utilization** - to cooperate … Item A. concerning notification of intra-basin use on tributaries (**e.g. proposed hydropower schemes**); Item B. concerning consultation on dry season intra-basin use on the mainstream, which aims at reaching an agreement by the Joint Committee (e.g. **proposed mainstream hydropower schemes and hydropower schemes on significant tributaries as relevant to the Procedures**)
Article 6	**Maintenance of flows on the mainstream** - … to cooperate in the maintenance of the flows on the mainstream from diversions, storage releases **(e.g. from hydropower reservoirs)**, or other actions of a permanent nature --- (**In the BDP Probable Future scenario by 2030, up to 45BCM storage in Mekong would come from tributary hydropower schemes compared to 23 BCM active storage on the Lancang Mekong –** see Table 4 in Section 1).
Implicit references to hydropower	
Article 7	**Prevention of Harmful effects** - ... to avoid, minimize and mitigate harmful effects that might occur to the environment, especially the water quantity and quality, the aquatic (eco-system) conditions, and ecological balance of the river system, from the development and use of the Mekong River Basin water resource ….

Section in the 1995 Agreement	Detail and relevance to hydropower considerations
Article 9	**Freedom of navigation on the mainstream** - … navigation shall be accorded throughout the mainstream of the Mekong River… navigational uses are not assured any priority over other uses, but will be incorporated into any mainstream project.
Article 26	**Rules for water utilization: …** (3) setting out criteria for determining surplus quantities of water during the dry season on the mainstream; 4) improving upon the mechanism to monitor intra-basin use;….
Article 10	**Emergency Situations:** … any special water quantity or quality problems constituting an emergency that requires immediate response, it shall notify and consult directly with the party(ies) concerned and the Joint Committee without delay in order to take appropriate remedial action." **(connected to safety of hydropower dams and emergency preparedness procedures linked also to coordinated reservoir flood management, and linked to water quality management in hydropower reservoirs).**
Article 24	**Functions of the Joint Committee: …** B. To formulate a basin development plan … and joint development projects/programs to be implemented in connection with it; and to confer with donors … to obtain the financial and technical support necessary for project/program implementation (**in connection with sustainable hydropower aspects)**… and, G. To review and approve studies and training for the personnel of the riparian member countries ... (**connecting to sustainable hydropower via capacity building).**

Table 3-3 Provisions and principles in the 1995 Mekong Agreement

The quotations highlight principles that guide hydropower development in the Mekong basin:

- Reasonable and equitable utilisation,
- Prevention of harmful effects, and
- Freedom of navigation

Many of these principles were already addressed in Section 1 of this training manual on international water law. The MRC can therefore be seen as reflecting international standards in transboundary hydropower governance.

Since 2011, the key document for basin development is the Basin Development Strategy. It contains a comprehensive programme for water resources development.

The Basin Development Strategy is based on the principle of Integrated Water Resources Management (IWRM). To operationalise this principle and to establish a basin-wide management process, the MRC has developed 5 Procedures and associated Technical Guidelines that apply to all projects where relevant:

MRC Procedures and associated Technical Guidelines	
Procedures	*Technical Guidelines*
Procedures for Data and Information Exchange and Sharing (PDIES)	Technical Guidelines for the implementation of the Procedures for Data and Information Exchange and Sharing (PDIES)

Procedures for Notification, Prior Consultation and Agreement (PNPCA)	Technical Guidelines for the implementation of the Procedures for Notification, Prior Consultation and Agreement (PNPCA)
Procedures for Water Use Monitoring (PWUM)	Technical Guidelines for the implementation of the Procedures for Water Use Monitoring (PWUM)
Procedures for the Maintenance of Flows on the Mainstream (PMFM)	Technical Guidelines for the implementation of the Procedures for the Maintenance of Flows on the Mainstream (PMFM)
Procedures for Water Quality (PWQ)	Technical Guidelines for the implementation of the Procedures for Water Quality (PWQ)

Table 3-4 MRC Procedures and associated Technical Guidelines

These 5 Procedures form part of the MRC's 5 Strategic Priorities for Basin Management, as detailed in the Basin Development Strategy. The Strategic Priorities for Basin Management include three important aspects: the coordination of basin-wide development, guided by the 5 Procedures that are based on the principle of IWRM (relevant passages in bold below). As such, following Sadoff and Grey's (2005) categories mentioned in Section 3.1 of this training manual, the MRC aims at moving basin development from unilateral action by one of the member countries to joint action in order to protect the social and ecological integrity of the basin by coordinating the activities of all four member countries. The Strategic Priorities for Basin Management call on the MRC to:

1. establish **basin objectives** and management strategies for water-related sectors: fisheries, navigation, flood and drought-risk management, and wetland management
2. strengthen national level water resources management processes
3. strengthen basin management processes: **implementation of MRC Procedures**; harmonization of methods and tools across all basin states; strengthening of national to basin scale monitoring systems; development of a project monitoring system **using the MRC Procedures (PDIES and PWUM)** and other tools to register national projects with transboundary impacts in the Project Master Database, establishment of a network of national water resources management agencies and river basin organisations; enhancement of stakeholder participation; and management of differences based on Articles 34 and 35 of the Mekong Agreement
4. develop environmental and social objectives and baseline indicators. This **includes adherence to the 5 Procedures, especially PMFM and PWQ**
5. implement a targeted **IWRM capacity building** programme

In terms of actual projects, the Basin Development Strategy has core elements, called Development Opportunity Space, which define the range of projects to be implemented:

- tributary hydropower development
- expansion of irrigated agriculture
- mainstream hydropower development, and
- other opportunities: fisheries, navigation, flood and drought management, as well as opportunities beyond the water sector such as alternative power generation options.

The MRC therefore has a wide variety of water-related functions, of which hydropower development is one – given the potential for disrupting social and environmental systems perhaps the most important one.

It is necessary to note that the MRC has no territorial rights in member countries. It cannot veto or supersede national decision-making processes. As a consequence, the MRC has a weak institutional structure. However, although the MRC has no right to intervene in national decision-making processes, the 1995 Mekong Agreement does bind countries to the MRC Procedures where dam projects affect the Mekong River system. As mentioned above, for transboundary projects, international law and the 1995 Mekong Agreement require states not to harm downstream states and to comply with the principle of equitable utilisation of the river. For the negotiation over transboundary hydropower projects, the PNPCA mechanism is key in order to comply with these principles.

Box: The PNPCA mechanism

Article 5 of the 1995 Mekong Agreement requires member countries to notify the MRC of dams on transboundary tributaries and the mainstream. Notification and consultation processes are governed by the Procedures for Notification, Prior Consultation and Agreement (PNPCA).

According to Article 4.1 of the PNPCA, notification only is required in the following cases:

- intra-basin use and inter-basin diversion on the tributaries, including Tonle Sap; and
- intra-basin use during the wet season on the mainstream;

According to Article 5.1 of the PNPCA, a process of prior consultation is activated when the proposed plans have significant impact on the mainstream. This is the case for:

- Inter-basin diversion from mainstream during wet season;
- Intra-basin use on the mainstream during the dry season; and
- Inter-basin diversion of the surplus quantity of water during the dry season (this requires not only consultation but also explicit agreement by the MRC Joint Committee. See Art. 6 PNPCA).

Yet, although these procedures are legally binding, the MRC has no mechanism to punish states should they fail to comply with the MRC provisions. This is a traditional problem of international organisations: inter-governmental organisations are only able to exert power when member governments convey sovereignty from the national to the level of the organisation (as is best illustrated in the case of the European Union). In the case of the MRC, member governments have so far resisted to relinquish a part of their sovereignty (e.g. decision-making over the transboundary water resource), and therefore the MRC has no independent capacity to act.

This is an institutional weakness of the MRC, which is evident when looking at the agents involved in the planning and implementation of hydropower projects. While the MRC has the mandate to coordinate the sustainable development or the Mekong river basin, hydropower planning begins de facto at the national level. By the time member governments notify the MRC of their intention to build a dam, dam planning has already significantly advanced: all relevant planning documents – pre-feasibility studies, feasibility studies, EIAs and resettlement action plans – have already been concluded. As the case of the Xayaburi Dam (see

below and Section 4.3.3 in this manual) shows, the MRC finds it very difficult to resume a strong role in the decision-making process.

3.3.3 Who is planning, building and operating hydropower plants in the LMB?

Planning and building dams is the exclusive domain of MRC member governments, and it is national government agencies that are involved in the planning process. The MRC has no right to interfere and can only give advice.

Most hydropower investment in the LMB comes from regional private or state-owned enterprises from China and Vietnam, which, however, increasingly operate on a profit basis. This is in contrast to the earlier phase of dam building between the 1950s and 1990s when major dams in the developing world were built with money from Northern donors.

The following box provides the example of the Xayaburi Dam, which is built and funded by Thai private agencies under contract with the Lao government (see also Section 4.3 for further discussion of the Xayaburi Dam).

Xayaburi Dam, Mekong River (Laos)

The first time that a process of prior notification was activated was in the case of the Xayaburi Dam, when the government of Laos submitted the planning documents for the Xayaburi Dam to the MRC Secretariat in 2010. A six-month consultation process ensued, convened by the MRC, that ended in no agreement over the Xayaburi Dam due to disagreements between downstream countries Cambodia and Vietnam and the notifying country Laos. Instead, Laos unilaterally continued with the project, announcing the official ground-breaking in November 2012 after intensive preparatory work in previous months. However, continued regional and international pressure on the government of Laos led to the government commissioning Pöyry and Compagnie Nationale du Rhone to suggest some changes to the dam design regarding fish passages and sediment flush. The effectiveness of these measures remains to be seen.

- **Government lead planning agency:** Lao Ministry of Energy and Mines
- **Developer:** Thai company CH. Karnchang
- **EIA and SIA:** Thai engineering consultancy TEAM Consulting, as commissioned by CH. Karnchang
- **Feasibility study:** Swiss firm Colenco, as commissioned by CH. Karnchang
- **Financiers:** private Thai banks
- **Operator:** Xayaburi Power Company

Xayaburi Power Company is owned by: CH. Karnchang (with a 30 per cent stake), Electricite du Laos (30 per cent stake), Natee Synergy (a subsidiary of PTT with a 25 per cent stake), Electricity Generating Company Limited (EGCO, 12 per cent stake), and Bangkok Expressway and P.T. Construction & Irrigation owning the remaining 13 per cent

Problems:

- Laos views the expansion of hydropower capacity as a way to earn revenue from electricity sales. Hydropower is one of the few high-potential income streams for the government. This agenda makes social and environmental concern secondary. The national development agenda is clearly set before the wellbeing of individual local communities.
- EIA conducted by classic engineering consultancy and with a very limited geograph-

ical range, not taking into account any transboundary dimensions
- Public consultations with affected people very basic
- Concerns by Cambodia and Vietnam raised regarding downstream impacts
- Further concerns were raised when the MRC released the Strategic Environmental Assessment conducted by ICEM. This resulted in an international media campaign against the dam.
- The dam plans activated the PNCPA process. Laos participated during the 6-months run of the process, but refused to negotiate further with Vietnam and Cambodia after that and instead commenced construction.
- Laos contracted Pöyry and Compagnie Nationale du Rhone as a response to the regional and international criticism and made small adjustments to the original dam design.

The second mainstream dam subject to the PNPCA process is Don Sahong, developed by Mega First of Malaysia. Laos notified the MRC of its intention to build Don Sahong in September 2013 when it submitted the planning materials to the MRC Secretariat. However, in contrast to Xayaburi, Laos argues that only notification is required, but not prior consultation or agreement. As a consequence, Laos is directly bypassing the MRC consultation procedure. This is based on Laos claiming that Don Sahong is an "intra-basin water use" project. In addition, according to the Deputy Minister of Energy and Mines, Viraphonh Viravong, the Lao governments regards Don Sahong not to be on the mainstream Mekong: Don Sahong is to be built on the Mekong's Hou Sahong channel, which is one of seventeen channels in the Siphandone area, where the Mekong splits into multiple channels. The Hou Sahong channel would only represent 5 per cent of total water flow. International NGOs, including the WWF and the Save the Mekong Coalition, have refuted this argument. They also argued that the Hou Sahong channel is the only channel available for dry season fish migration, an argument not accepted by Laos. As in the Xayaburi case, Cambodia and Vietnam have expressed concerns about the downstream effects. Cambodia has called for a suspension of Don Sahong and has asked Laos to submit the project to the MRC's prior consultation process to conform with the PNPCA mechanism.

Discussion topics	• What is the role of the MRC in hydropower development in the LMB?
	• Do you see problems with the current way that hydropower plants are planned and built? At what point in the planning process can they be improved?
	• Discuss to what extent lessons from other river basins might be applicable to the Mekong river basin.
Exercises	• Small group work: compare the mandate of the MRC and the MRC's ability to influence hydropower development to other RBOs introduced in Section 3.2. What are the advantages and disadvantages of the MRC structure when compared to other basin development mechanisms?

Additional reading and resources	Cooper, Rachel 2012: The Potential of MRC to Pursue IWRM in the Mekong: Trade-offs and Public Participation. In: Öjendal, Joakim / Hansson, Stina / Hellberg, Sofie (eds.): Politics and Development in a Transboundary Watershed. The Case of the Lower Mekong basin. Heidelberg, London, New York: Springer.
	Hirsch, Philip 2012: IWRM as a Participatory Governance Framework for the Mekong River Basin? In: Öjendal, Joakim / Hansson, Stina / Hellberg, Sofie (eds.): Politics and Development in a Transboundary Watershed. The Case of the Lower Mekong Basin. Heidelberg, London, New York: Springer.
	Browder, Greg 2000: An Analysis of the Negotiations for the 1995 Mekong Agreement. In: International Negotiation 5.
	Browder, Greg / Ortolano Leonard 2000: The Evolution of an International Water Resources Management Regime in the Mekong River Basin. In: Natural Resources Journal 40.
	ICEM 2010: Strategic Environmental Assessment of Hydropower on the Mekong Mainstream: Final Report. Glen Iris, Victoria: ICEM, http://www.mrcmekong.org/about-the-mrc/programmes/initiative-on-sustainable-hydropower/strategic-environmental-assessment-of-mainstream-dams/.

4 GUIDELINES AND PROCEDURES FOR TRANSBOUNDARY HYDROPOWER DEVELOPMENT

Session 4: Guidelines and procedures for transboundary hydropower development	
Sub-Session	**Key questions**
I. International frameworks and guidelines for hydropower development	• How do general hydropower development assessment frameworks address the transboundary dimension? • Which selected guidelines and procedures are necessary for project development on the basin level? • Which standards of international development banks and finance institutions are important for transboundary hydropower development?
II. Examples from other river basins	• How do the guidelines and frameworks effective in international river basins worldwide look like?
III. Current situation at the Mekong	• What is the current situation of hydropower development in the Lower Mekong basin? • What provisions are available from the MRC (tools, guidelines, mechanisms and support structures)?

4.1 International frameworks and guidelines for hydropower development

Purpose	This sub-session provides an introduction into international hydropower development frameworks that guide the different project stages. Special attention is paid to the transboundary dimension of these assessment frameworks. Moreover, the sub-session provides information on guidelines and requirements of international development banks and finance institutions.
Objectives	By the end of the sub-session, trainees will: • Know and be able to apply relevant assessment frameworks • Be able to identify the key challenges of transboundary hydropower development at different project stages • Be aware of international standards and requirements
Preparatory reading	IHA 2010: Hydropower Sustainability Assessment Protocol. London: IHA, pp.4-25. Online: http://www.hydrosustainability.org/IHAHydro4Life/media/PDFs/Protocol/hydropower-sustainability-assessment-protocol_web.pdf.
	WCD 2000: Dams and Development. A new Framework for Decision Making. The Report of the World Commission on Dams. London/Sterling: Earthscan, pp.258-307. Online: http://www.internationalrivers.org/files/attached-files/world_commission_on_dams_final_report.pdf.
	The Equator Principles, June 2012. Online: http://equator-principles.com/resources/equator_principles_III.pdf.

Many international organisations have established international guidelines, frameworks and assessment systems for sustainable water resources and hydropower development. The following Table 4-1 presents an overview of those that will be presented in this sub-session.

Guideline/Framework	Organisation	Year
World Bank Safeguard Policies	World Bank	1980-
World Commission on Dams – Dams and Development, a New Framework for Decision Making	World Commission on Dams	2000
Equator Principles	International Finance Corporation	2003-
Water Resources Strategy – Strategic Directions for World Bank Engagement	World Bank	2004
International Finance Corporation Performance Standards	International Finance Corporation	2006-
Hydropower Sustainability Assessment Protocol	International Hydropower Association	2010

Table 4-1 Examples of existing international guidelines, frameworks and assessment systems for sustainable water resources and hydropower development[175]

4.1.1 Introduction into the main stages of hydropower development and relevant international provisions and assessment systems

The **Hydropower Sustainability Assessment Protocol (HSAP)** developed by the International Hydropower Association (IHA) is a sustainability assessment framework for hydropower development and operation. It aims to support the sustainable development of hydropower projects worldwide and defines good and best practice for hydropower sustainability. The protocol is based on international standards as well as the principle of sustainable development and states that "[h]ydropower, developed and managed sustainably, can provide national, regional, and local benefits, and has the potential to play an important role in enabling communities to meet sustainable development objectives"[176].

The HSAP comprises of four sections which correspond with the key stages of a hydropower project cycle (see Figure 4-1). The four parts of the protocol, namely Early Stage, Preparation, Implementation and Operation, have been designed to be used as standalone documents. The choice of the appropriate section depends on the development stage of the project you are planning to assess. Each section focuses on a number of sustainability topics which are of special importance at this stage of the project cycle. At the Preparation stage for example, relevant topics include Environmental and Social Impact Assessment and Management, Integrated Project Management and Resettlement.

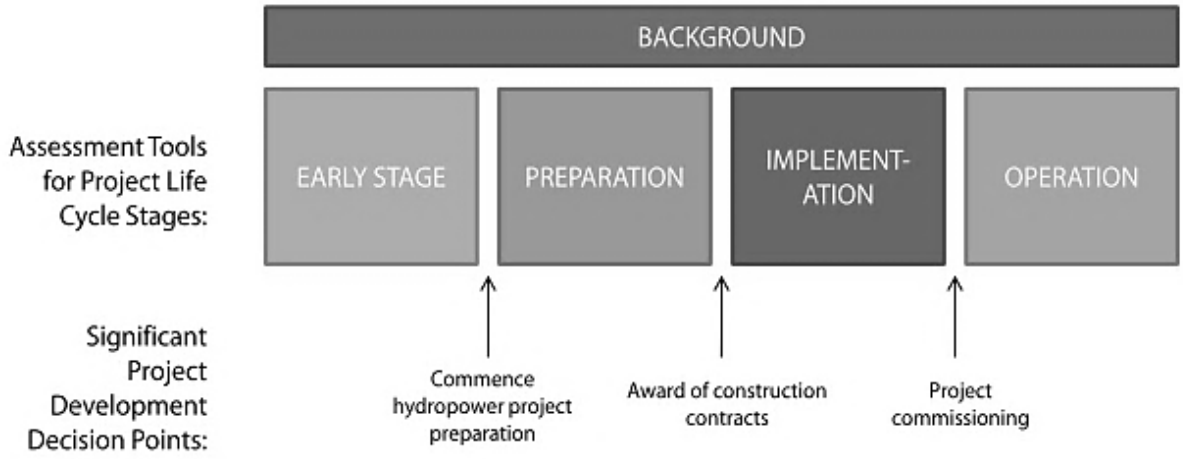


Figure 4-1 Protocol Assessment Tools and Major Decision Points[177]

Each of the topic pages then provides background information on the respective issue and its scope. Moreover, the scoring statements guide how to allocate scores to a specific hydropower project for each topic. Scoring for each topic ranges from level 1 to level 5 with level 5 describing proven best practice on a particular sustainability topic and level 3 labeling

[175] Adapted from Lindström, et al. 2012.
[176] IHA 2010:6.
[177] IHA 2010.

good practice. Thus, the HSAP also provides detailed criteria defining best practice for hydropower sustainability.

The HSAP regards transboundary issues as cross-cutting issues for sustainable hydropower which are addressed in the protocol but are not explicitly apparent in the names of the topics. Transboundary hydropower issues are most directly addressed under Political Risk (ES-4). Moreover, they do play an indirect role in Governance (P-2, I-2, O-2), Environmental & Social Impact Assessment & Management (P-5), Environmental & Social Issues Management (I-3, O-3), Hydrological Resources (P-7) and Downstream Flow Regimes (P-23, I-20, O-19).

In contrast to the other three sections, the topic pages in the Early Stage section do not contain detailed scoring guidance. Nevertheless, in order to address transboundary issues in the assessment of Political Risks (ES-4), the HSAP suggests to look at institutional arrangements upstream and downstream of the project and to consider basin-wide sharing of resources.

The HSAP follows an audit approach with the scoring of the respective project at its particular stage as the main output of the assessment. Usually, the assessment is carried out by certifies assessors. The HSAP is intended to be used by the organisation with the primary responsibility for a project at its particular stage in the project cycle, thus usually the project developer.

The **World Commission on Dams** (WCD) also developed a framework for decision-making in the sustainable development and management of hydropower projects. The framework is based upon the WCD seven strategic priorities and aims at taking into account the full range of social, environmental, technical, economic and financial criteria and standards. The WCD Criteria and Guidelines are intended to be used and incorporated by all relevant stakeholders into their respective decision support instruments (see Figure 4-2). The framework, thus, could facilitate communication and mutual understanding between stakeholders and help decision-makers, practitioners and affected people to determine whether their interests and need have been addressed in an adequate manner.[178]

[178] WCD 2000.

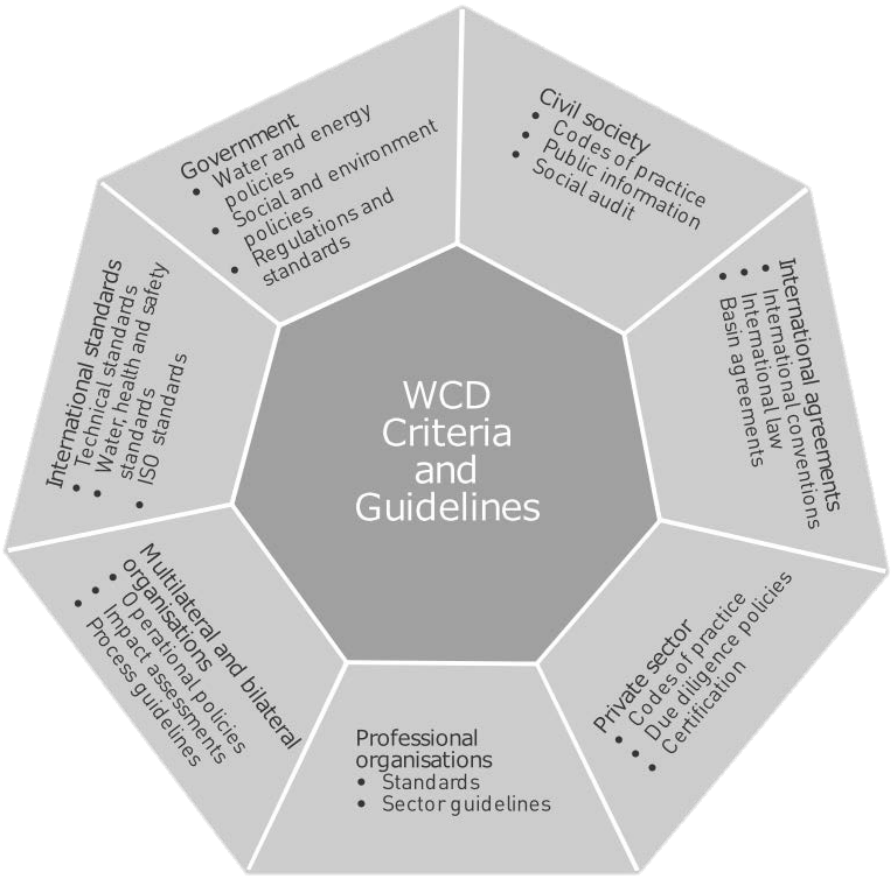


Figure 4-2 WCD Criteria and Guidelines can be used by all stakeholders to strengthen other decision support instruments[179]

The framework is structured around five key stages and associated decision points relevant for the energy and water sector (Figure 4-3). The five key stages are:

- Needs assessment: validating the needs for water and energy services
- Selecting alternatives: Identifying the preferred development plan from among the full range of option
- Project preparation: verifying agreements are in place before tender of the construction contract
- Project implementation: confirming compliance before commissioning
- Project operation: adapting to changing contexts

For each of the decision points, the WCD framework provides detailed background information on the necessary steps and a criteria checklist summarizing the most important aspects that need to be taken into account. The criteria checklists for each project stage are structured according to the seven Strategic Priorities, one of them – "Sharing Rivers for Peace, Development and Security" – having an explicit transboundary focus. These criteria with special relevance for transboundary hydropower development are explained in more detail under Guideline 26. The WCD promotes the adoption of a basin-wide perspective and

[179] WCD 2000.

calls on stakeholders to follow the principles laid down in the UN Watercourses Convention and other international agreements. Special attention is given to procedures regulating the prior notification of states that might be affected by a dam project. Moreover, Guideline 26 suggests conducting a basin-wide impact assessment by an independent panel agreed upon by all riparian states. In the case of a dispute, the WCD points to the provisions made by the UN Watercourses Convention and to the International Court of Justice.

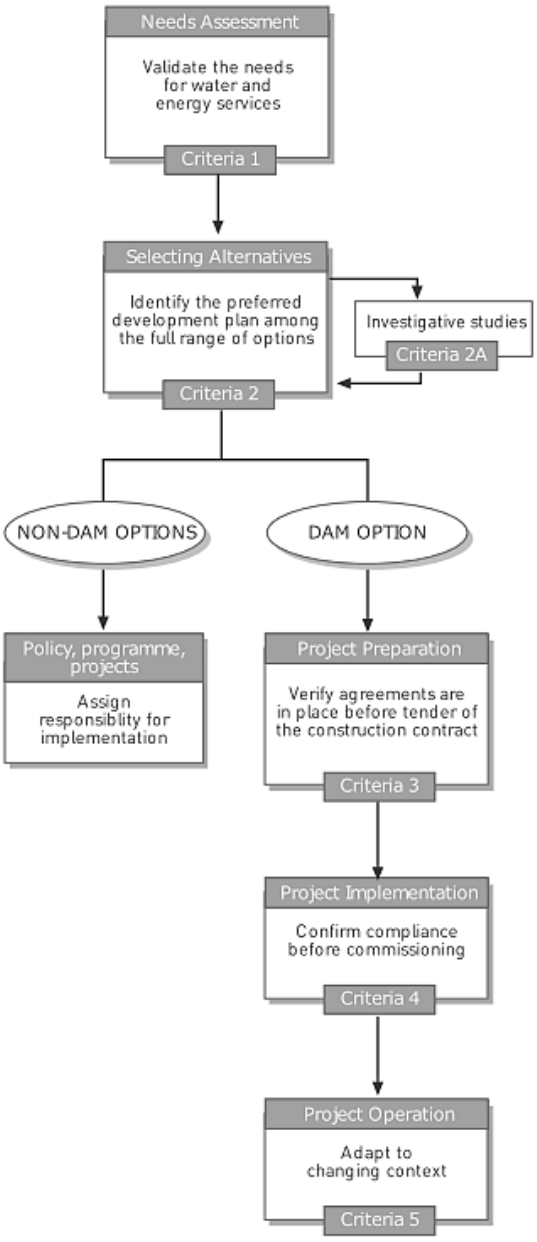


Figure 4-3 Five key decision points in planning and project development[180]

[180] WCD 2000.

4.1.2 Standards and guidelines of financial institutions

Infrastructure projects often face a financing challenge. Particularly in transboundary settings, requirements have to be met and aligned by all parties. In this session, international guidelines and standards shall be explored.

i. The World Bank

The World Bank relies on a set of safeguard policies which are supposed to guide decisions in all aspects of the Bank's operational work including at the stage of identification, preparation and implementation of projects and programmes in order to minimise harm on humans and the environment. There are two safeguard policies with special relevance for transboundary hydropower development:

- Operational Policy/Bank Procedure 7.50: Projects on International Waterways (2001)
- Operational Policies/Bank Procedures 4.37: Safety of Dams (2001)
- Other relevant Operational Policy/Bank Procedure with relevance for involuntary resettlement, environmental assessments, indigenous people, etc., can be retrieved from the following webpage:
    - http://go.worldbank.org/WTA1ODE7T0, http://go.worldbank.org/3GLI3EECP0.

Moreover, the World Bank developed the World Bank Water Resources Sector Strategy. It builds on the bank's operational experience and spans a broad range of water management issues such as legal and regulatory components including development, operation and maintenance of water storage infrastructure. The document also addressed the issue of hydropower development.

ii. International Finance Corporation

The International Finance Corporation (IFC) is the private-sector lending arm of the World Bank Group. The IFC has a set of performance standards directed towards project implementers and operators. The standards provide guidance on how to identify risks and impacts. They have been designed to help avoid, mitigate and manage risks and impacts. There are eight performance standards that the client is expected to meet throughout the IFC financing:

1. Assessment and Management of Environmental and Social Risks and Impacts
2. Labor and Working Conditions
3. Resource and Pollution Prevention
4. Community Health, Safety and Security
5. Land Acquisition and Involuntary Resettlement
6. Biodiversity Conservation and Sustainable Management of Living Natural Resources
7. Indigenous Peoples
8. Cultural Heritage

For each of these performance standards, the IFC offers separate guidance notes. Water is addressed by them as a cross-cutting issue which plays in to multiple performance standards.

iii. Equator Principles

The Equator Principles (EPs) are a risk management framework adopted by financial institutions for determining, assessing and managing environmental and social risk in projects. They are primarily intended to provide a minimum standard for due diligence to support re-

sponsible risk decision-making. The EPs were revised twice since their start in 2003, the latest update having taken place in June 2013. They apply globally, to all industry sectors and to four financial products, namely to project finance advisory services, project finance, project-related corporate loans and bridge loans. Banks can voluntarily commit to the EPs. At the moment, 78 financial institutions in 35 countries have officially adopted the EPs covering over 70 percent of international project finance debt in emerging markets (as of August 2013).

The ten Equator Principles are as follows:
Principle 1: Review and Categorization
Principle 2: Environmental and Social Assessment
Principle 3: Applicable Environmental and Social Standards
Principle 4: Environmental and Social Management System and Equator Principles Action Plan
Principle 5: Stakeholder Engagement
Principle 6: Grievance Mechanism
Principle 7: Independent Review
Principle 8: Covenants
Principle 9: Independent Monitoring and Reporting
Principle 10: Reporting and Transparency

Discussion topics	• How could the IHA HSAP be modified to specifically adapt it to *transboundary* hydropower projects?
	• Do you think the World Bank Safeguard Policies are sufficient for assuring the sustainability of transboundary hydropower projects?
Exercises	• Case study exercise: Apply the IHA HSAP to a specific case study. Which criteria are met? Which are not met?
	• You learned/refreshed your knowledge about different guidelines in this sub-chapter. Use a table to compare scope, key regulations and application of these guidelines. • In what way do guidelines ensure implementation of international law (see Chapter 1.2)? • How do guidelines respond to identified challenges of HP development projects (see Chapter 1.1)?
Additional reading and resources	IFC 2012: IFC Performance Standards on Environmental and Social Sustainability. Washington D.C.: IFC. Online: http://www.ifc.org/wps/wcm/connect/c8f524004a73daeca09afdf998895a12/IFC_Performance_Standards.pdf?MOD=AJPERES.

4.2 Examples from other river basins

Purpose	This sub-session discusses how different RBOs address the challenges of hydropower project development. Selected guidelines and procedures in place in three different transboundary river basins will be presented. The focus lies on the Danube, the Nile and the Zambezi.
Objectives	By the end of the sub-session, trainees will: • Be able to identify different approaches and options of RBOs to support and promote hydropower development in the region • Know about concrete examples and activities pursued in three different basins
Preparatory reading	ICPDR 2013: Guiding Principles on Sustainable Hydropower. Overview and Key Recommendations. Online: http://www.icpdr.org/main/sites/default/files/nodes/documents/guiding_principles_sustainable_hydropower_-_public.pdf.
	SADC 2011: Transboundary Water Management in SADC: Dam Synchronisation and Flood Releases in The Zambezi River Basin Project. Executive Summary. Online: http://www.icp-confluence-sadc.org/sites/default/files/0%201%20-%20GIZ%20SADC%20Final%20Executive%20Summary%2031%20March%202011.pdf.

With these international frameworks and guidelines in mind, many RBOs develop procedures and strategies which help to facilitate both the realisation of hydropower projects and the access to necessary financing. There is not one single best solution but this sub-session will shed light on the way how three different basins - the Danube basin, the Nile basin and the Zambezi basin - deal with the challenges.

4.2.1 The Danube basin

Hydropower development in the Danube basin is guided by a set of principles specifically adapted to the hydropower context. Following a request by the Danube Ministerial Conference in 2010, the International Commission for the Protection of the Danube River (ICPDR) initiated a dialogue with representatives from the hydropower sector. As an important step in this process, in June 2013 the ICPDR adopted the Guiding Principles on Sustainable Hydropower Development in the Danube basin. The aim was tocreate a common vision and understanding on the requirements, the policy framework and issues to be addressed in order to ensure the sustainable use of hydropower in the Danube basin. The Guiding Principles are intended to support a coherent and harmonized implementation of important legislation, in particular for the EU Renewable Energy Directive and the EU Water Framework Directive.

The document has been developed in a participative process including all relevant stakeholders in the hydropower sector. The three ICPDR member states Austria, Romania and Slovenia decided to take a stronger role within the ICPDR in order to push forward the development of the Guiding Principles. They were supported by a team of experts including

representatives from energy and environmental administrations, the European Commission, Energy Community, sector representatives as well as environmental interest groups and the scientific community.[181] The main addressees of the Guiding Principles are public bodies and competent authorities responsible for the planning and authorization of hydropower projects. The principles set forth in the guidance document have the character of recommendations, thus, they are not legally binding.[182]

The document lists six general principles for sustainable hydropower development, namely

1. Sustainable development
2. A holistic approach in the field of energy policies
3. The consideration of hydropower types and plant capacities
4. Weighing public interests
5. Public participation
6. Adaptation to climate change

Next to these general provisions, the Guiding Principles also promote standards for the technical upgrading of existing plants and ecological restoration methods, for the strategic planning approach for new hydropower development and for mitigation measures. The practical application of the Guiding Principles on the domestic level will be supported by an exchange of experiences in the frame of a follow-up process[183] (see sub-session 3.2 for additional information on cooperation in hydropower development in the Danube basin).

4.2.2 The Nile basin

A different approach is taken by the Nile Basin Initiative (NBI). In 2011, the NBI introduced the Nile Basin Sustainability Framework (NBSF), a strategic planning tool that seeks to ensure that all relevant guiding policies and strategies needed to support the Subsidiary Action Program investment projects are available in a timely manner; promote the consideration of the transboundary dimension in riparian states' approaches to water resources management; and provide direction in some aspects of the cooperative management and development of the river basin until a permanent RBO is established.[184]

The overall goal of the NBSF is "to enable Nile basin countries consolidate the achievements of the past years of cooperation and move systematically towards realisation of shared vision through strategic actions derived from mutually agreed policies, strategies and guidelines that focus on identified development priorities for the Nile basin."[185] (see sub-session 3.2 for additional information on cooperation in hydropower development in the Nile basin)

In the framework of the NBSF, the NBI is planning several strategies with relevance for transboundary hydropower development, including

- The NBI strategy for hydropower development, power interconnections and power trade
- The NBI strategy for benefit sharing
- The NBI guidelines for benefit sharing
- The NBI sub-basin guidelines for environmental and social assessments
- The NBI guidelines for transboundary EIA

[181] ICPDR (n.d.).
[182] ICPDR 2013.
[183] ICPDR (n.d.).
[184] NBI 2011a.
[185] NBI 2011a.

The issue of hydropower development also plays a role in the NBI Regional Power Trade Project (RPTP). In order to establish means to coordinate the development of regional power markets among the Nile basin countries, the NBI set up the RPTP in 2001 as one of the projects under the NBI Shared Vision Program.[186] The long-term goal of the project is "to contribute to poverty reduction in the region by assisting the NBI countries in developing the tools for improving access to reliable, low cost, sustainable generated power".[187] The project was expected to lead to the following outcomes at regional level:

- Increased opportunities for joint investments in programs / projects related to electric power development;
- Increased human capacity in electrical energy resources management.

The fundamental deliverable of the RPTP was the Comprehensive basin-wide Study of Power Development Options and Trade Opportunities (CBWS) published in 2011. The study is intended to inform the planning of multipurpose river-basin resource management, and deliver a portfolio of best options generation projects, and the corresponding transmission back-bone for the whole NBI/Eastern Africa region.[188]

The CBWS was supposed to be an inclusive and participatory comprehensive basin-wide study of power development options in the Nile basin. It is based on the review of relevant power studies and power related water management studies. Two studies were conducted in the framework of the two regional offices/programs of the NBI. First, the Nile Equatorial Lakes Strategic Action Program commissioned the Strategic/Sectoral Social and Environmental Assessment, which was completed in early 2007 and covered the countries of Burundi, Kenya, Rwanda, Tanzania and Uganda as well as the Eastern part of the Democratic Republic of the Congo. Its objective was to provide an analysis of the social and environmental issues surrounding possible power development options in the Nile Equatorial Lakes Region of Africa and to rank the various options based on a combination of cost, social, environmental and risk considerations. Second, the Eastern Nile Technical Regional Office commissioned the Eastern Nile Power Trade Program Study, which covered Egypt, Ethiopia and Sudan was completed in 2007. Its objectives were: to provide a market and power trade assessment for the countries of the eastern Nile, an energy sector profile and projections in the three countries, a ranking of hydro sites and pre-feasibility studies on three sites. The document includes an investment plan and a legal framework. The Eastern Nile Technical Regional Office commissioned the Eastern Nile Power Trade Program Study, which covered Egypt, Ethiopia and Sudan was completed in 2007.[189]

The two regional studies mainly addressed the following issues[190]:

- Regional generation planning, assessment, evaluation and selection;
- Comprehensive power sector master planning;
- Load forecasting and growth pattern modelling;
- Regional power sector policy development and regulation;
- Regional power market and power trade analysis;
- Economic and financial assessment of power projects;
- Power project EIA and Socio-economic evaluation;

[186] NBI 2001.
[187] NBI 2011b.
[188] NBI (n.d.).
[189] NBI 2011b: section 2.
[190] NBI 2011b: section 2.

- Project Risk assessment, evaluation and mitigation planning;
- Interactions with stakeholders.
- Recent Country Master Plan Studies

4.2.3 The Zambezi river basin

"How can dams and measures of water management in the whole Zambezi river basin contribute to safeguarding lives, livelihoods and nature while giving room for further sustainable development with due regard for the costs?" In order to address this question, the Southern African Development Community (SADC) introduced the Dam Synchronization and Flood Releases in the Zambezi River Basin Project in 2009. The project examines to which extent the timing of water releases for electricity production, agricultural demands, environmental flow, dam safety, and flood protection from existing and proposed new dams can result in more collective win-win advantages.[191]

To successfully manage the inflows, storage and releases for these purposes, forecast of flows at key locations are needed. These short term forecasts for floods as well as seasonal forecasts for environmental flows can be useful for reservoir operation decision-making too. At the moment, the predominant interest focuses on the multi-million dollar hydropower generation investment sector. Any operational changes or re-allocation of the water first have to earn the confidence of this sector. Forecasts and appropriate models can be used to reliably show that the power generating levels/storage will be sustainable whilst ensuring at the same time that releases are made for environmental flows or flood protection.

Often, the environmental requirements are perceived as competing with other interests such as hydropower generation. The SADC project has the aim of demonstrating that flood management and release of environmental flows can go hand in hand. This is consistent with the idea that environmental flow management should provide flows needed to sustain freshwater and ecosystems in coexistence with competing interests such as agriculture, hydropower production, public water supply and industries.

Improved dam operation rules and the development of a flow forecasting system can contribute to the transboundary management of the Zambezi River with due regard for all diverging interests, thereby reducing flooding whilst taking into account environmental needs. Transboundary river basins such as the Zambezi are usually complex. Therefore, the development of such operation rules and flow forecasting system requires expert input with know-how of the whole catchment, dedicated models and tools and sufficient human resources. Amongst other objectives, the SADC project aims to provide such expert input by finding ways and means to positively address the water infrastructure management and development scenarios in the Zambezi basin in respect of flood management, improved livelihoods and water for the environment[192] (see sub-session 3.2 for additional information on cooperation in hydropower development in the Zambezi river basin).

In the framework of the project, SADC published a report in 2011 addressing the overall challenges, findings and recommendations of the project. The following figure illustrates key parts of the report.

[191] SADC 2011,
[192] SADC 2011.

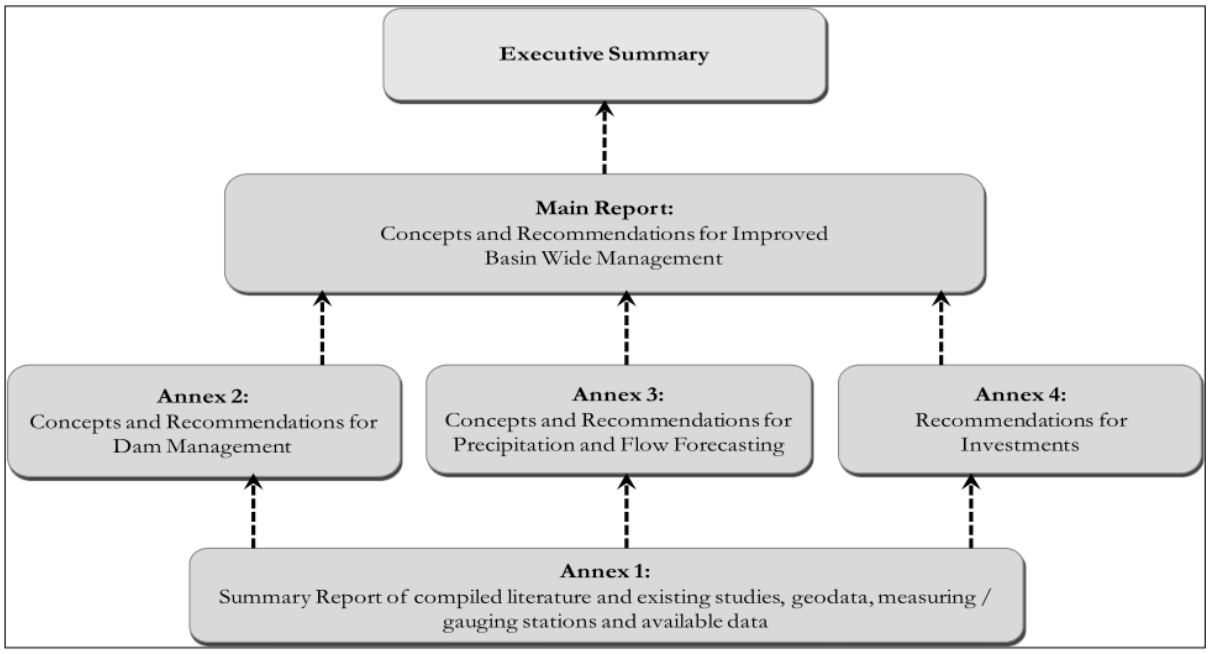


Figure 4-4 The structure of the dam synchronization report in a flow chart[193]

Annex 1 presents available water resources and climatic data for the whole of the Zambezi river basin as well as information on current management of the basin that is relevant to the Project. A variety of institutions within the basin were consulted for this information. The data and information was also analysed and used as reported in the other Annexes 2, 3 and 4.

Annex 2 presents Concepts and Recommendations for Dam Management, which aimed at attaining the following objectives:

- improving the modes of operation of the dams on the Zambezi in order to create a win-win balance amongst the interests of environmental flows, flood reduction, hydropower generation and agriculture; and
- improving cooperation between dam operators in the basin by applying the latest analytical techniques to provide them with improved approaches to dam management

Annex 3 presents an analysis of the available data and information to derive Concepts and Recommendations for establishing a Precipitation and Flow Forecasting System for the whole Zambezi river basin. The recommendations from this part of the Project were aimed at addressing the following objectives;

- to improve the reliability of seasonal forecasts, thereby providing Dam operators with enhanced confidence for flow releases;
- to contribute to an archive of hydrological forecasted and measured information for enhanced dam operation, optimization of hydropower production, flood control and environmental flow releases; and
- to improve operational disaster management by providing Disaster Management/Civil Protection Units with reliable and targeted forecast information.

Annex 4 analyzes the investment options that can be considered in the Zambezi river basin. Different investments are being planned to improve the utilisation of the Zambezi River wa-

[193] SADC 2011.

ters. The investments investigated focused on improving flood protection and flow regulation. From this perspective, the different investment options were evaluated.

The Main Report of the Project presents the overall concepts and recommendations on ways and means of improving flood protection and providing environmental flows in the Zambezi river basin. These concepts and recommendations are based on simultaneous consideration of all the various and divergent interests of the riparian states including the need to sacrifice some electricity generation capacity to provide for environmental flows in the rivers.[194]

Discussion topics	• You learned about the guidelines in place in other river basins around the world. Which of the principles you encountered might be useful in the Mekong basin?
	• What are relevant context factors that shape the strategy pursued in a particular basin?
Exercises	• Group discussion: Discuss the effectiveness of the approaches taken in different river basins. What works? What could be improved?
Additional reading and resources	NBI 2001: Nile Basin Regional Power Trade. Project Document.
	NBI 2011: Nile Basin Sustainability Framework.
	NBI 2011: Comprehensive basin-wide study. Regional Power Trade Project.
	SADC 2011: Transboundary Water Management in SADC: Dam Synchronisation and Flood Releases in The Zambezi River Basin Project.

[194] SADC 2011.

4.3 Current situation at the Mekong

Purpose	The emphasis of this sub-session is on the current situation of hydropower development in the Mekong region. The chapter explains the MRC provisions guiding and supporting water resources development and particularly hydropower development (tools, guidelines, mechanisms, support structures). The Rapid Basin-wide Hydropower Sustainability Assessment Tool (RSAT) will be introduced.
Objectives	By the end of this session, the trainee will be able to: • Understand the role of the MRC in assisting in the region's hydropower development • Gain an overview of the technical aspects of hydropower development • Be able to evaluate how this affects individual countries' hydropower plans
Preparatory reading	1995 Mekong Agreement and Procedures, http://www.mrcmekong.org/assets/Publications/policies/MRC-1995-Agreement-n-procedures.pdf.
	MRC 2011: Basin Development Strategy, http://www.mrcmekong.org/assets/Publications/strategies-workprog/BDP-Strategic-Plan-2011.pdf.
	MRC 2010: Rapid basin-wide Hydropower Sustainability Assessment Tool.
	Initiative for Sustainable Hydropower (ISH), http://www.mrcmekong.org/about-the-mrc/programmes/initiative-on-sustainable-hydropower/.
	Xayaburi PNPCA process: http://www.mrcmekong.org/news-and-events/consultations/xayaburi-hydropower-project-prior-consultation-process/. Please also familiarise yourself with the documents that can be downloaded from this website and that will illuminate the process and the contentious issues in more detail.
	PNPCA Working Group: http://www.mrcmekong.org/news-and-events/consultations/xayaburi-hydropower-project-prior-consultation-process/pnpca-working-group/.
	MRC 2009: Preliminary Design Guidance for Proposed Mainstream Dams in the Lower Mekong basin, http://www.mrcmekong.org/assets/Publications/Consultations/SEA-Hydropower/Preliminary-DG-of-LMB-Mainstream-dams-FinalVersion-Sept09.pdf.

The Lower Mekong basin is seeing the rapid construction of large dams. On the mainstream, elevens dams are proposed, of which nine will be located in Laos and two in Cambodia. Of the eleven dams, the Xayaburi Dam is currently under construction. The second dam likely to be built is Don Sahong, of which the government of Laos notified the MRC in September 2013 (for details see Section 3.3). The remaining dams are in different stages of planning.

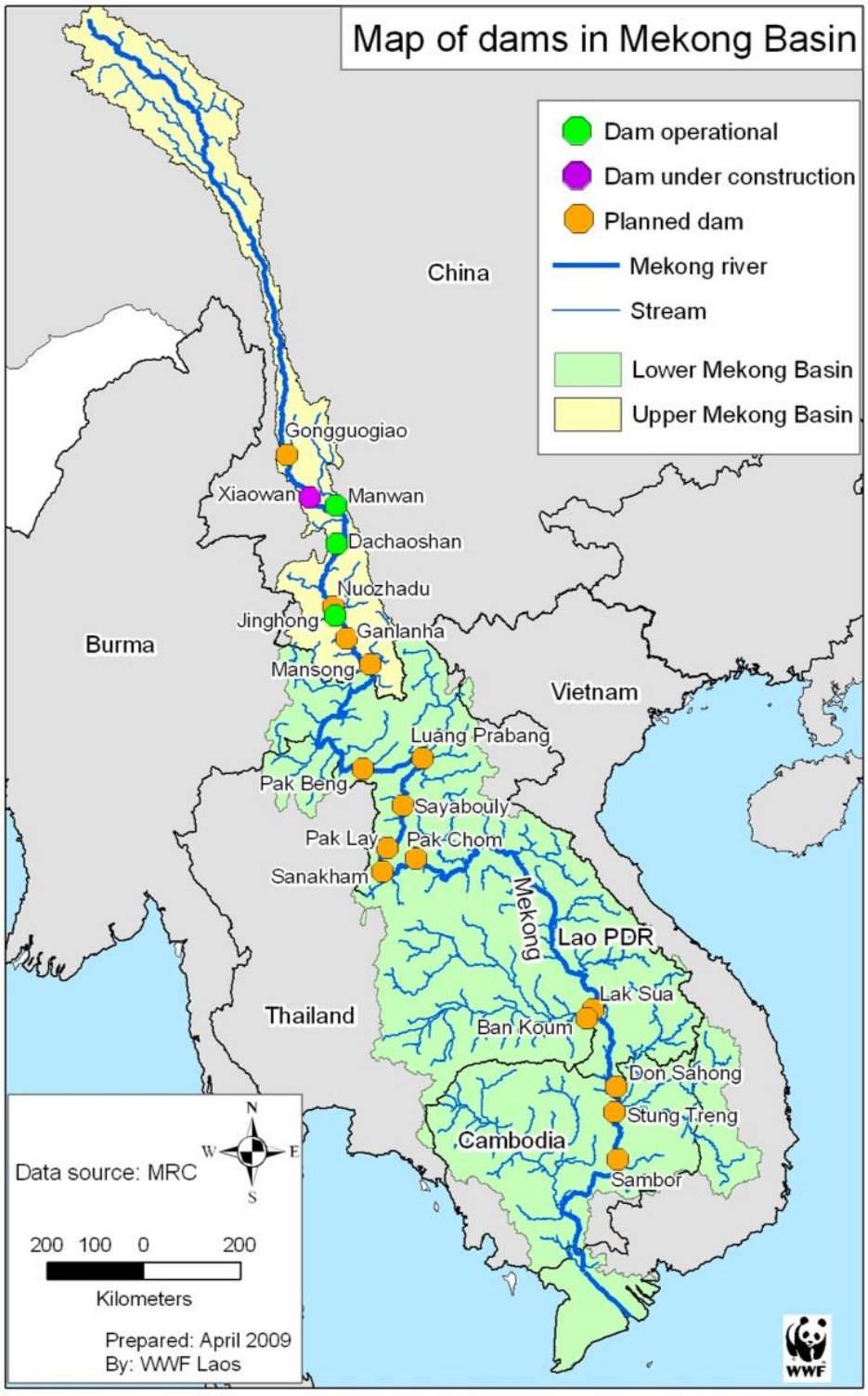


Figure 4-5 Map of dams in the Mekong basin[195]

Note that the map was produced in 2009. Therefore, as of November 2013, the following information is outdated: in China, the Xiaowan Dam is now completed; the Nuozhadu Dam is

[195] National Geographic 2010.

under construction and scheduled for completion in 2014. In the Lower Mekong basin, the Xayaburi Dam is under construction, and Laos notified the MRC of its intention to build the Don Sahong Dam in September 2013 (for details on Xayaburi and Don Sahong see Section 3.3. For Xayaburi see also below).

Dams on the Mekong mainstream automatically trigger negotiations under the PNPCA process (see Section 3.3 above). Outside of the Mekong mainstream, countries are actively engaged in building up their hydropower capacity on Mekong tributaries and on non-Mekong related rivers. The MRC's role in this is not as direct and explicit as in the case of mainstream dams. However, the 1995 Agreement as well as MRC's Procedures apply to any challenges to the sustainable development of the Mekong River, including potential alterations of the mainstream's flow due to tributary projects which then require at least notification under the PNPCA.

Based on its IWRM mandate, the MRC has established principles for the environmentally and socially sustainable development of hydropower on the Mekong tributaries and the mainstream. As examples in Southeast Asia and other areas of the world have shown, large dams can lead to widespread poverty and environmental destruction (for regional examples refer for instance to the Pak Mun Dam in Thailand).

In order to avoid a repetition of these problems and engage in costly re-regulation of existing dams, ecological restoration and post-hoc poverty reduction programmes, the MRC has developed a set of guidelines, norms and procedures to enable sustainable hydropower development in the Lower Mekong basin and to help its member countries in managing the transboundary dimension of hydropower development on a river that transcends the boundaries of states.

4.3.1 Institutional processes

The MRC **Procedures**, especially the **Procedures for Notification, Prior Consultation and Agreement (PNPCA)**, are a key mechanism of the MRC to guide sustainable hydropower development. For a detailed discussion of the PNPCA see Section 3.3.2.

The **MRC Initiative on Sustainable Hydropower (ISH)** is an MRC Programme. As such it is based at the Secretariat but has National Coordinators in each National Mekong Committee (NMC) Secretariat. The ISH supports cooperation among MRC members to plan sustainable hydropower dams. This includes development of relevant sector policies and their alignment with the 1995 Mekong Agreement. Among many other projects on sustainable hydropower, the ISH has been involved in the development of the Rapid Basin-Wide Hydropower Sustainability Assessment Tool (see below) and has published the Preliminary Design Guidance for Proposed Mainstream Dams in the Lower Mekong basin. The Preliminary Design Guidance lays down technical standards to be met so that dams would qualify as sustainable in terms of environmental and social protection.

The IHS has also published the Initiative for Sustainable Hydropower 2011-2015 Document, which lays out rationales, principles, and guidelines for hydropower development.

4.3.2 Tools

The ISH has developed a detailed Design and Monitoring Framework in order to ensure the implementation of sustainable hydropower in all four basin countries:

ISH Design Summary	Indicators	Sources of Data
Initiative objective		
Decisions concerning the management and development of hydropower in the Mekong are placed in a river basin planning and management context, applying IWRM principles. MRC and key stakeholders actively cooperate to bring sustainable considerations into the regulatory frameworks, planning systems of Member Countries concerned with hydropower, and into project-level planning, preparation, design, implementation and operation activities.	1. Extent to which national agencies bring sustainable hydropower considerations into national planning systems and regulatory frameworks.	○ MRC and ISH performance reviews and reports. ○ Periodic consultation with line-agencies agencies and stakeholders.
	2. Extent that accepted of 'good practice' is reflected in the design, implementation and operation of LMB hydropower projects.	○ MRC and ISH performance reviews and reports. ○ Sustainability assessments of policy / legal frameworks done by line agencies facilitated by MRC.
	3. Stakeholder perceptions of the value the ISH adds as a cross-cutting initiative relevant to the MRC's role.	○ MRC and ISH performance reviews and reports. ○ Stakeholder interviews.
Intermediate outcomes		
Outcome 1. A demonstrated increase in awareness of sustainable hydropower and its rationale, increased dialogue among the key stakeholder interests and partnerships being formed to introduce sustainable considerations into LMB hydropower practices.	1.1 Extent to which increased awareness of and commitment to sustainable hydropower is reflected in LMB stakeholder dialogue.	○ Review of stakeholder documentary outputs and proceedings of events.
	1.2 Level of request for information and knowledge outputs from MRC bodies and line agencies.	○ MRC Reports ○ Periodic stakeholder meetings and solicited feedback
	1.4 The level and quality of coverage of sustainable hydropower in the LMB in regional and national media.	○ MRCS media monitoring.
	1.5 Extent to which multi-stakeholder partnerships form for policy to project planning Exercises.	○ Reports of ISH National coordinators
Outcome 2. Demonstrated improvement in technical capacities of MRC and prioritized national agency staff in hydropower data systems and use of information needed to advance sustainable hydropower considerations.	2.1 Extent to which key stakeholders use MRC information and guidance in their hydropower planning and development work.	○ ISH progress reports
	2.2 Level of systematic knowledge sharing between relevant agencies in the Member countries.	○ Periodic consultations with stakeholders and surveys
	2.3 Extent to which improved developer/operator information and capacity is reflected in improved project design and operation practices.	○ Independent assessment using sustainability assessment tools
Outcome 3. Sustainable hydropower aspects are more systematically and demonstrably incorporated into sector, sub-basin and Mekong regional planning systems and regulatory frameworks.	3.1 Extent to which SEAs are undertaken by power sector agencies and sub-basin actors and reflect sustainable hydropower considerations.	○ Review of documentation on planning studies
	3.2 Extent to which the need to plan and coordinated hydropower development and operation in sub-basins is recognized.	○ Review of documentation on sub-basin planning and management
	3. Extent to which hydropower projects optimized for all water uses in planning processes and at operation stages.	○ Analysis of trends in agency planning studies and project feasibility studies.

ISH Design Summary	Indicators	Sources of Data
Outcome 4a). Hydropower sustainability assessment tools at the project and sub-basin level are in place to systematically measure and assess progress made with sustainable hydropower in the LMB. **Outcome 4b**.) Innovative financing mechanisms, especially benefit sharing mechanism, are increasingly evaluated and introduced for LMB hydropower projects.	4.1 Proportion of projects in MRC hydropower database on which hydropower sustainability assessment protocol (SAP) has been undertaken. Stakeholder perceptions of quality and value added.	○ MRC and line agency reports ○ Stakeholder evaluations as part of SAP assessments
	4.2 Outcome from basin-wide rapid assessment / dialogue tools as perceived by (i) sub-basin basin planning entities (ii) hydropower developers and operators, and (iii) relevant regulatory agencies.	○ Stakeholder evaluation as part of basin-wide assessments / dialogue facilitation
	4.3 Extent to which innovative financing mechanisms including benefit sharing are piloted and introduced by Member Countries.	○ MRC and line agency reports
Outcome 5. ISH is effectively managed and staffed and functions as a cross-cutting initiative working with other MRC Programmes.[196]	5.1 Achievement of approved staffing levels functioning of the Technical Review Group and Hydropower Advisory Committee and the ISH Coordinator network.	○ MRC and ISH Progress reports
	5.2 Proportion of ISH outputs produced to the expected level of quality.	○ Self-assessment by members of the Hydropower Steering Committee
	5.3 Degree to which key ISH stakeholders feel the ISH responds to their needs.	○ Solicited feedback from MRC bodies and NMCs

Table 4-2 Design summary of the ISH (2011-2015) with objective, outcomes and indicators[197]

The Basin Development Strategy lists 7 Strategic Priorities for Basin Development. Strategic Priority 3 directly refers to tributary and mainstream hydropower, and details relevant tools for dams to qualify as sustainable. The details listed in the Strategic Priority 3 are an inventory of suggested options at various stages of the hydropower project cycle:

Move towards sustainable development of hydropower on tributaries. This includes:

- Identifying sub-basins with high ecological value to be protected and those where hydropower can be developed with limited social and environmental impacts
- Evaluating hydropower from a multi-purpose perspective to increase overall economic benefits and decrease adverse effects on other water uses
- Mitigating negative impacts of hydropower, such as through: re-regulation reservoirs downstream of peaking projects; multi-level water intakes or aeration facilities to manage water quality/temperature; fish passages; and minimising sediment entrapment.
- Developing management plans for environmental hotspots impacted by changed flow

[196] Effective management of the ISH is noted as Output 1.1 in the previous ISH Component-Output structure, under previous component 1 Management and communication. For the purpose of 2011-2015 planning it is shown as IO 5.1, as provided in the LFA in Annex 1.
[197] MRC 2010d: 48-50.

regimes; and
- Evaluating benefit-sharing options, such as watershed development and management benefitting hydropower generation and funded from hydropower revenues.

Address the uncertainty and risk of possible mainstream dams. This includes: acquiring essential knowledge to minimize uncertainty; identifying risk mitigation options; strengthening the PNPCA process; applying the Design Guidance for Mainstream Dams; and developing specific guidance for existing and new wetlands, river flow variations and related erosion impacts, and improvement of social conditions, all to complement project-specific studies such as feasibility studies, EIAs and SIAs.

Assess power options, including alternatives to mainstream hydropower. Promote evaluation of the benefits and impacts of mainstream hydropower dams, within the broader context of power options assessments and national and regional power strategies.

i. Strategic environmental assessments

The MRC Secretariat can also solicit relevant studies such as strategic environmental assessments as technical input into the dam planning process. However, the MRC Secretariat can only solicit such studies upon approval and consensus by all four member countries. While the MRC Secretariat can initiate these studies, they must first be approved by countries in regional consultations and work programme discussions.

Following approval by all member countries, the MRC has for the first time commissioned a strategic environmental assessment: the Strategic Environmental Assessment of Hydropower on the Mekong Mainstream (ICEM 2010). The SEA proposed to defer construction of mainstream dams to allow more time for studying the ecological and social effects, including on food security, that the dams would have. The SEA proved particularly contentious in the PNPCA process as Cambodia and Vietnam supported its conclusions whereas these were rejected by Laos.

ii. Transboundary Environmental Impact Assessment

The MRC is also well advanced in getting member country approval of a Framework for Transboundary EIA in the LMB. The current draft of a Framework agreement, which is still being reviewed by member countries, inter alia, indicates that a transboundary EIA will become mandatory for hydropower projects of a certain size and location. If the process is triggered, the origin country and the potentially affected country will work together to define the transboundary environmental impacts and agree on mitigation measures. They will jointly seek funds to carry out the necessary investigations and subsequent monitoring.

iii. Stakeholder participation

As dams can have significant social impacts resulting in widespread poverty as a consequence of destruction of traditional livelihoods and social networks, consultation with affected people is essential. Stakeholder consultations with national agencies, communities, NGOs, academia, and development partners over a period of two years were an integral element in developing the Basin Development Strategy that was published in 2011. The MRC Secretariat has thus run extensive stakeholder dialogues to achieve public input across the four member countries. This was a key element of the IWRM principle underlying the Basin Development Strategy and the 1995 Mekong Agreement. For details, see the MRC's report on stakeholder participation during planning for the Basin Development Strategy (MRC 2004/5).

iv. The Rapid Basin-wide Hydropower Sustainability Assessment Tool (RSAT)

RSAT was developed by the Partnership Initiative "Environment Criteria for Sustainable Hydropower (ECSHD)", consisting of the ADB, MRC and WWF, and funded by GIZ. Within the Mekong River Commission, the Initiative for Sustainable Hydropower cooperated with the Environment Division and the National Mekong Committees to establish RSAT.

RSAT "considers what needs to be taken into account at all stages of the project-cycle from planning and design through operations. The range of topics and criteria in RSAT reinforces the inherent multi-disciplinary nature of the sustainability hydropower challenge." (MRC 2011: Knowledge Base on Benefit Sharing, pp. 29-30)

The purpose of the RSAT is to provide a basin-wide approach to sustainable hydropower development. This differs from the International Hydropower Association's Hydropower Sustainability Assessment Protocol in that the protocol is designed for individual projects, whilst RSAT takes a basin or sub-basin approach[198].

The primary aims of RSAT are:

- To provide a common basis for dialogue and collaboration on sustainable hydropower between key players;
- To highlight and prioritize areas of hydropower sustainability risk and opportunity in a particular basin or sub-basin for further more detailed study; and
- To identify capacity building needs in the basin.

The key themes within the assessment are:

- Continuous improvement.
- Basin-wide understanding and protection of values.
- Integration between basin planning and hydropower development regulatory and management frameworks.
- Co-operation between different countries sharing a river basin.
- Balance of social and environmental criteria with economic and technical criteria in decision making processes.
- Consistency in approaches across a river basin.
- Informed participation of stakeholder in decision making and broad community support.
- Climate change – a cross-cutting issue.
- The topics and criteria used in the assessment.

RSAT also reflects the 7 Principles of the World Commission on Dams (for details on the WCD see section 4.1):

1. Gaining Public Acceptance
2. Comprehensive Options Assessment
3. Addressing Existing Dams
4. Sustaining Rivers and Livelihoods
5. Recognising Entitlements and Sharing Benefits
6. Ensuring Compliance
7. Sharing Rivers for Peace, Development and Security

[198] GIZ 2013b.

RSAT is therefore directly informed by international norms for hydropower development. RSAT "is based on the principle that sustainable hydropower development in a shared river basin calls for a high level of co-operation between the different national governments sharing a basin as well as the different levels of government at the sub-national and local levels. This co-operation between governments needs to be underpinned by a shared vision for sustainable and equitable development across the basin" (Rapid basin-wide Hydropower Sustainability Assessment Tool).

4.3.3 Examples of successful cooperation mechanisms and negotiation approaches in the Mekong countries

The Xayaburi Dam: success or failure of regional cooperation?

As already addressed in Section 3.1, the Xayaburi Dam is considered to have side-lined the MRC as a regional forum. Governed by the MRC's PNPCA process, all four countries had a period of six months to reach agreement on how or if the Xayaburi Dam should be constructed. Cambodia and Vietnam supported the recommendation of a Strategic Environmental Assessment that was commissioned by the MRC and carried out by ICEM that dam construction on the mainstream be deferred for 10 years, allowing for further studies. Laos rejected these recommendations, arguing that Xayaburi would have no effects on Cambodia and Vietnam.

However, following sustained pressure by Cambodia and Laos and the wider international community, Laos commissioned Pöyry (a Finish/Swiss consultancy) to make alterations to the dam and also to work on a study that showed that Xayaburi complied with all MRC requirements, regarding the PNPCA process and downstream countries' concerns as well as regarding the MRC Preliminary Design Guidance for Proposed Mainstream Dams in the Lower Mekong basin. In the study, Pöyry concluded that Laos was 'principally' in compliance with MRC requirements.[199] However, Pöyry also identified large gaps between the Xayaburi design and MRC Preliminary Design Guidance, especially concerning fish passing facilities, sediments, and water quality and aquatic ecology. For fish passes, Pöyry points out that knowledge of fish species and their requirements for fish passes 'is not sufficient', calling the Environmental Impact Assessment, the Environmental Management Plan, the Social Impact Assessment and the Resettlement Action Plan 'weak' and suggesting substantial studies to be carried out, including baseline investigations, fish surveys, and behavioural studies of target species.[200] For sediment transport, Pöyry recommends design changes and additional investigations and modelling in order to be in compliance with MRC Design Guidelines.[201] For water quality and aquatic ecology, Pöyry points to the need for further studies in order to achieve compliance with MRC Preliminary Design Guidance.[202] All the studies called for could be carried out during the phase of construction.[203] Given the complexity of the required studies, the latter point was harshly criticised by relevant experts and the NGO community.

The assessment also directly contradicted the MRC-commissioned Strategic Environmental Impact Assessment conducted by ICEM that called for a delay of mainstream dams by 10 year to allow further studying.

[199]Pöyri 2011.
[200]Pöyri 2011: 25-26.
[201]Pöyri 2011: 35-43.
[202]Pöyri 2011: 44-46.
[203]Pöyri 2011: 14.

Following the controversial Pöyry study and the unabating criticism, Laos then hired French firm Compagnie Nationale du Rhone to review the Pöyry study in order to provide it with additional credibility. Compagnie Nationale du Rhone suggested making alterations to the dam design by adding a fish passage and a sediment flushing system. Compagnie Nationale du Rhone commented, however, that its solutions 'have been proposed at the conceptual level […]. These solutions need to be developed and their costs evaluated' (Compagnie Nationale du Rhone 2012). Further ignoring the continued concerns by Cambodia and Vietnam, the government of Laos held the ground-breaking ceremony in November 2012.

Discussion topics	• Discuss the effect of the MRC on national hydropower planning. • Do you know of successful examples in the basin?
Exercises	• Group work: discuss if / how the different tools of the MRC complement each other. Where in the planning cycle for a hydropower scheme are they applied?
Additional reading and resources	MRC 2011: Knowledge base on benefit sharing, Volume 1 of 5, pp. 10-30. Online: http://www.mrcmekong.org/assets/Publications/Manuals-and-Toolkits/knowledge-base-benefit-sharing-vol1-of-5-Jan-2012.pdf.
	Compagnie Nationale du Rhone 2012: Xayaburi Dam Project: Clarifications from the Compagnie Nationale du Rhone. Press release, 2 August 2012, http://www.internationalrivers.org/files/attached-files/2012_08_02_press_release_cnr_xayaburi_dam_project.pdf.
	Pöyri 2011: Compliance Report, Government of Laos, Main Report: Xayaburi Hydroelectric Power Project Run-of-River Plan. Zürich: Pöyri.

5 NEGOTIATION AND DISPUTE RESOLUTION PROCESSES RELEVANT FOR TRANSBOUNDARY HYDROPOWER DEVELOPMENT

Session 5: Negotiation and dispute resolution processes relevant for transboundary hydropower development	
Sub-Session	**Key questions**
1. Negotiation and conflict resolution on transboundary hydropower dams	• How does the conflict-cooperation spectrum relate to transboundary hydropower? • Which interpersonal skills allow for an effective dialog? • What are the opportunities specific to hydropower cooperation?
2. Examples from other river basins	• How does “success” look like in different international river basins? • Which levels of integration, from simple coordination through joint investment and management, can be found in transboundary basins worldwide? • Which concrete conflict mitigation examples can be found?
3. Negotiation and conflict resolution at the Mekong	• What are the provisions for negotiation and dispute resolution in the MRC and the limits of the approach?

5.1 Negotiation and conflict resolution on transboundary hydropower dams

Purpose	This sub-session centers on negotiation processes and disputes with regard to hydropower development. It provides a theoretical input on the spectrum of conflict resolution and gives concrete advice on necessary skills for an effective dialogue.
f	By the end of this sub-session, the trainee will: • Understand how proactive dialog on hydropower development can ease relations and prevent tensions between nations • As productive negotiations are carried out by individuals, not "nations", develop interpersonal skills that are as critical to the process as is understanding theory and practice • Be able to identify the collaborative or coordinated management options that offer benefits basin-wide
Preparatory reading	Carius, A., G. Dabelko, and A. Wolf. "Water, Conflict, and Cooperation." Environmental Change and Security Project Report. Issue #10, 2004. pp. 60-66.
	MacQuarrie, P., V. Viriyasakultorn, and A. Wolf."Promoting Cooperation in the Mekong Region through Water Conflict Management, Regional Collaboration, and Capacity Building." GMSARN International Journal. Vol. 2 (2008).pp. 175 – 184.

5.1.1 Introduction to hydropolitics

Water management is, by definition, dispute management. Water, unlike other scarce, consumable resources, is used to fuel all facets of society, from biology to economies to aesthetics and spiritual practice. Moreover, it fluctuates wildly in space and time, its management is usually fragmented, and it is often subject to vague, arcane, and/or contradictory legal principles. There is no such thing as managing water for a single purpose—all water management is multi-objective and based on navigating competing interests. Within a nation these interests include domestic users, agriculturalists, hydropower generators, recreators, and environmentalists—any two of which are regularly at odds—and the chances of finding mutually acceptable solutions drop exponentially as more stakeholders are involved. Add international boundaries, and, without careful recrafting of the issues involved, the chances decrease exponentially yet again.

Surface and groundwater that cross international boundaries present increased challenges to regional stability because hydrologic needs can often be overwhelmed by political considerations. While the potential for paralyzing disputes is especially high in these basins, history shows that water can catalyze dialogue and cooperation, even between especially contentious riparians. There are 276 rivers around the world that cross the boundaries of two or

more nations, and untold number of international groundwater aquifers. The basin areas that contribute to these rivers (Figure 5-1) comprise approximately 47% of the land surface of the earth, include 40% of the world's population, and provide almost 80% of freshwater flow[204].

Within each international basin, demands from environmental, domestic, and economic users increase annually, while the amount of freshwater in the world remains roughly the same as it has been throughout history. Given the scope of the problems and the resources available to address them, avoiding violent water conflict is vital. Disputes are expensive, disruptive, and interfere with efforts to relieve human suffering, reduce environmental degradation, and achieve economic growth. Developing the capacity to monitor, predict, and preempt transboundary water conflicts, particularly in developing countries, is key to promoting human and environmental security in international river basins, regardless of the scale at which they occur. Yet conflict can yield positive results as well, providing opportunities for dialogue and integrated planning.

A general pattern has emerged for international basins over time. Riparians of an international basin implement water development projects unilaterally first on water within their territory, in attempts to avoid the political intricacies of the shared resource. At some point, one of the riparians, generally the regional power, will implement a project which impacts at least one of its neighbors. This might be to continue to meet existing uses in the face of decreasing relative water availability. This project which impacts one's neighbors can, in the absence of relations or institutions conducive to conflict resolution, become a flashpoint, heightening tensions and regional instability, and requiring years or, more commonly, decades, to resolve.

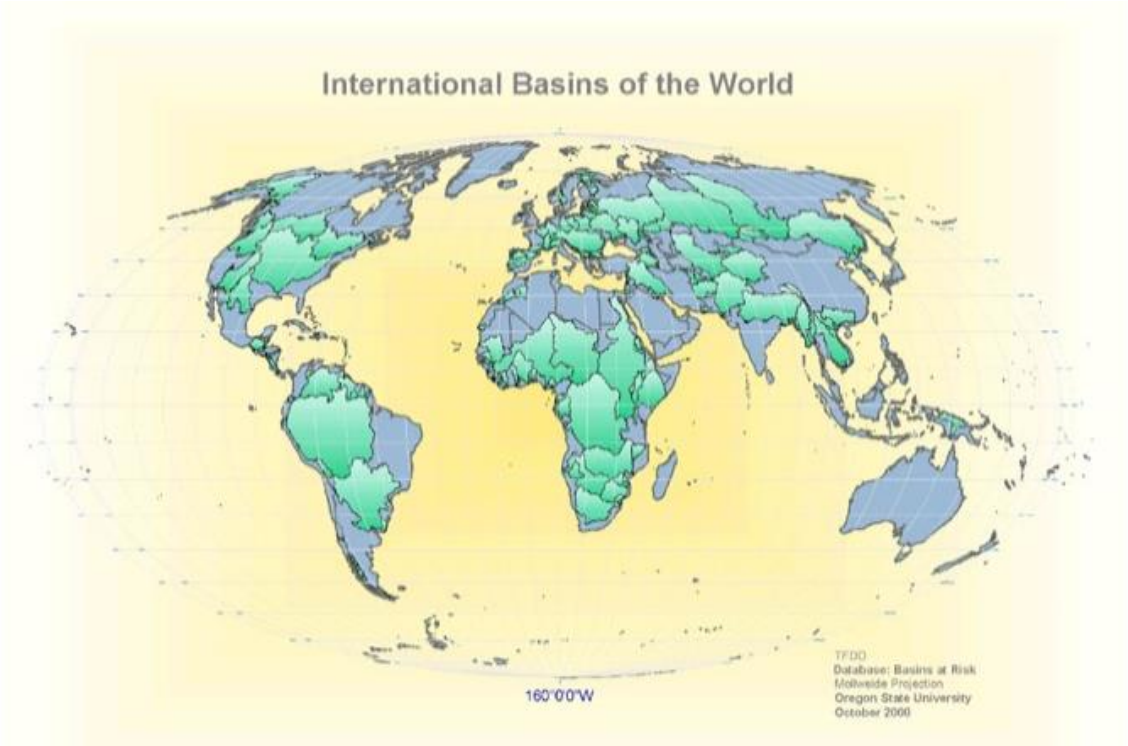


Figure 5-1 International basins of the World

[204]Wolf et al. 1999

There is some room for optimism, though, notably in the global community's record of resolving water-related disputes along international waterways. For example, the record of acute conflict over international water resources is overwhelmed by the record of cooperation. Moreover, the most vehement enemies around the world either have negotiated water sharing agreements, or are in the process of doing so as of this writing, and once cooperative water regimes are established through treaty, they turn out to be impressively resilient over time, even between otherwise hostile riparians, and even as conflict is waged over other issues. Violence over water does not seem strategically rational, hydrographically effective, or economically viable. Shared interests along a waterway seem to consistently outweigh water's conflict-inducing characteristics.

Lessons for the International Community

Despite their complexity, the historical record shows that water disputes do get resolved, and that the resulting water institutions can be tremendously resilient. The challenge for the international community is to get ahead of the "crisis curve," to help develop institutional capacity and a culture of cooperation in advance of costly, time-consuming crises, which in turn threaten lives, regional stability, and ecosystem health.

One productive approach to the development of transboundary waters has been to examine the benefits in a basin from a multi-resource perspective. This has regularly required the riparians to get past looking at the water as a commodity to be divided, and rather to develop an approach which equitably allocates not the water, but the benefits derived there from.

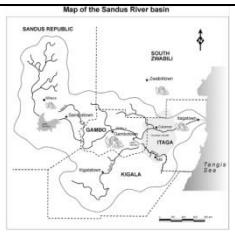
Negotiation Stage[205]	Common Water Claims[206]	Needs	Geographic Scope
Adversarial	Rights	Physical	 Nations
Reflexive	Needs	Emotional	 Watersheds
Integrative	Benefits	Intellectual	 "Benefit-sheds"
Action	Equity	Spiritual	 Region

Table 5-1 Four stages of water collaboration

5.1.2 Needs: physical, emotional, intuitive, and spiritual

The four stages of negotiations correspond to four levels of need within each of us: physical needs, emotional needs, intellectual needs, and spiritual needs. Whether as individuals, groups, or nations, we react defensively when our needs are threatened; anger and tension are shields protecting vulnerability. Many understand these needs through Abraham Maslow's hierarchy of needs, which categorises and ranks basic human needs to their level of motivating behaviour.[207]

---

[205] These stages build primarily on the work of Jay Rothman, who initially described his stages as ARI – Adversarial, Reflexive, and Integrative (Rothman 1989). When ARI become ARIA, adding Action, Rothman's terminology (1997) also evolved to Antagonism, Resonance, Invention, and Action. We retain the former terms, feeling they are more descriptive for our purposes.

[206] These claims stem from an assessment of 145 treaty deliberations described in Wolf (1999). Rothman (1995) too uses the terms rights, interests, and needs, in that order, arguing that "needs" are motivation for "interests," rather than the other way round as we use it here. For our purposes, our order feels more intuitive, especially for natural resources.

[207] Maslow 1954

The most effective path to understanding the Four Worlds depends on how you learn best. If visual models help, take a look at Figure 5-2 on the left. If you were to look down on the figure in a map view, each state would be within the other – each expands out from, and incorporates, the previous state. Yet from the side, they also rise – not because higher is better, but because higher is higher (in some traditions, each state is associated with different chakras, each ascending from the one before. As we will note later, each can be "felt" in a different part of the body in ascension).

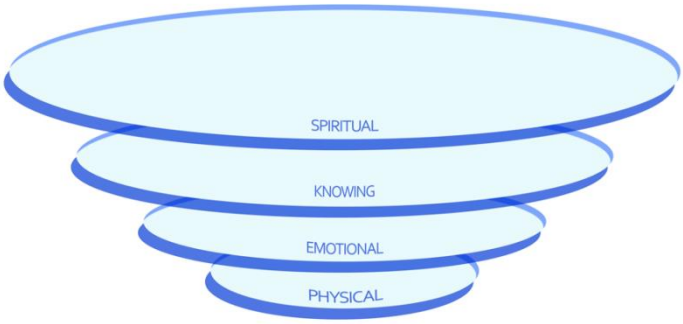


Figure 5-2 Four levels of need

A key point to understand about the worlds is that they exist all the time, simultaneously. One intuitive example might be seen through a piece of bread, which exists most recognizably on a physical plane or, if one is hungry or the bread is particularly good, one perceives the bread emotionally. One can also intellectualise the bread and consider its components and interaction with our body to provide sustenance. Finally, one might say a blessing over the bread, removing its "profane" covering, and it now becomes a source of spiritual nourishment. While these four levels of perception can be thought of separately, and might occasionally be achieved in sequence, they should not be considered as distinct or linear. The bread, in this example, exists simultaneously in all four states – it is up to us to determine through which lenses it will be perceived. Nonetheless, understanding the four worlds in sequence is often useful, if not critical. Someone desperately hungry, for example, may have difficulty taking the time and effort to intellectualise anything when offered a piece of bread.

Another point is that one state is not "better" than any other; the object is *not* to get to the "higher" states; each state has its place and vital role. Even the most focused ascete, rock-climber or fly-fisher, experiencing near-transcendent clarity, needs to make sure the physical body is nourished.

5.1.3 Reframing: general setting – enhancing benefits: beyond the basin, beyond water

Once participants have moved in the first two stages from mostly speaking to mostly listening, and from thinking about rights to needs, the problem-solving capabilities which are inherent to most groups can begin to foster creative, cooperative solutions. In this third, *integrative stage*, the needs expressed earlier begin to coalesce together to form group interests – the "why" underlying the desire for the resource. Conceptually, they start to think about how to enhance benefits throughout the region, primarily by adding resources other than water, geographic units other than the basin, and social and economic networks that connect with and contribute to the health of the basin. The collaborative learning emphasis is now on the *consensus-building* of the group, and it begins to think about a "benefit-shed" rather than being restricted by the basin boundaries.

There are different ways to pursue this integrative stage. The appropriate process will be situation-dependent and have its own organic unfolding. Nevertheless, these processes take

unusual facilitation and/or leadership, and this should be assessed as one considers undertaking an integrative process.

Through many of these processes, parties have had an experience of transformation from what they may have known. If parties still tend to think of the integrative process as being about the river, management, and negotiation; if they think about themselves or their interest as separate from other parties/interests; and how they think about cooperating and distributing benefits among parts -- rather than thinking as a whole system, consider the following integrative process.

It is framed around creating a shared cooperative agenda. The extent to which this can occur will be determined by each party's perception of the benefits it can secure from cooperation. Convergence towards a cooperative agenda will be facilitated by several important and practical steps. First, the perception of the range and extent of potential benefits needs to be expanded to the extent possible, from the obvious to the less apparent. Second, the distribution of benefits, and benefit-sharing opportunities to redistribute the costs and benefits of cooperation, need to be explored to enable the definition of a cooperative agenda that will be perceived as fair by all parties. Third, alternative modes of cooperation need to be recognized and appropriate types of cooperation identified to secure the greatest net benefits. Each of these steps is examined below.

A first step in motivating cooperation is to recognise the widest possible range of potential benefits that cooperation could bring. There will be no cooperation if benefits are perceived to be insufficient relative to the costs of cooperation. Benefits are broadly defined here to extend beyond any direct relationship to the river to the "problemshed" and to include economic, social, environmental and political gains.

A useful framework for broadening the range of recognised benefits of cooperation proposes the identification of four types of cooperative benefits.[208] The first type of benefit derives from cooperation that enables better management of ecosystems, providing *benefits to the problemshed*, and underpinning all other benefits that can be derived. The second type of benefit derives from the efficient, cooperative management, development, and protection strategies, yielding *benefits from the problemshed*. The third type of benefit derives from the lessening of tensions because of cooperation and shifting the focus from the river itself to a problemshed, resulting in the reduction of costs *because of the problemshed*. And finally, there are benefits derived from greater cooperation *beyond the problemshed*. For a detailed discussion of benefit sharing in transboundary hydropower development see also Session 2 of this manual.

5.1.4 Beyond negotiation: relating as a system

For many "intractable" water problems, these processes will need to be taken up a notch. There are several examples around the world of problems that have come to a standstill because of limits to our laws, institutions, and capacity to tackle these. Also the way we frame the problem and solutions need to change.

These situations call for a certain quality of leadership, ripeness of the issues, and sincerity and fluency in the process.

[208] Sadoff / Grey 2002.

i. Generative dialogue and relationships

Generative dialogue allows us to challenge taken-for-granted assumptions that are broadly held; reorder people's existing knowledge – allowing people to see what they already know in a new light; and to reframe the problem. It "requires that we take responsibility for thinking, not merely reacting, lifting use into a more conscious state."[209] This type of dialogue creates entirely new possibilities and creates new levels of interaction.

At this level it is not uncommon for participant to conclude that we do not know as much as we would like to about the natural system and probably can't know as much as we would like to know. Humbly, participants concede that the system is chaotic; that instead of thinking about *managing* natural systems, we should shift our thinking to how we govern our own behaviour in relation to the resource. Dialogue then reflects on dynamic interconnections that extend beyond hydrologic units alone and moves to thinking comprehensively about economic, ecologic and social needs, interests and benefits as a whole. Ultimately, participants will engage with each other in an entirely new way exploring the dynamic natural and social systems within which relationships are embedded.

ii. Framing

In the middle of complex conflicts and crisis, participants often recognise that the framing of the problem won't lead to a solution. Even with this awareness, many leaders will stay with familiar framing because taking on more and engaging a suite of highly complex, dynamic challenges may be daunting and politically risky.

Leaders who are motivated by policy rather than politics, and function rather than form, will look at these crises and systemic patterns of conflicts, and examine their framing of the problem. In order to hold the full dynamic that is usually at play, they will look at the source of the problem and probe how well and holistically it is understood and in light of present-day circumstances. They will then reframe the problem to capture the kernel of what is needed for the present as well as the future.

Reframing is not an easy skill because of the number of embedded assumptions we collectively carry. However, the most promising opportunities for reframing come from:

- Seeing clearly what the root of a problem is and what the symptoms are. Reframe the problem around the root of the problem.
- Recognising that health, quality, and restoration of systems (e.g. economic, ecologic, and community/social) is not just quantity. This opens up a surprising number of opportunities, particularly when one becomes aware of and challenges one's assumptions about these.
- Exploring these dimensions simultaneously. Treat everything as whole and interconnected. Solutions framed this way tend to be apolitical, and don't send participants into polarized camps. This comes from holding out a vision that all parties can see themselves as a part of.
- Orienting attention to short-term responses as well as mid- to long-term strategies for change. Words that encompass such a time horizon may be expressed in words like "sustainable."

[209] Sadoff / Grey 2002: 45-46.

5.1.5 Facilitation: the principles

The field of conflict management and alternative dispute resolution (ADR) has brought new insights to negotiation and bargaining, adding much to the theory and practice of assisted negotiations, facilitation, and mediation. It has added practical tools to diagnose the causes of conflict and relate diagnosis to ADR techniques.[210] The ADR field has codified a new language of interest-based bargaining. And much of these insights have arisen from environmental and natural resources cases.

Much of the ADR literature is divided between works written by mediators or negotiators themselves about their own work, case studies by outside observers, and a growing body of theoretical work.[211] One distinction important in ADR is that between distributive (also known as zero-sum or win-lose) bargaining—negotiating over one set amount, where one party's gain is the other's loss—and integrative (positive-sum or win-win) bargaining, where the solution is to everyone's gain. Reaching a collaborative arrangement is the goal of integrative bargaining. It depends on identifying values and interests that underlie positions; using these interests as building blocks for durable agreements; diagnosing the causes of conflict and designing processes appropriate to these causes; and focusing on procedural and psychological, as well as substantive satisfaction of parties. Interest-based bargaining or negotiations is the preferred way to accomplish this.

In traditional positional, or distributive, bargaining, parties open with high positions while keeping a low position in mind and they negotiate to some space in between. Sometimes this is all that can be done. In contrast, interest-based, or integrative bargaining involves parties in a collaborative effort to jointly meet each other's needs and satisfy mutual interests. Rather than moving from positions to counter positions toward a compromise settlement, negotiators pursuing an interest-based bargaining approach attempt to identify the interests or needs of other parties *prior* to developing specific solutions. Often, outside help is needed to facilitate dialogue, rather than to dictate solutions. It essentially is a process of social learning. Parties actually educate each other in their interests and thus become reeducated in their own interests in the process.

After the interests are identified, the negotiators jointly search for a variety of settlement options that might satisfy all interests, rather than argue for any single position. This encourages creativity from the parties, especially in technical water management negotiations. Engineers may use their technical knowledge to liberate creativity rather than simply applying it to defending solutions. The process can actually generate solutions that no one person may have thought of before negotiations. The parties select a solution from these jointly generated options. This approach to negotiation is frequently called integrative bargaining because of its emphasis on cooperation, meeting mutual needs, and the efforts by the parties to expand the bargaining options so that a wiser decision, with more benefits to all, can be achieved.

Susskind and Cruikshank divide negotiations into three phases—pre-negotiation, negotiation, and implementation—and offer concrete suggestions, such as “joint fact-finding” and “inventing options for mutual gain” in order to build consensus in an unassisted process.[212] In

[210] see Delli Priscoli and Moore 1988; Moore 2003; Shamir 2003
[211] see, for example, Fisher and Ury 1981, Fisher and Ury 1991; Kaufman 2002; Lewicki et al. 1994; Mnookin et al. 2000; and Susskind and Cruikshank 1987, as representative works that combine the three approaches
[212] Susskind and Cruikshank 1987

assisted negotiations (facilitation, mediation, and arbitration), they observe that whether the outcome is distributive or integrative depends primarily on the personal style of the negotiator. They also offer the interesting note that, "negotiation researchers have established that cooperative negotiators are not necessarily more successful than competitive negotiators in reaching satisfactory agreement."

Lewicki and Litterer identify five styles of conflict management in a 'dual-concern model' along a ratio of the degree of concern for one's own outcome, compared with the degree of concern of the other's outcome.[213] The five styles possible are avoidance, compromise, and collaboration, as equal concern for both parties; and competition and accommodation as completely selfish and selfless, respectively. In their classic, *Getting to Yes*, Fisher and Ury offer guidelines to reach this ideal, positive-sum solution.[214] In language that is now common to much of the ADR literature, including Lewicki and Litterer[215], whose terminology for similar concepts is presented in parentheses), Fisher and Ury suggest the following principles:

1. Separate the people from the problem (identify the problem).
2. Focus on interests, not positions (generate alternative solutions).
3. Invent options for mutual gain (generate viable solutions).
4. Insist on objective criteria (evaluate and select alternatives).

While a collaborative arrangement is frequently seen as superior to any other, Lewicki and Litter offer a series of common pitfalls that preclude such an agreement.[216] These factors that make integrative bargaining difficult include the failure to perceive a situation as having integrative potential, the history of the relationship between the parties, and polarized thinking. Ury offers specific advice to getting past historically difficult and value-based conflicts—"getting past NO."[217] And Donahue and Johnston, Faure and Rubin, and Blatter and Ingraham describe cultural differences in approaches to water disputes.[218]

Amy provides an altogether different approach to ADR, one of harsh criticism.[219] He suggests that, since most studies of mediation are carried out by mediators, there is relatively little criticism of the fundamental claims made by the field. He begins by reviewing the advantages claimed by mediation over legislature, bureaucracy, and the courts to resolve environmental conflicts, and concludes that mediation only tends to be justified when (1) there is a relative balance of power between the disputants; and (2) an impasse has been reached in the conflict such that neither side can move unilaterally in what they perceive as their best interest.

Restricting himself to intranational disputes, he also contests the common assertions that environmental mediation is cheaper, faster, and more satisfying than other approaches, particularly litigation. Amy approaches his critique from the perspective of power politics, and his most important observations are of power distributions throughout the process of mediation, and of some resulting drawbacks.[220] He argues that the same power relationships existing in

[213]Lewicki and Litterer 1985
[214]Fisher and Ury 1981
[215]Lewicki and Litterer 1985
[216]Lewicki and Litterer 1985
[217]Ury 1991
[218]Donahue and Johnston 1998; Faure and Rubin 1993; Blatter and Ingraham 2001
[219]Amy 1987
[220]Amy 1987

the real world are brought into the negotiating process. In the classic environmental dispute of developer versus conservationist, for example, the former will usually have the power advantage. As such, the developer will only enter into negotiations if he or she somehow has that power blocked through, for example, a restraining order. The mediator, then, usually approaches a conflict looking for a compromise. The assumption is that the compromise will be found between the two initial positions. The problem may be rooted in fundamental differences in values or principles, though—for example, whether development should even take place—which may represent alternatives that are not even on the table.

Further, if one party believes strongly one way or the other, any compromise may seem like capitulation. In other words, positions or interests can be compromised, but not principles. A mediator is usually not entrusted with finding the right solution, only the best compromise—and a mediator who becomes an advocate, either against disproportionate power or in favor of any specific world-view, will not likely find ready employment.

Facilitation techniques are designed to help people listen to one another. UNICEF and others often use the term "animators," or people who help people explore their situation and build critical awareness of problems and possibilities.[221] By fostering conditions and processes where people learn from each other, facilitation can result in creation of new integrative options. Participation can isolate extremes and create incentives for building new grounds for agreement. Extreme positions will always be present on all sides of water issues, for important ethical and moral reasons. But extreme positions should not be allowed the claim of broadly based constituent support without transparent accountability. Participation can build that transparency. Frequently, the lack of meaningful participation often encourages the very situation most seek to avoid—extreme posturing, little dialogue, and no transparent accountability to constituencies. The level of participation could be viewed as a simple scale: *knowledge about a decision* to *being heard before the decision* to *having an influence on the decision* to *agreeing to the decision* (Figure 5-2). A wealth of practical and theoretical material exists on how to achieve participation at each of these levels.[222]

Multi-party facilitation and environmental mediation have substantially been products of public participation experience. In the end, participation builds on open access to information and empowerment of people. Participation in water resources seeks to build a sense of shared ownership in alternatives, thus increasing the probability that they will be implemented. Therefore, it must be part of the early design of policy and projects. Kirmani describes what can happen on the international level when participation and the sense of ownership among riparians are not present, even with external resources.[223] He states that the Mekong Commission is a classic example of external effort, management, and planning, with little involvement of beneficiaries. After much engineering study and technical and financial assistance, dreams and hopes have not been realized.

5.1.6 Institutional design and agreement design: addressing the apparent dichotomy between sovereignty and efficiency

In essence, countries in a basin can develop unilaterally, with each country pursuing its own needs; in a coordinated fashion, with each country agreeing what will cross each border in terms of quantity, quality, and timing; or in a collaborative fashion, with projects being as-

[221] Racelis 1992
[222] Delli Priscolli 1983
[223] Kirmani 1990

sessed for overall efficiency and where power, agriculture and the environment are considered collectively. As noted earlier Feitelson and Sadoff and Grey have suggested that, as one moves through those options, efficiencies increase, but so do transaction costs, political risk, and threats to sovereignty.[224]

This presents apparent counterbalancing considerations, between sovereignty and efficiency or, in our model (introduced in Chapter 2.1.2), between the X-axis (tangible benefits of cooperation) and the Y-axis (political risks of cooperating). In order to address both, it is worth considering the importance of guarantees, and how they might help create the conditions necessary for cooperation. This dichotomy is most fully realized when considering hydropower projects such as the Renaissance Dam, where benefits may well be realized basin-wide, but apparent threats to sovereignty can also be acute.

For an assessment of hydropower projects in other parts of the world, Christina Leb, Laurence Boisson de Chazournes, Don Blackmore, Aaron Wolf, and Katja Bratrschovsky developed a framework noting four institutional components, or "institutional spectrums," that need to be considered both separately and together, given the hydropolitical realities at any one time[225]:

i. Geographic scope

Geographically, investment can range from unilateral to multilateral. At one end, development might occur in only one basin country. Bilateral options would involve coordinated investment between two states, trilateral between three, and so on. At the broad end of the geographic spectrum is multilateral, basin-wide agreement, with the broadest scope extending beyond the basin to include additional state and non-state actors.

ii. Level of institutional integration

The institutional integration spectrum deals with the array of institutional mechanisms available. This spectrum is naturally related to the institutional scope spectrum, as a broader mandate requires a more complex system for institutional integration. Options in institutional integration range from no joint mechanism to formal joint basin authority or river basin organisation (RBO). Minimalist options include limited data exchange and/or coordination, while more complex institutional integration options may involve third party facilitators, political and technical commissions, and/or a centralised mechanism for data sharing. These institutional integration options can be designed to be integrated into existing frameworks or to be separate institutional bodies.

iii. Scope of (institutional) mandate

The mandate of an institutional structure may range in breadth and depth depending on what the states and other interested parties agree to do and what they can do practically for efficient infrastructure management. Narrow mandates may deal only with one aspect of one issue, while broad mandates may tackle multiple issues. The depth of the mandate can vary based on the level of complexity and comprehensiveness involved in the joint action. The most elaborate cases may involve joint mechanisms extending beyond water to joint infrastructure, electricity trade, and/or other modes of economic integration.

---

[224] Feitelson 1998; Sadoff and Grey 2003
[225] unpublished report, 2013

iv. Choice of legal instrument

A range of international legal instruments may be used as the basis for a joint arrangement. A unilateral national investment that does not involve other parties would not necessitate a new international instrument; however, parties considering joint action may form international agreements. These agreements may be based on ministerial meeting minutes, a joint declaration, or at the highest political level, a memorandum of understanding (MOU) or international treaty. The appropriate formality for legal instruments will depend on the basin's individual characteristics as well as the activity's geographic scope, level of institutional integration, and breadth and depth of mandate.

Spectrum	Low	Medium	High
Geographic	Involves only one state	Involves multiple (two or more) states	Involves whole-basin cooperation and/or cooperation involving actors beyond the basin
Institutional integration	Minimal data sharing or coordination	Facilitated political or technical committees, centralized data sharing	Collaborative river basin management through a RBO
Mandate (breadth and depth)	One select issue and/or low complexity	A few issues and/or integrated, more complex goals	Multiple integrated issues potentially extending beyond water into joint infrastructure or economic integration
Legal instrument	None	Exchange of letters, meeting minutes, joint declaration	Memorandum of Understanding (MOU) or international treaty

Table 5-2 Four spectrums of institutional options for international water resources investment projects.

Table 5-2 shows the four spectrums of institutional options. Although some institutional spectrums are related (e.g. a complex mandate necessitates more complex institutional integration), scenario options may independently range from low to high in each spectrum (e.g. a large geographic scope agreement could potentially have a narrow or broad mandate).

Each level of analysis encompasses an array of alternative designs that are located along a spectrum that ranges from minimum scope to maximum scope options. The approach adopted for the respective spectrum needs to be adjusted to the specifics of the proposed investment. The point of the exercise is that there are no blueprints for development throughout the basin, but that breaking out what is possible in each location along each of these four considerations can offer insight.

5.1.7 The "flow" of conflict management

Although there are no "blueprints" for water conflict transformation, there do seem to be general patterns in approaches to water conflict which have emerged over time. "Classic" disputes between, for example, developers and environmentalists, rural and urban users, or upstream and downstream riparians, suggest zero-sum confrontations where one party's

loss is another's gain where confrontation seems inevitable. Yet such "intractable" conflicts are regularly and commonly resolved, as creative thinking and human ingenuity allow solutions which draw on a more intricate understanding of both water and conflict to come to the fore.

This chapter offers one path to the transformation of water disputes from zero-sum, intractable disputes to positive-sum, creative solutions, and centers on a migration of thought generally through four stages. Note that all stages exist simultaneously, and need not be approached in sequence, and no stage be achieved necessarily for "success." In today's world, many disputes never move beyond the first or second stage, yet are tremendously resilient, while a few have achieved the fourth stage and are fraught with tension. Nevertheless, like any skill, it is useful to understand the structure of an "ideal" path, in order to perfect the tools required for any individual situation.

In Stage 1, in its initial, *adversarial*, setting, regional geopolitics often overwhelms the capacity for efficient water resources management. Metaphorically, the political boundaries on a map at this stage are more prevalent than any other boundaries, either of interest, sector, or hydrology. Dialogue is often focused on the past, based on the *rights* to which a country feels it is entitled, and a period of expressing off pent-up grievances can be necessary. As a consequence of these initial tensions, the collaborative learning emphasis is on *trust-building*, notably on active and transformative listening, and on the process of conflict transformation. By focusing primarily on the rights of *countries*, inefficiencies and inequities are inevitable during this stage of negotiations. We have seen this stage most recently between upstream countries looking to develop hydropower while downstream countries object: Tajikistan and Uzbekistan on the Amu Darya and Ethiopia and Egypt on the Nile, for example.

As the adversarial stage of negotiations plays out, occasionally some cracks can be seen in the strict, rights-based, country-based positions of each side (although in actual water negotiations, this process can last decades). Eventually, and sometimes painfully, a shift can start to take place where the parties begin to listen a bit more, and where the interests underlying the positions start to become a bit apparent. In this Stage 2, a *reflexive stage,* negotiations can shift from *rights* (what a country feels it deserves), to *needs* (what is actually required to fulfil its goals). Conceptually, it is as if we have taken the national boundaries off the map and can, as if for the first time, start to assess the needs of the watershed as a whole. This shift, from speaking to listening, from rights to needs, and from a basin with boundaries to one without, is a huge and crucial conceptual shift on the part of the participants, and can be both profoundly difficult to accomplish, and absolutely vital to achieve for any movement at all towards sustainable basin management. To help accomplish this shift, the collaborative learning emphasis is on *skills-building*, and we approach the (boundary-less) basin by sector rather than by nation.

"Needs" were used as a basis for agreement between Israel and Jordan on the Johnston negotiations of the 1950', when irrigable land was used to determine allocations on the Jordan River; between Israel and the Palestinians, who used current and future population to quantify Palestinian allocations of shared groundwater; and allocations of the Rio Grande/Rio Bravo on the Colorado between Mexico and the USA are based on Mexican irrigation requirements.

Once participants have moved in the first two stages from mostly speaking to mostly listening, and from thinking about rights to needs, the problem-solving capabilities which are inherent to most groups can begin to foster creative, cooperative solutions. In this Stage 3, an *integrative stage*, the needs expressed earlier begin to coalesce together to form group in-

terests – the "why" underlying the desire for the resource. Conceptually, we start to add *benefits* to the still boundary-less map, and in fact to think about how to enhance benefits throughout the region, primarily by adding resources other than water, and geographic units other than the basin. The collaborative learning emphasis is now on the *consensus-building* of the group, and we begin to move in "benefit-shed" rather than being restricted by the basin boundaries.

Tapping a "basket of benefits," to include benefits beyond strictly water-related, was used to fuel collaboration between all 11 riparian countries through the Nile Basin Initiative. Projects include linking the benefits of hydropower, irrigation, regional infrastructure, and transportation. It is also the thinking behind the "nexus" concept that links the benefits of power, agriculture, and the environment.

Finally, while tremendous progress has been made over the first three stages, both in terms of group dynamics, and in developing cooperative benefits, Stage 4, the last, *action*,stage helps with tools to guide the sustainable implementation of the plans which have been developed, and to make sure that the benefits are distributed *equitably* amongst the parties. The scale at this stage is now *regional* where, conceptually, we need to put the political boundaries back on the map, reintroducing the political interest in seeing that the "baskets" which have been developed are to the benefit of all. The collaborative learning emphasis is on *capacity-building,* primarily of institutions.

These are the regional action plans that not only evaluate individual projects, but watersheds, powersheds, and virtual water markets (in the form of food trade) that are assessed collectively for overall efficiencies to the benefit of all participants.

It is critical not to think of these "stages" as a linear process, where the further along the better. Most basins ebb and flow back and forth over time, finding the level that meets a particular set of hydropolitical needs for a given place and time – there is no "right" set of answers. One might think of these all existing in parallel "universes" simultaneously, each with its own set of approaches or tools, any of which may be useful at any given time, or conceptually as a helix or set of spheres rather than strictly linear. We break them apart here only for the purposes of explanation.

5.1.8 What is a "good" outcome?

The 1992 United Nations Conference on Environment and Development identified three components of sustainability: environmental, social, and economic.[226] Despite recognition that dam impacts are felt across these three areas, few studies have comprehensively evaluated the distribution of costs and benefits across these three areas.[227] We understand the economic facet, through a benefit-cost analysis; the social impacts, through social impact analysis, and the environmental, through environmental impact analysis. But there is no single gage to evaluate them collectively, such that a dam may well do little environmental damage, but have huge social and economic impacts. More commonly, dams are shown to benefit the economy, while causing harm socially and environmentally.

To assess dams fully, either individually or to prioritise against each other, it is necessary to assess all three components and consider them collectively.

[226]UNCED 1993
[227]Whitelaw and MacMullan 2002

Today, parts of the Mekong basin are in flux, while three separate facets of the nexus – agriculture, power, and environmental needs – are all increasing dramatically, pushing large scale development. Eventually, a collaborative agreement that manages all three facets for joint efficiency may be possible. The question is, how do we get there?

In essence, a countries in a basin can develop unilaterally, with each country pursuing its own needs; in a coordinated fashion, with each country agreeing what will cross each border in terms of quantity, quality, and timing; or in a collaborative fashion, with projects being assessed for overall efficiency and where power, agriculture and the environment are considered collectively. As Feitelson as well as Sadoff and Grey have noted, as one moves through those options, efficiencies increase, but so do transaction costs, political risk, and threats to sovereignty.[228]

5.1.9 Skills-building: listening, the heart of conflict management

Dialog over shared waters is carried out by individuals, not countries. In order to move dialog forward in a productive fashion, the discussants need a variety of skills, not least amongst them is the art of listening. To move past positions to hear the interests and values incorporated in positions, one needs to listen. To understand the potential mutual benefits collaboration might bring, one needs to listen. To be listened to, one needs to listen.

This set of skills is geared towards two types of listening, active and transformative, as described below.

General information	
Context:	The most difficult leap in negotiations (or in most discussions, for that matter), is to get past *positions* (what someone is saying) to understanding their *interests* (why they are saying it). Yet understanding interests is critical to effective dialogue. The single most effective way to accomplish this leap is to listen – truly listen – to the speaker. Listening at depth is not an easy skill, especially in many western cultures where power seems to be associated with how much is said (and sometimes with how loudly).
Objective:	To offer two skill-sets for listening: *active listening*, which is a set of ground rules for polite, constructive discourse; and *transformative listening*, which allows for deeper work, useful especially when powerful emotion is present.

i. Part 1 -active listening

Context

In advance of any formal or informal negotiations, it is worth talking in a group about ground rules. These should be suggested by the participants (although an instructor/facilitator can help with suggestions), adopted by consensus, and posted in a visible place as a “touchstone” document.

Example

[228] Feitelson 1998;Sadoff and Grey 2003

1. When a group convenes, ask them for help in crafting a list of ground rules for the negotiations. If typical, the group will come up with a set similar to:

- One speaker at a time, signaled by, e.g. upturned name-plates, a speakers list, etc.;
- Every speaker gets to finish uninterrupted;
- No direct accusations; “generic” examples can be used instead;
- All should try to participate fully;
- Others?

2. The next step is to focus on active listening skills, including (more skills are listed in Table 5-1):

- **Repeat main points**. Repeat the main points of the speaker (this lets the speaker know that they have really been heard, a powerful psychological message, as well as helping to focus the dialogue);
- **Ask.** Ask (non-threatening) questions. Useful both to better understand the speaker, and also to reassure them that you are really listening;
- **"I" not "you" statements.** When speaking, speak in the first person – "I" not "you" – setting a tone which is more reflective and less confrontational;
- **Future, not history.** Speak in the future or present tense, not the past. This further reduces the possibility of accusations, and allows for greater cooperation to build for a common future. [In many settings, a period of venting of past grievances does need to be set aside – that, after all is a main reason why some negotiators initially participate. It should be done in as productive a way as possible, and then put aside for the duration.

Paying Attention

- Face the person who is talking.
- Notice the speaker’s body language; does it match what he/she is saying?
- Listen in a place that is free of distractions, so that you can give undivided attention.
- Don’t do anything else while you are listening.

Eliciting

- Make use of “encourages” such as “Can you say more about that?” or “Really?”
- Use a tone of voice that conveys interest.
- Ask open questions to elicit more information.
- Avoid overwhelming the speaker with too many questions.
- Give the speaker a chance to say what needs to be said.
- Avoid giving advice, or describing when something similar happened to you.

Reflecting

- Occasionally paraphrase the speaker’s main ideas, if appropriate.
- Occasionally reflect the speaker’s feelings, if appropriate.
- Check to make sure your understanding is accurate by saying “It sounds like what you mean is...Is that so?” or “Are you saying that you’re feel-

ing...”

Table 5-3 Techniques of Active Listening[229]

ii. Part 2 -transformative listening

Context

When real emotion is present, classic problem-solving approaches to dialogue are generally not practical. Water, as we have seen, can be tied in to all levels of existence, from basic survival to spiritual transformation. Often, water negotiations are tied inextricably to regional conflicts, including in some of the most contentious regions in the world, and negotiators carry the weight of those disputes with them into the dialogue setting.

When a participant is clearly distraught, and “objective” problem-solving seems not to be viable, it may be worth stepping back for a few moments, giving the participant the space and time to work through their issue. In such a setting, a listener should take over (often the mediator or facilitator), in a process of “transformative listening”. Here, in contrast to “active listening”, the listener is not trying to facilitate a healthy dialogue, but rather making him- or herself absolutely present for the speaker to get deeply into their issues.

When real energy is present, it is NOT helpful to offer:

- advice
- reassurance
- opinion
- curiosity
- presence

Instead, be present entirely for the speaker, knowing that resolution comes from within.

- Listen with an open heart;
- Pause – the gift of silence;
- Track or reflect (statements or open-ended clauses)

Only when speaker’s energy allows (stop if grief or mourning; just be present)...

- Ask permission
- Offer without insistence
- Check for completeness

Listening

Good listening is more difficult than we think. Listening seems to be a very easy thing to do. In reality we think we listen, but we actually hear only what we want to hear! This is not a deliberate process, it is almost natural. Listening carefully and creatively (picking out positive aspects, problems, difficulties and tensions) is the most fundamental skill for facilitation. Therefore, we should try to understand what can hinder it, in order to improve our skills. Listed below are so-called barriers to listening that may prevent effective and supportive listening. Being aware of them will make it easier to overcome them.

[229] Kaufman 2002: 220.

Listening barriers

On-off listening: This unfortunate listening habit comes from the fact that most people think about four times faster than the average person can speak. Thus the listener has about three to four minutes of 'spare thinking time' for each minute of listening. Sometimes the listener may use this extra time to think about her or his own personal affairs and troubles instead of listening, relating and summarizing what the speaker has to say. This can be overcome by paying attention to more than just the speech, but also watching body language like gestures, hesitation etc.

Red-flag listening: To some people, certain words are like a red flag to a bull. When they hear them, they get upset and stop listening. These terms may vary for every group of participants, but some are more universal such as "tribal", "black", "capitalist", and "communist" etc. Some words are so 'loaded' that the listener tunes out immediately. The speaker loses contact with her or him and both fail to develop an understanding of the other.

Open ears – closed mind listening: Sometimes 'listeners' decide quite quickly that either the subject or the speaker is boring, and what is being said makes no sense. Often they jump to the conclusion that they can predict what the speaker will say and then conclude that there is no reason to listen because they will hear nothing new if they do.

Glassy-eyed listening: Sometimes 'listeners' look at people intently, and seem to be listening, although their minds may be on other things. They drop back into the comfort of their own thoughts. They get glassy-eyed, and often a dreamy or absent-minded expression appears on their faces. If we notice many participants looking glassy-eyed in sessions, we have to find an appropriate moment to suggest a break or change in pace.

Too-deep-for-me listening: When listening to ideas that are too complex and complicated, we often need to force ourselves to and to understand it. Listening and understanding what the person is saying might result in us finding the subject and the speaker quite interesting. Often if one person does not understand, others do not either, and it can help the group to ask for clarification or an example if possible.

Don't-rock-the-boat listening: People do not like to have their favorite ideas, prejudices and points of view overturned and many do not like to have their opinions challenged. So, when a speaker says something that clashes either with what the listener thinks or believes in, then s/he may unconsciously stop listening or even become defensive. Even if this is done consciously, it is better to listen and find out what the speaker thinks first, in order to understand his or her position fully. Responding constructively can be done later.

When listening we should try to do the following:	**When listening we should avoid doing the following:**

• show interest • be patient • be understanding • be objective • express empathy • search actively for meaning • help the speaker develop competence and motivation in formulating thoughts, ideas and opinions • cultivate the ability to be silent when silence is necessary	• pushing the speaker • arguing • interrupting • passing judgment too quickly in advance • giving advice unless it is requested by the other person • jumping to conclusions • letting the speaker's emotions affect own too directly

Table 5-4 Dos and don'ts of listening

Discussion topics	• What is a "good" outcome, from an economic, environmental, social, and/or political measures?
	• Discuss the role of interpersonal skills and their place in effective transboundary dialog.
Exercises	• Scenario X (scenario of transboundary hydropower development, to be specified): Negotiation by State versus by Sector
	• Listening skills: hearing the interests and values behind positions.
	• Game: Water Prisoners Dilemma (Aaron Wolf)
Additional reading and resources	Lederach, John Paul 2003:The Little Book of Conflict Transformation, Intercourse PA: Good Book.
	Subramanian, Ashok/Brown, Bridget/Wolf, Aaron 2012: Reaching Across the Waters. Facing the Risks of Cooperation in International Waters. Washington, DC: The World Bank.
	GIZ 2012: Assessment of RBO-Level Mechanisms for Sustainable Hydropower Development and Management. Vientiane: GIZ. Online: http://www.icp-confluence-sadc.org/sites/default/files/RBO_Mechanisms_SustainableHydropower_Report_MRC-GIZ_final.pdf
	Delli Priscoli, Jerome/Wolf, Aaron T. 2009: Managing and Transforming Water Conflicts. Cambridge: Cambridge University Press.

5.2 Examples from other river basins

Purpose	The focus of this sub-session lies on negotiation and conflict resolution mechanisms in two case studies, namely the La Plata basin and the Senegal river basin.
Objectives	By the end of this sub-session, the trainee will: • Understand that "success" comes at a variety of levels of integration, from coordination through joint investment and management. • Know concrete examples for dispute resolution in other RBOs
Preparatory reading	Subramanian, Ashok/Brown, Bridget/Wolf, Aaron 2012: Reaching Across the Waters. Facing the Risks of Cooperation in International Waters. Washington, DC: The World Bank. Online: http://water.worldbank.org/sites/water.worldbank.org/files/publication/WaterWB-Reaching-Across-Waters.pdf.
	GIZ 2012: Assessment of RBO-Level Mechanisms for Sustainable Hydropower Development and Management. Vientiane: GIZ. Online: http://www.icp-confluence-sadc.org/sites/default/files/RBO_Mechanisms_SustainableHydropower_Report_MRC-GIZ_final.pdf

5.2.1 The La Plata basin[230]

i. Background

The La Plata River basin encompasses an area of 3.2 million square kilometers and is among the five largest international rivers basins in the world. It includes territory in Argentina, Bolivia, Brazil, Paraguay, and Uruguay, comprises the Parana, Paraguay and Uruguay river systems and makes up the largest wetland in the world—the Pantanal. The basin is the life sustenance for much of the agricultural and industrial sectors of the riparian states and has become a source of alternative energy and economic possibility.

The basin's five riparian states have a history of cooperation and joint management of the watershed, and have stressed the river's binding them to each other. Bolivia, Paraguay and Uruguay's agriculture economies depend on the basin as crucially as the industrial sectors of Argentina and Brazil. Large amounts of grain, beef, wool, timber and some manufacturing goods are exported from this region to other parts of the world[231]. The 1969 La Plata River Basin Treaty, the umbrella treaty and first to which all of the riparians are signatories, provides a framework for joint management, development and preservation of the basin. Subsequent multilateral and bilateral treaties outline the specifics of economic investment, hydro-electric development and transportation enhancement.

Following the 1969 multilateral treaty, bilateral hydroelectric development opportunities were explored which gave source to the construction of dams and alternative power plants along

[230] Adapted from Wolf /Newton 2009.
[231] Elhance 1999.

the Parana. Today there are 130 dams along the River, two of which are widely known, the Itaipu and the Yacureta. Itaipu is the largest hydroelectric project in the world and a result of a 1973 bilateral agreement between Paraguay and Brazil. The hydroelectric dam cost the two governments and other international participants US$15 billion and 20 years to construct. The generating capacity is 26,000MW and supplies 26% of all of the electricity for Brazil and 78% for Paraguay with zero emissions.

The political and environmental dimensions of the Itaipu make for an interesting case of cooperation over a shared water resource. The land, where the Itaipu dam now sits, was once a source of great controversy between Brazil and Paraguay. Each country declared rights and legal authority over the Guaira Falls, which lies on the border of both countries and to which both claimed ownership and control. In 1957, Brazil, whobelieved the Falls to be within their borders and who wanted to invest in the hydroelectric power of the Falls, unilaterally took military control over the region. After five years of dispute and disagreement, Brazil and Paraguay finally negotiated the terms of the Itaipu dam. In addition to providing electricity to the two countries, the proposed project would submerge Guaira Falls[232], thus, marking an end to the border dispute.

This conflict negotiation and cooperation between Brazil and Paraguay had ripple effects into areas of conservation and preservation. When the environmental concerns around the construction of the Itaipu basin came to the forefront, the two countries implemented two joint projects, the Gralha Azul and the Mymba Kuera, to minimize the effects of reservoir flooding on the regions ecology, deforestation in the region and moved the wildlife most affected by the dam to biological reserves.

The Yacyreta Treaty, an agreement between Argentina and Paraguay, to construct a hydroelectric dam downstream from the Itaipu, has not been deemed as successful in its implementation. The treaty was hastily signed in December 1973, very soon after the Itaipu and was similar in content (generated power to be divided evenly between the two nations), except for the Yacyreta allowed for either country to sell power surpluses to a third party (Da Rosa, 1983). This contingency has since caused great confusion and complicated the construction.

The dam, from its inception, has become a “monument to corruption.” The project has been unable to fill the reservoir to planned levels, and is operating at two-thirds of its capacity because of the environmental repercussions the system would incur if it was at 100% capacity. In addition, the indigenous populations along the river and beside the dam do not feel like they were part of the planning process, were compensated for losses of theirown land or believe they will be allocated power from the hydroelectric plant.

Many bilateral treaties and hydroelectric projects have come out of the 1969 multilateral agreement, however, the first multilateral economic investment that joins all five riparian states and tests the framework of the La Plata Basin Treaty is termed “Hydrovia.’ The ‘Hydrovia’ is a proposed river transportation project that will dredge and straighten major portions of the Paraná and the Paraguay, including the portions of the river that lie in the Pantanal wetlands. The initial backers of the proposal, dubbed "Hydrovia" ("waterway" in Spanish and Portuguese), were the governments of the La Plata basin states who met in 1988 to discuss the plans for the project and out of which was borne the Intergovernmental Commis-

[232]Elhance 1999.

sion on the Paraná-Paraguay Hydrovia. The project would allow year-round barge transportation (current conditions only allow for barges during the three dry months) and would open up a major transport thoroughfare for land-locked sections of the riparian states. Environmentalists and those whose livelihoods depend on traditional economies have expressed trepidation at the project.

ii. The problem

A cooperative management body has been in place on the La Plata basin since 1969 and is generally considered a successful and productive organisation. At the same time, 'Hydrovia' is the largest project for navigational river development proposed to date. Its size and possible impacts on the economies and environments of the basin states are beginning to strain the cooperative nature of basin management. The biodiversity of the world's largest wetland, the Pantanal, could be strongly affected by the construction of the waterway. Opponents of the project point to loss of biodiversity and significant changes in the hydrology of the Pantanalas reasons why the project should be avoided. The Pantanal currently decreases the occurrence of floods and droughts in the downstream area[233], maintains the current ecosystem and hydrology there and is the life sustenance of the people, animals and wildlife along its banks.

iii. Attempts at conflict management

The La Plata Basin Treaty of 1969 provides an umbrella framework for several bilateral treaties between the riparian states and a direction for joint development of the basin. The treaty requires open transportation and communication along the river and its tributaries, and prescribes cooperation in education, health, and management of 'non-water' resources (e.g., soil, forest, flora, and fauna). The foreign ministers of the riparian states provide the policy direction, and a standing Intergovernmental Coordination Committee is responsible for ongoing administration.

Basin states agree to identify and prioritize cooperative projects, and to provide the technical and legal structure to see to their implementation, illustrated best by the 130 dams along the Parana, the construction of the world's largest hydroelectric project, Itaipu, and successive development, infrastructure and transportation projects. The treaty also has some limitations, notably the lack of a supra-legal body to manage the treaty's provisions. The necessity to go through each country's legal system for individual projects has resulted in some time lag and lack of implementation.

The 1969 treaty's success has been in the areas of transportation and cooperation, so it is not altogether surprising that the 'Hydrovia' project has been forwarded to the planning stages and that many multilateral and bilateral treaties came out of the 1969 La Plata Basin Treaty. The first meeting of the backers of the project was in April of 1988, out of which the Intergovernmental Commission on the Paraná-Paraguay Hydrovia was formed.

iv. Outcome

As positions between supporters and opponents of the project have sharpened, these positions are based on very little information. The Inter-American Development Bank and the United Nations Development Programme, in 1997, helped finance a technical and environ-

[233]Lammers et al. 1994.

mental feasibility study by the Intergovernmental Commission on the Paraná-Paraguay Hydrovia.

The study included dredging, rock removal and structural channeling. Through motivation by independent technical critiques and environmental and social action networks the initial studies were discredited. As a result, the future of the Hydrovia is still uncertain. New studies were commissioned by Andean Development Corporation through the Intergovernmental Commission and were completed in February 2004.

v. Lessons learned

- If riparian states start cooperation from the outset of a conflict, instead of letting it create stronger positions, the economic and joint management prospects are much greater. Since 1969, the quantity of joint economic ventures in the La Plata basin has allowed for increased cooperation between the riparian nations when many times conflict could have arisen and defeated the benefits the states are receiving today.
- If riparian states agree to equal access to transboundary water resources, equal and joint management, investment and distribution of that resource is feasible. In the water resources sector, neither Brazil nor Argentina has used their economic or military superiority to maintain greater control over water resources or hydroelectric potential.

vi. Creative outcomes resulting from resolution process

The La Plata Basin Treaty has helped bring the five nations together and aid in not their own disputes, but assist in resolving disputes between sectors. The nations cooperate well, but the treaty has been helpful to resolve intersectorial conflicts. While the Hydrovia project was proposed in 1988, even now in 2004, there is still little movement towards implementing the project due to environmental and social action groups in defending the economic, cultural and ecological integrity of the basin. In the end, this will allow for a more sustainable project.

5.2.2 The Senegal river basin[234]

i. Background

The Senegal River, the second-largest river in Western Africa, originates in the Fouta Djallon Mountains of Guinea. Afterwards, the Senegal River then travels 1,800 km crossing Mali, Mauritania and Senegal on its way to the Atlantic Ocean.

Following the independence of the basin countries, tension remained in the region. However, the Senegal River continued to be a common link between the basin countries. There was a desire between them to cooperate in the management of the basin so that all countries would benefit from its development. This aspiration has been carried into the twenty-first century as Guinea, Mali, Mauritania and Senegal work cooperatively toward more effective basin management.

The river is a key resource for all three countries. Large herds of cattle, camels, goats and sheep migrate season to season across these borders and herders rely on this water source to sustain their herds. The basin region receives only an average of 660mm of rainfall per year; therefore the Senegal river waters represent the key to agriculture in the region. On the left bank, the surface area of community-based irrigated fields grew from 20 hectares in

[234] Adapted from Wolf /Newton 2009.

1974 to 7,335 hectares in 1983 and 12,978 hectares in 1986. After agriculture, fishing is the largest economic activity in the region. Other river based economic activities include sugar cane production, rice framing and, to a lesser extent, mining.

Two dams, Manantali and Diama, were built in 1986 and 1988, respectively, in order to provide fresh water for agriculture and municipal uses and, in the case of the Manantali Dam, eventually to produce hydroelectric power for the region. These two dams were part of an economic growth strategy for the region that would reduce the investment risk and reduce poverty by increasing income-generating activities. The Manantali Dam was put on line in 2002 and is now supplying the three basin countries with 547 gwh/yr.

ii. The problem

There are a few areas of concern in regards to the Senegal River basin. The first is that of the climate. Beginning in the 1960s, the region suffered a continuous drop in rainfall until the mid-1980s. Because of the local populations' dependence on rainfall for crops, the droughts caused severe disruption in the economies of the basin states. The extreme poverty in the region makes these populations very vulnerable to changes in the climate.

In the 1960s and 1970s this problem led the countries of the Senegal River basin to look at ways to work together to mitigate the disastrous effects of severe droughts. Unlike other international water bodies, cooperation over this basin did not grow out of a conflict over use of the Senegal River resources. Instead the catalyst for cooperation was the vulnerability of the populations of the basin states. These four countries believe that collaboration on the development of this resource would improve the standard of living of all involved.

Problems in the basin today focus on the detrimental health and environmental and agricultural impacts of the two dams. Seasonal flooding and water movement decreased dramatically after the dams were built. This has caused an increase in the incidence of numerous waterborne diseases: diarrhea, schistosomiasis and malaria. The reduction of flooding also prevents pollution from industrial agricultural from flushing out of the basin. The dams have caused a reduction in pastureland, degradation of river fisheries, increased soil salinity and riverbank erosion. Traditional agricultural and pastoral productions systems have been superceded by irrigated, in some cases industrial size, agriculture. This emphasis on irrigation has created problems for social cohesion and access to land in some areas of the river basin, and in some cases artificial flooding has been so poorly planned that it has wiped out crops.

A separate, but equally worrisome issue is the pressure on the water resources from a rapidly increasing river basin population: 16% of the population of the three river basin countries—Mali, Mauritania, and Senegal—live in this basin, and this population is growing at a rate of 3% per year.

iii. Attempts at conflict management

During the 1960s, as the newly independent African states established their national identities and put in place their national infrastructures, there was a large movement among the Senegal River basin states to act jointly in the development of the basin.

The first step to this mutual development of the Senegal River basin came in 1963 when, after several meetings between the basin states, the four countries signed the Bamako Convention, which recognized the Senegal River as an international waterway and created the Interstate Committee (CIE, Comité Inter-États pour l'Aménagement du fleuve Sénégal) to oversee its development. The CIE's main goal was to use a multilateral approach when de-

veloping technical capacity and financial support for the Senegal River. The Bamako Convention, and a year later, the Dakar Convention, introduced a framework for future development of the basin for mutual benefit of all countries.

In meetings between the heads of state of the four countries in 1965 and 1966, proposals were made to improve the already existing infrastructure of the CIE and move beyond the Senegal River basin to look at linkages to other West African rivers. The goal was to reinforce the idea of cooperation through the development and integration of the region's economies. However, due to tensions that arose between Senegal and Guinea in January of 1967, Guinea suspends its participation in the CIE. Mali and Mauritania, still interested in the regional integration of the Senegal River basin, managed to bring all four heads of States back to the negotiating table.

In late 1967, several ministerial meetings took place to revive the idea of cooperation. These meetings resulted in the Labé Convention, signed on March 24, 1968, which created the Organization of Boundary States of the Senegal River (OERS, Organization des États Riverains du Sénégal). The goals of OERS were more comprehensive than those of the CIE. Because its objectives were not limited to the valorisation of the basin, the member states attempted to politically and economically integrate the basin through the standardisation of legislation, the improvement of education and the further breaking down of borders to allow increased trade and labor movement. This initiative demonstrated the interest these four countries had in treating the river basin as an international resource.

The economic cooperation of the member states of OERS advanced with various ministerial-level meetings in the transportation and economic sectors, but when political instability of the basin occurred in 1970, difficulties arouse within the organisation. Guinea withdrew from OERS in 1972 and the organisation became defunct. The desire for regional integration remained with Mali, Mauritania, and Senegal, however, and the three countries established the Organization for the Development of the Senegal River (OMVS, Organization pour la Mise en Valeur du fleuve Sénégal). One of the most important aspects of this convention is that Guinea did not participate, but it did not object either, which has allowed the process to move forward with less difficulty. The organisation created two types of shared infrastructure, physical and institutional, which were designed to accomplish the goals of OMVS:

- The development of food security for the populations of the basin
- The reduction in the economic vulnerability of OMVS states to external factors such as climate changes.
- The acceleration of the economic development of member states the preservation of ecosystem balance in the sub-region and particularly in the basin

iv. Secure and improved revenue of the valley populations outcome

The history of cooperation over this river basin has led to numerous multilateral agreements, projects and organisations over the last 25 years. The Manantali Dam has been working at full capacity since May 2003 providing each of the basin countries with electricity based on the amount the invested in the dam project. Mali is receiving 52% of the benefits, while Mauritania receives 15% and Senegal 33%. An additional benefit of this dam has been the fiber optic cables used for the transmission lines, which telecommunications companies can also use.

The Senegal River Charter, signed in 2002, sets the principles and procedures for allocating water between the various use sectors, defines procedures for the examination and acceptance of new water use projects, determines regulations for environmental preservation

and protection and defines the framework and procedures for water user participation in resource management decision-making bodies.

v. Lessons learned

- Stakeholder participation should be included at all levels of decision-making processes for optimal mutual gain. When local populations were not included on the decision-making processes within the Senegal River basin, there tended to be frustration, confusion and economic losses directly as a result of not participating. Participation by all stakeholders can only benefit all groups involved in making agreements more sustainable, mutually beneficial and efficient.
- Lack of participation of all basin nations weakens the overall negotiations and creates opportunity losses for those not participating. Guinea, not party to the OMVS organisation, has not experienced the development benefits of the other three countries in the basin. As a result, they are lacking water resource management infrastructure, a reliable energy source and water supplies.
- Mutually beneficial projects and integrated investments create good neighbors. As a result of the OMVS and the design and implementation of joint projects, the relations between the countries have improved and economic development has increased thereby making cooperation rather than conflict a meeting point with regards to the Senegal River.

vi. Creative outcomes resulting from resolution process

The mutually beneficial design of the OMVS and how it redistributes the economic benefits based on how much each country puts into the project creates incentives and equality in the development process. Even though Guinea dropped out of the cooperation process officially in 1967, Mali, Mauritania and Senegal have allowed them to be an observer thereby reducing the potential for conflict within the basin. Full participation would be ideal, but under the circumstances, it is better to have Guinea present and make the process transparent rather than exclude them altogether.

PASIE (Plan d'Attenuation et de Suivi des Impact sur l'Environnement) was formed in 1998, an entity with its sole purpose to investigate the environmental impacts of the development and distribution of power from the Manantali hydroelectric power station.

5.2.3 Further case studies

The following table provides a list of references and documents which offer further insights into negotiation and conflict resolution processes in other river basins. They may prove helpful for the application of the theoretical concepts presented in this manual.

Basin	Riparian countries	Reference
Indus	China, India, Pakistan	Rieu-Clarke, Alistair/Moyinihan, Ruby/Masgig, Bjørn-Oliver. 2012: UN Watercourses Convention User's Guide. IHP-HELP Center for Water Law, pp. 243, 247-248.
Nile	Ethiopia, Sudan, Egypt, Uganda, Democratic Republic of the Congo, Ken-	Phillips, David/Daoudy, Marwa/McCaffrey, Stephen/Öjendal, Joakim/Turton, Anthony 2006: Transboundary Water Cooperation as a Tool for Conflict Prevention and for Broader Benefit-sharing. Stockholm:

	ya, Tanzania, Rwanda, Burundi, South Sudan	Ministry for Foreign Affairs Sweden, pp. 64-89. *This case study also discusses the Kagera River basin.*
		Subramanian, Ashok/Brown, Bridget/Wolf, Aaron 2012: Reaching Across the Waters. Facing the Risks of Co-operation in International Waters. Washington, DC: The World Bank, pp. 11-14.
Jordan	Lebanon, Syria, Israel, Jordan, Occupied Territories of Palestine	Phillips, David et al: pp. 41-63.
Syr Darya	Kazakhstan, Kyrgyz Republic, Tajikistan, Uzbekistan	Subramanian et al. 2012: pp. 20-23.
Zambezi	Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia, Zimbabwe	Subramanian et al. 2012: pp. 23-26.

Discussion topics	• Discuss the relationship between the level of management integration and potential benefits basin wide.
	• Discussion of the MRC context: Where are current
Exercises	• Scenario X (scenario of transboundary hydropower development, to be specified): How integrated does effective management need to be in order to manage hydropower efficiently?
	• Role play based on hypothetical case
Additional reading and resources	Delli Priscoli, Jerome/Wolf, Aaron T. 2009: Managing and Transforming Water Conflicts. Cambridge: Cambridge University Press.
	Richter, B.D.; Postel, S.; Revenga, C.; Scudder, T.; Lehner, B.; Churchill, A. and Chow, M. 2010. Lost in development's shadow: The downstream human consequences of dams. Water Alternatives 3(2)

5.3 Negotiation and conflict resolution at the Mekong

Purpose	This sub-session provides a quick overview of the provisions for negotiation and dispute resolution which are in place in the Mekong basin.
Objectives	By the end of this sub-session, the trainee will: • Have an insight into negotiation and conflict resolution processes in the Mekong basin • Know the MRC framework and its limitations
Preparatory reading	Hirsch, Philip and Kurt Mørck Jensen (with Ben Boer, Naomi Carrard, Stephen FitzGerald and Rosemary Lyster) (2006), National Interests and Transboundary Water Governance in the Mekong (Sydney: Australian Mekong Resource Centre, the Danish International Development Assistance, The University of Sydney).
	Backer, Ellen B. (2007), "The Mekong River Commission: Does It Work, and How Does the Mekong Basin's Geography Influence Its Effectiveness?", Südostasien aktuell 4: 31–55.
	Browder, Greg and Leonard Ortolano (2000), "The Evolution of an International Water Resources Management Regime in the Mekong River Basin", Natural Resources Journal 40(3): 499–531.

As discussed in detail in Sections 3.3 and 4.3 of this manual, the construction of hydropower dams is the sovereign right of national governments. Although the MRC is tasked with coordinating the sustainable development of the Lower Mekong river basin, it has no territorial rights in member countries. It can therefore only give advice. The 1995 Mekong Agreement also provides no mechanisms to punish countries who contravene the agreement. Importantly, international law is soft law. Therefore, it is difficult to implement. This renders intergovernmental organisations weak where member states subscribe to the absolute sovereignty principle.

As a consequence, the MRC's negotiating power is weak. The PNPCA process, described in detail in Section 3.3, therefore had so far limited effects, as can be seen during the Xayaburi negotiations. In the case of Don Sahong, the government of Laos is set to entirely circumvent the negotiation procedures by arguing that merely notification is required but not prior consultation and agreement. The MRC's institutional conflicts resolution mechanism – the PNPCA mechanism – is therefore severely hampered by the refusal of Laos to negotiate over its use of the Mekong's water resources.

Cambodia and Vietnam have both opposed Xayaburi and Don Sahong. While Cambodia has not yet begun to build its own mainstream dams, it remains to be seen to what extent Cambodia will respond to Vietnamese criticism that maybe forthcoming once Cambodia has started construction. This will again test the PNPCA process and raise the question to what extent basin countries are willing to refer to the regional conflict resolution mechanism if their use of the water resource is disputed by fellow basin countries.

Discussion topics	• Discussion of the MRC context: where are current conflict hotspots, and how did these conflicts emerge? Would benefit sharing be a way out of the conflict?
Exercises	• After the role play based on the hypothetical case is concluded, there might be two options: the role play could be repeated for the Mekong basin, or participants could develop potential solutions for the Mekong basin.
Additional reading and resources	Johns, Fleur / Saul, Ben / Hirsch, Philip / Stephens, Tim / Boer, Ben 2010: Law and the Mekong River Basin: A Social-Legal Research Agenda on the Role of Hard and Soft Law in Regulating Transboundary Water Resources. In: Melbourne Journal of International Law 11(1).
	Browder, Greg 2000: An Analysis of the Negotiations for the 1995 Mekong Agreement. In: International Negotiation 5(2): 237–61.
	Hensengerth, Oliver 2008: Vietnam's Security Cooperation in Mekong Basin Governance. In: Journal of Vietnamese Studies 3(2): 101–27.

ANNEX I: ENERGIZERS

Annex II will provide information on a set of energizers that might be used at different stages of the training. The section will be based largely on MRC 2012: Manual for Training Trainers in Integrated Water Resources Management in the Mekong Basin, Annex 4. Moreover, the following list of energizers and ice-breakers is part of Annex II.

(1) Introducing yourself

Fold sheets of full-size white paper into four sections. Give a folded sheet and a pen to each participant. Ask them to do the following:

(1) In the upper left section of the sheet resulting from the fold, write down name, job title and organisation.
(2) In the upper right section of the sheet, indicate two expected results from the training.
(3) In the lower left section of the sheet, write down your favourite foods and hobbies.
(4) In the lower right section, draw any symbol or picture that you feel describes your life-style. (Example: open sky, symbol of openness, being open-minded)
(5) On completion of the exercise, ask participants to present. Each person will be allowed 2-3 minutes for his or her presentation.

Time required: 10-15 minutes

Note: The amount and types of information to write in each section can be changed.

Name Job Title Organisation	Expected Results from the training
Favourite Food and hobbies	Symbol/Picture that describes my lifestyle

(2) Introducing your neighbor

Ask participants to introduce their direct neighbor (either left or right)

Hand out moderation cards and explain that they have 5 min time to collect the following information on the other person on cards: name; organisation& position; experience with the workshop topic and workshop expectations (can be adapted as required)

Each pair has 1 minute time to present each other to the plenary

Once presentation is finished, they are asked to pin their cards to a board/wall

Cards remain on the wall for the rest of the seminar to give participants the opportunity to look up the information

(3) Hagoo:

Divide participants into 2 teams and form 2 lines. Have people stand shoulder to shoulder, facing a person on the other team. One person from each time will volunteer to walk past each person in the row of the opposite team. The people on the team make the volunteer from the other team smile as she or he walks by. No touching is allowed. If the volunteer cracks up, she or he must join the opposite team. If he or she makes it to the end straight-faced, she or he goes back to the original team.

(4) Multiple use of a marker pen

(1) Ask participants to form a circle in the middle of the training room. Tell them that they will now play a game that requires innovative thinking and performance skills.
(2) Take a comb and demonstrate how it can be used to write and as a knife to cut something.
(3) Hand over the comb to a participant and ask him/her to demonstrate something new. After his/her performance, the participant hands over this comb to another participant to show something new using the same comb.
(4) Ask other participants to guess what the demonstration is about.
(5) Continue this exercise until everyone finishes their performance.

Time required: 10 minutes

Note: Trainers can use any object – comb, paper, handkerchief, rope, etc.

(5) Bingo

(1) Distribute Bingo sheets (as prepared below) to all the participants.
(2) Ask each participant to go to another participant to see if they both can respond with a “yes” to the items in the boxes on the sheet.
(3) If there is agreement on any item, the other participant must sign his/her name in the appropriate box.
(4) Have each participant do the same with all the others. The participant who gets signatures in all the boxes has to announce the names of the people from whom he/she obtained signatures and will be declared the winner.

Example of a Bingo Sheet:

Have three children or more	Like romantic movies	Enjoy travel
Enjoy spicy food	Like bananas	Like swimming
Check e - mail at least once a day	Had hair cut within two weeks	Like to sing
Like rainy days	Believe in horoscopes	Like yellow rather than red

Time required: 10-15 minutes

Note: For the points in Bingo, it is better to include items which participants cannot figure out without communication with other participants, rather than physical features (e.g., have a moustache, have black hair, are tall).

(6) The avalanche stick

(1) Preparation: Get 2 long sticks (or large rings) - folding rules/yardsticks are suitable
(2) Ask participants to split into 2 or more groups.
(3) The aim of the game is to make the stick/ring go down to the ground as quickly as possible.
(4) Ask each person to hold out their index finger. Place stick or ring on fingers of each group. On “Go”, the groups try to make the stick go down without it falling to the ground.
(5) Likely the stick/ring goes up instead of down first. This illustrates the complexity of collective action.

ANNEX II: MOVIES

Annex III will provide information on relevant hydropower movies can be used for training purposes. Please find below the long list of selected movies, we will streamline in the next phase and suggest for respective sessions.

(1) Upstream downstream

There is conflict over water use between upstream and downstream communities on the Ping River in northern Thailand. How can the competing demands for water be balanced? The Ping River Basin Committee brings all stakeholders together to seek common ground on sharing and protecting this vital river system. http://www.youtube.com/watch?v=t8n7pPwM9kM or http://www.thewaterchannel.tv/en/videos/categories/viewvideo/90/integrated-water-resource-management/water-voices-upstream-downstream-thailand

(2) A river loved: a film about the Columbia river & the people invested in its future

[Film by OSU student Julie Watson] The Columbia River has been successfully managed by the United States and Canada for hydropower and flood control since the 1960s. The Columbia River Treaty is an inspirational example of international cooperation; however, needs and values for the basin have changed since the 1960s.Many values for the river, including salmon migration, ecosystem services, aesthetics, recreation, and cultural value were not included in the original treaty. Furthermore, the treaty was negotiated by federal entities, and important actors- from tribes to regional stakeholders- were not actively included in the process. Today, these topics are being discussed throughout the basin. In 2024, the flood control provisions of the Columbia River Treaty will expire. This creates the perfect opportunity for all the stakeholders on both sides of the border to come together and have a conversation about future management of the Columbia. http://www.youtube.com/watch?v=ZTIj8zIugdA

(3) Bujagali Dam: A climate sensitive investment?

The Bujagali dam should provide Uganda with the energy the country desperately needs. But problems have been surrounding the project ever since it started. Because of the dam, lands of the local people will be submerged, changing the local environment drastically and giving people fewer options to use their natural resources. At the same time the water level of Lake Victoria (that supplies the dam with water) is dropping because of global climate change. Therefore the dam will likely produce less power than projected and have a higher electricity price for the people of Uganda. http://www.thewaterchannel.tv/en/videos/categories/viewvideo/521/large-dams/bujagali-dam-a-climate-sensitive-investment

(4) Battle for the Xingu

The Xingu, a tributary of the Amazon, is home to over 10,000 indigenous people who rely on the river for survival. The Brazilian government, however, keen to develop the region, is proposing what would be the world's third largest hydroelectric dam, threatening to destroy the biodiversity of the Xingu River basin and deprive these people of their rights to a sustainable future. Cultures of Resistance was in Altamira in 2008 for the Xingu Alive Encounter - one of the largest-ever gatherings of indigenous Brazilians - to witness the spectacular determination of the Amazon people to protect their way of life.

http://www.thewaterchannel.tv/en/videos/categories/viewvideo/1038/large-dams/battle-for-the-xingu

(5) A river runs through us

The documentary offers a personal and hopeful introduction to one of the biggest threats facing our world's lifelines, as told by the people at the forefront of the global movement. Filmed at the Rivers for Life 3 meeting -- a gathering of 350 river activists from 50 countries, held in rural Mexico -- this documentary touches on issues such as how climate change will affect rivers and dams; what happens to communities displaced by or living downstream of large dams; and what kinds of solutions exist that both preserve our life-giving waterways while meeting our needs for energy and water. http://www.thewaterchannel.tv/en/videos/categories/viewvideo/798/large-dams/a-river-runs-through-us

(6) A river and its dams

[Mekong] More than 140 dams are currently planned, under construction or commissioned for different rivers in the basin. If constructed, this will radically alter the basin's hydrology, its ecology and, consequently, the lives of millions who depend upon it. How can Dams be built to minimize these social and environmental impacts? This short looks at three different dams. The Xayaburi dams which officially broke ground in November 2012. The Nam Theun Hin Boun Expansion Project which is considered a well implemented dam. Finally, the Don Sahong which is still in the planning stage. http://www.thewaterchannel.tv/en/videos/categories/viewvideo/1591/hydropower/a-river-and-its-dams

(7) Assignment earth - damming the Mekong

Assignment Earth travels to Thailand where we see the growing environmental troubles being faced as a result downstream, including lower water levels, less nutrient-rich sediment and degraded fisheries. http://www.thewaterchannel.tv/en/videos/categories/viewvideo/437/rivers/assignment-earth-damming-the-mekong

(8) Large dams in West Africa - building the dialogue

This documentary film is a medium of information and awareness for various stakeholders (policy makers, civil society, populations, technical and financial partners) about the many challenges and opportunities related to large dams in West Africa. These challenges were addressed through four sites in the region: Sélingué in Mali, Bagre in Burkina Faso, Diama in Senegal and Kandadji (planned) in Niger. http://www.thewaterchannel.tv/en/videos/categories/viewvideo/945/large-dams/large-dams-in-west-africa-building-the-dialogue

Water Before Anything: Crisis and Transformation -Umatilla Groundwater

We are invited into a small community in Oregon, where over the course of five years, residents worked together to find solutions to their water crisis. Filmmaker Sarah Sheldrick (Oregon State University) interviews a range of stakeholders on the hardships and hopes for their community. Sheldrick's talents as a storyteller successfully integrates these elements with the science of groundwater and the complex steps of a regional task force working through conflict resolution to form policy. http://www.thewaterchannel.tv/en/videos/categories/viewvideo/1072/groundwater/water-before-anything-crisis-and-transformation-umatilla-groundwater

(9) Hot cities - water, water everywhere...

Bangladesh is one of the countries most seriously affected by climate change. It is constantly battered by cyclones, coastal surges, overflowing rivers and violent downpours. Climate refugees from across the country are pouring into the capital, Dhaka. How can this intense pressure on the country's capital be eased?

http://www.rockhopper.tv/films/detail/hot-cities-water-water-everywhere...

(10) Hot cities - meltdown!

Water supplies and security will be one of the most pressing issues as the world faces the challenge of climate change. If average global temperatures rise by only a few degrees most of the world's glaciers will all but disappear, leading to floods and severe water shortages for millions of people. "Hot Cities" goes to Lima in Peru, one of the driest cities in the world but a city which relies heavily on the water from three rivers fed by glacial melt. As the city swells in size the demands on the water supply are increasing. But already Lima is working on a survival strategy based on re-cycling projects and "fog-catching" – literally catching fog in large thin-meshed nets and using the "captured" moisture to irrigate plants.

http://www.rockhopper.tv/films/detail/hot-cities-meltdown

(11) Bridging waters: water for economic development

From villages to cities; from farms to factories; from schools to parks… competing demands for water in the water-scarce Southern Africa region calls for nations to work together towards economic development and regional integration. Water quenches our thirst; washes us; supports our farmers and mines; offers a cheap and renewable energy supply for our homes and factories; and provides transport. Uncertain access to water is a threat to economic development and social equity as growing numbers of people make increasing demands for a limited resource. The transboundary nature of Southern Africa's watercourses highlights the importance of sharing this strategic resource, for example in the form of the Lesotho Highlands Water Project, which transfers water from the highlands of Lesotho to the economic powerhouse of South Africa's Gauteng Province. The SADC Water Division aims to create regional consensus regarding the management and implementation of water strategies to tackle the region's escalating challenges of capacity building, infrastructure development, irrigated agriculture, food and energy security, and provision of drinking water and sanitation.

SADC's Protocol on Shared Watercourses sets out the principles that guide river basin organisations such as the Orange-Senqu River Commission as they collect vital data, devise practical management strategies and coordinate integrated water resources management (IWRM) as we realize our goal of "Water for Development"

http://www.thewaterchannel.tv/en/videos/categories/viewvideo/681/transboundary-water-management/bridging-waters-water-for-economic-development

(12) Bridging waters: water for peace

The availability and quality of the Southern African Development Community's (SADC) surface and groundwater resources are intimately linked to the health and welfare of the region's approximately 250 million people. Access to clean water and proper sanitation are a basic development goal; healthy river ecosystems are central to potable water, food and energy security. But the region's watercourses are now under stress. Growing demands coupled with the ill effects of climate change in a region already vulnerable to floods and

droughts is putting increasing pressure on a dwindling resource. About 70 percent of the region's water resources are in river basins shared by two or more countries. Water-related stress raises the potential for conflicts – within and across borders. Today we know that co-operation around shared river basins can make all the difference between whether water becomes a source of conflict... or a motivation for cooperation and ultimately regional integration – as is the case in the SADC region. The SADC Protocol on Shared Watercourses is one of the many agreements pioneered by the SADC Secretariat as the region seeks "Water for Peace" http://www.thewaterchannel.tv/en/videos/categories/viewvideo/671/transboundary-water-management/bridging-waters-water-for-peace

ANNEX III: GAME

Annex IV provides information on the role play devised by Bruce Lankford (University of East Anglia Water Security Research Centre) and how it can be integrated into the training. While the game is currently aiming at water resources allocation for irrigation, it can easily be adapted to the hydropower context.

About the River Basin Game

The River Basin Game is a dialogue tool for decision-makers and water users tested in Tanzania and Nigeria. It comprises a physical representation of a river catchment in the form of a board. A central channel flows between an upper catchment and a downstream wetland, and has on it several intakes into irrigation systems. Glass marbles, representing water, roll down the channel. Participants place sticks to catch the marbles and scoop them into the irrigation systems. The players become highly animated and learn that being at the top has advantages, whilst tail-enders experience water shortages. The game promotes mutual understanding of access to water and allows participants to react to scenarios. By the end of the game, participants obtain an understanding of system and conflict dynamics, and by drawing from their own and outsiders' knowledge, explore solutions to re-distributing water.[235]

Playing the River Basin Game during a training on transboundary water cooperation and hydropower development in Bangkok, Ovtober 2013

The four phases of the game

Introduction: The board is placed sloping, giving a 'catchment' at the top end and a 'wetland' at the bottom. A river flows between the catchment and wetland, and has on it several intakes into irrigation systems of varying sizes. About 50-70 marbles are used as a proxy for water. The game is played in four stages. The minimum time it can be played with students is about 90 minutes though ideally 120 minutes allows for a more fruitful discussion. With water officers, farmers and water users, a two day workshop can be utilized, with the game providing the 'ice-breaker' on the morning of the first day. Workshops need good planning to be successful, with careful thought given to representation, facilitation and to follow-up.

[235] Lankford/Watson2007.

First phase – demonstration.

1. The river 'flows' when marbles are released down the channel. Many marbles represent the wet season, and few marbles represent a drought or the dry season.
2. Sticks (weirs) are placed across the channel to capture marbles and scoop them into the irrigation systems to sit in holes— meeting the water requirement of that plot of irrigation.
3. Larger sticks capture the marbles very easily—these represent upgraded and modernized intakes associated with irrigation improvement programmes. Smaller slimmer-profile sticks represent traditional or proportional intakes which allow marbles to bypass them.

Helmand/Nimroz summit on water conservation with Afghan provincial leadership using the River Basin Game, March 2012. Organized by Jean Jolicoeur and Brett Burkhart, USAID. Photo: Leslie Shively.

4. The aim is to show how marbles may be captured easily by the upstream irrigation systems, allowing top-enders to deprive downstream players of water.
5. The large group of players is then divided into 6 to 7 smaller groups depending on how many intakes there are on the game, also counting for the downstream wetland.

Second phase - water-seeking strategies (individual water focus and consequences).

1. The aim of this phase is to get players to grab water in a competitive way.
2. Groups are asked to think about where on the board they wish to be and what kind of intake (large stick or small thin stick) to get hold of in order to 'win' water for themselves.
3. This could happen via a race to the board, or by throwing a dice, or by giving the top intake to the most 'powerful' team (cumulative body weight? seniority?).A race to the board is enjoyable way to see people 'fight' to grab water.
4. Once sticks and positions have been selected, marbles are rolled down the channel.
5. A discussion ensues to determine who 'won' (or found) water and who lost out, plus a check on how people 'feel' about not getting water and about the stark differences in upstream and downstream distribution of water.

Third phase - money-seeking strategies (livelihoods focus and consequences).

1. In this phase, the motivation is to get hold of money or a livelihood – water being central to that. Players 'fight' to get their position and preferred intake stick, and the marbles are rolled. Again the top-enders grab most of the water.
2. All groups brainstorm how they acquire a livelihood or money. Those with marbles offer "grow and sell a crop of rice", or "rent out land", or "sell water". Those without marbles might say things like "migrate to the city", "rent out my labor", "go upstream

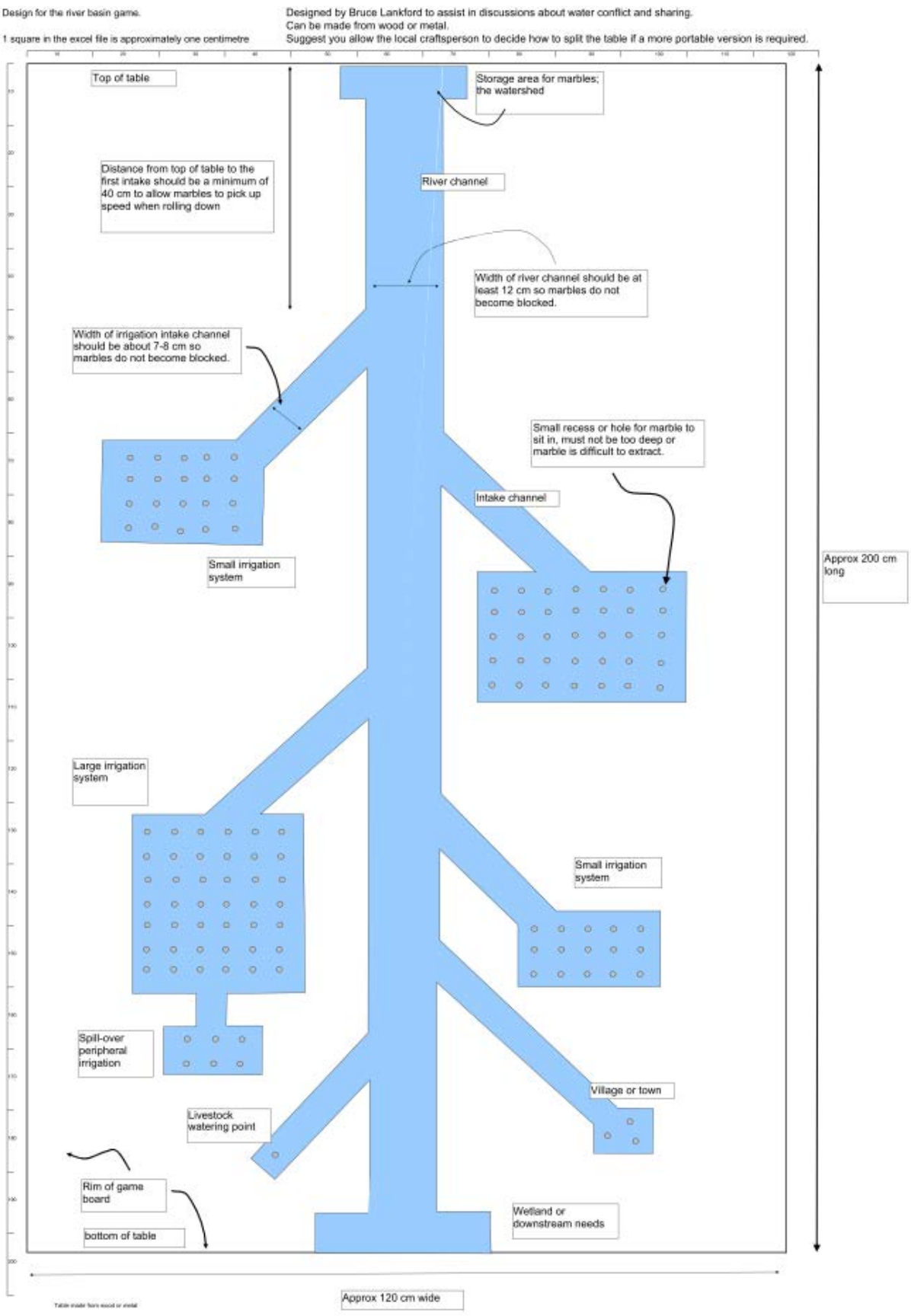
in the night and steal water', "make and sell charcoal", "borrow or steal money", "take my children out of school", and so on.
3. Some people propose supply side solutions, e.g. drill a borehole or capture rainwater.
4. The facilitator writes up the ideas no matter how sensible or unsavory. The purpose is to share a common concern for the consequences of 'water conflict', 'poor water allocation' and 'ineffective water policy'.
5. Prior to the next phase of the game, the facilitator demonstrates the benefits gained when one marble is taken from an upstream plot where it sits as surplus to requirements and is moved to an empty plot downstream.

Fourth phase - community-based adjustments (common agreements/consequences).

1. In this phase, players aim to share marbles between all intakes. A collective approach gives everyone (even those in the downstream wetland) a voice and influence over the setting of the intakes.
2. Players come to the table to take a stick and a position. By setting the sticks in a variety of 'regulated' positions (not blocking the whole channel), the marbles spill and distribute more evenly between all the irrigation systems – often to applause and a feeling of co-operation.
3. Groups then brainstorm two types of solutions ('technological' and 'institutional') to support a more equitable and deliberative approach to water management.
4. Players are asked to consider their own experience when proposing solutions, and not to pluck ideas from text books or donor agendas (such a large dams or drip irrigation).People are encouraged to think about those amongst the community who are known to grow a good crop while using less water than others (a local viewpoint about careful water use).

All ideas are written down. Everyone further prioritizes and classifies (e.g. demand versus supply solutions, expensive versus cheap solutions, community-led versus external solutions, quick versus long-term solutions, and the local definitions of 'careful water management').The emphasis should be on local organisations, structures and community-led solutions.

Please see the figure below for a detailed design of the game.



Design of the River Basin Game, designed by Bruce Lankford

Suggestions for adaptation of the River Basin Game to the Pandal basin case

The River Basin Game can easily be adapted to the provisions of the Pandal basin case presented in Annex IV. For this purpose, each intake on the river represents one of the countries. The distribution of the intakes depends on the position of the respective country on the Pandal river. During the game, participants should always keep in mind the specific characteristics of their fictitious country.

The following table gives a brief overview on how the River Basin Game could be used in combination with the Pandal basin case.

Phase	Discussion Focus
1st round: Demonstration	• Demonstrate and explain the functioning of the game (let marbles roll down the basin). • Briefly explain the consequences of the different positions on the river (upstream vs. downstream). • Discuss which other factors influence the discussions and relationship between states in a basin (e.g. power, money, knowledge).
2nd round: Competition for resources	• Create five groups and assign a country to each group (e.g. by lot). Distribute country descriptions (see Annex IV) • Groups come to the table and choose their “dam” in order of their position on the river (upstream to downstream) – The downstream countries will probably end up with the smallest dams. • Allow each group some time to read its role description and develop a strategy. • The groups place their dams on the boardand the marbles roll down the basin. • Discussion: Ask each country whether they are satisfied or not with their result (☺/☹).This could be written down on a flip chart in the form of a table with a column for each country. • Discussion: Which are the impacts of the amount of available water in each country? Every country explains its situation. Key points could be written down on a flip chart in the form of a table with a column for each country. • Brief discussion inside the countries on the strategy for the next round.
3rd round: Focus on coordinated use	• The groups place their dams on the board and the marbles roll down the basin. • Discussion: Ask each country whether they are satisfied or not with their result (☺/☹).This could be written down on a flip chart in the form of a table with a column for each country. • Discussion: What are your options for action now? Every country explains its situation. Key points could be written down on a flip chart in the form of a table with a column for each country. • Countries are allowed to freely choose a different dam from a larg-

	er choice of big and small dams.
4th round: Cooperation	• The groups place their new dams on the board and the marbles roll down the basin. • Discussion: Ask each country whether they are satisfied or not with their result (☺/☹).This could be written down on a flip chart in the form of a table with a column for each country. • Discussion: How could cooperation help to solve the problem? Every group reflects on the question. Afterwards every country presents its ideas for cooperation and explains what it expects from the other countries. Key points could be written down on a flip chart in the form of a table with a column for each country. • Discussion: How can cooperation be achieved (e.g. foundation of an institution, the role of third parties)?

Further publications on the game

Magombeyi, M.S./Rollin, D./Lankford, Bruce (2008). The river basin game as a tool for collective water management at community level in South Africa, Physics & Chemistry of the Earth, (33): 873-880.
Rajabu, Kossa (2007) Use and impacts of the river basin game in implementing integrated water resources management in Mkoji sub-catchment in Tanzania. Agricultural water management. vol. 94, 1-3, pp. 63-72.
Lankford, Bruce/Watson, Drennan 2007. Metaphor in natural resource gaming; insights from the River Basin Game. Simulation & Gaming, Vol. 38 No. 3, 421-442.
Lankford, Bruce/Sokile, Charles/Yawson, Daniel/Lévite, Hervé 2004. The River Basin Game: A Water Dialogue Tool. Working Paper 75. Columbo, Sri Lanka; International Water Management Institute.

ANNEXIV: FICTITIOUS SCENARIO FOR TRAINING PURPOSES

The Pandal basin is a fictitious basin designed for this course. A description of the basin and its riparian countries is included here, and relevant Exercises are included in each chapter to aid in helping students to refine their understanding of the concepts that will be covered. This fictitious basin (described below) and the associated Exercises may be used in training or educational settings to demonstrate the principles of select modules. The fictitious scenario allows abstraction and development of problem constellations beyond real life cases. They allow a greater flexibility in evaluating country interests and problem solutions than already implemented real life examples.

In these Exercises, the instructor/facilitator guides participants in dialogue and negotiation regarding issues in the fictional Pandal basin. Participants should be divided amongst the five states described. In each group, one lead negotiator (representing the head of state) should be identified. The remaining participants in each team may select various ministerial roles, such as (but not limited to) ministers of water, agriculture, urban development, environment, and defense. In a large group, the facilitator may wish to ask some participants to serve as non-governmental organisations (NGOs), international financing institutions (IFIs) such as the World Bank, and/or representatives from the indigenous populations identified in the basin description. All participants should be provided with a copy of the country descriptions, a basin map, and tabletop nameplates that identify their country and role in the negotiation. After each simulation exercise, the facilitator should lead a debrief (out-of-role) discussion among participants to discuss observations and take-away messages from each activity.

Below are the basin and country profiles for the fictional Pandal basin:

Pandal basin overview

The Pandal River basin (PRB) is five riparian countries, Dalik, Ordon, Gandor, Esund, and Panam. The headwaters of the Pandal River start high in the peaks of Dalik's central mountain range. From Dalik, the river flows directly south into Ordon and then southwest into Gandor. Here, the river meets with two major tributaries, the Nortesund and Suresund, which are dammed to form the Gand Reservoir in Gandor. Finally, the river flows south from Gandor to its mouth in Panam. Along the way, the river supports a multitude of uses: transport of logs; irrigation for rice cultivation and floodplain subsistence gardens; fisheries; a large mangrove forest; and drinking water.

(1) Ordon

Ordon is a poor country, with an economy based on subsistence agriculture, primarily rice and timber, which it has traditionally exported without much regulation by the government. Logging activities have led to the construction of a number of roads leading to the Pandal River, which timber companies use to transport logs downstream. Ordon's objective is economic growth. Its geographic conditions have endowed it with significant hydropower potential along the Pandal River, a potential that has been as yet unrealized due to the reluctance of private groups to invest under its instable political conditions. However, with its first democratically-elected government now in office, Ordon has been seeking to develop hydropower to export to its neighbour countries. Its population is composed of several different ethnic groups, who have occasionally clashed over access to the country's timber resources. All of Ordon's ethnic groups depend on the Pandal River's water for subsistence agriculture and drinking water. One group, the Suwa, also conducts traditional religious rites along a stretch of the Pandal River. Recently, the country's ethnic groups have united in opposition to for-

eign investors who keep disproportionate profits from the Ordon's timber industry. Five years ago, a brief civil uprising broke out, threatening to "Occupy Ordon" and overthrow the central government before being resolved with help from the larger regional community.

Additional Ordon challenges:

- Deforestation is leading to increasing frequency of landslides that threaten Ordon's roads and other infrastructure. On one occasion in 2010, a landslide into the Pandal led to high sedimentation of public drinking water supplies.
- While the Occupy movement in Ordon has quieted, the underlying tensions between the indigenous population and foreign timber corporations remain.

(2) Gandor

To the south of the Ordon sits Gandor, a small, landlocked country situated entirely within the Pandal basin. Gandor is an economically poor country rich in natural resources, including lush agricultural land, valuable minerals, and a large native fishery. Through its resource reserves, Gandor is making modest economic gains, moving from raw exports to the construction of factories that produce electronic products. As Gandor has developed, its electricity needs have increased. Gandor has traditionally met its power needs through domestic hydropower production at Gand Reservoir, just downstream of the confluence of the Nortesund and Suresund tributaries, but the combination of growing electricity needs and exhaustion of its domestic hydropower supply has made it eager to import electricity from its neighbors. Gandor's population consists of two predominate ethic groups, the larger of which, the Tulsi, dominate the government and industry in Gandor's burgeoning cities. The minority, the Hrang, reside near Gandor's northern border with Ordon, where they live along the riverbed. There is also a small Hrang population on Ordon's side of the border. The Hrang rely on rice cultivation, seasonal floodplain gardening, and traditional fisheries to meet their subsistence needs. They are also characterized by a higher level of poverty than in the rest of the country as well as political marginalization- which came to light in the 1990s, when the international community intervened in Gandor to stop violence against the Hrang. The impoverished conditions that emerged during the 1990s in Gandor's northern region have created political opposition to the governing democratic regime, which the majority party is eager to contain.

Additional Gandor challenges:

- The ethnic minority, the Hrang, are threatened by the effects of climate change. Larger floods and longer dry seasons threaten their subsistence agriculture.
- Conversely, large hydropower projects proposed upstream in Ordon and Dalik may flatten the hydrograph that supports seasonal floodplain farming and the large and diverse native fishery. These native fish species, used both as an economic export and as subsistence for the Hrang, are unlikely to thrive without historic wet and dry season conditions.

(3) Panam

Southeast of Gandor sits Panam, a coastal country at the mouth of the Pandal River. Most of the country lies along the Tulgy Sea outside of the basin, divided from Gandor by the Panam Mountains. Previously isolated and economically stunted by civil war, Panam has exhibited surprising economic growth since the resolution of the conflict in 1992. Panam's economy is

driven by a combination of subsistence agriculture (primarily rice cultivation), clothing production and exports, and coastal fisheries both at the mouth of the Pandal River and in the Tulgy Sea. To the south of the country, where the Pandal River approaches the ocean, sit a large mangrove forest and fishery, recently expanded as an income-generating project for local women by a large international NGO. To spur economic development, Panam has been seeking to draw ecotourists to the exceptional biodiversity in its northern region, including several species of rare and endangered birds that nest along the Pandal River. As the country farthest downstream in the Pandal river basin, Panam is very concerned about maintaining a reliable water supply for its fisheries. Flash floods from dams constructed in Gandor have on occasion inundated its fisheries, destroying fish stocks and fishing equipment. Panam has enjoyed a relatively stable democratic government for the last twenty years, and is primarily inhabited by the Klee ethnic group.

Additional Panam challenges:

- Panam's groundwater is at risk for saltwater intrusion, leaving the Panam government with limited options for drinking water.
- Panam's government is growing increasingly concerned about sea level rise. While there is some high ground along the Gandor border, most of the country lies near sea level. With a sea level rise of +1 meter, most of the habitable land in Panam would be inundated.

(4) Esund

To the south of Gandor and Ordon, neighboring Panam, lies Esund, a relatively wealthy country that contains two significant tributaries, the Nortesund and Suresund, that feed into the Pandal River. Esund's capital lies outside of the Pandal basin, and its economy is centered in large cities with industry, tourism, and service sectors. Esund has a long coastline and a long-established fishery in the Southern Ocean. So far, it has not imposed significant demands on the water resources of the Pandal tributaries. However, the central government has been exploring plans to construct a series of dams on the Norteland River in order to generate power for its large coastal cities and to boost industrial agriculture in its western region. The country is diverse, drawing international commerce and tourists. However, a number of ethnic groups who rely primarily on subsistence agriculture inhabit Esund's countryside, and these groups are wary that their traditional practices may be lost in the country's push for industrial agriculture for export.

Additional Esund challenges:

- Esund, like Panam, relies on groundwater for its coastal urban water supply. Esund's groundwater supply is threatened by industrial pollution and by salt water intrusion related to unsustainable withdrawals.
- Esund's globalized capital draws tourists, many of whom venture inland to see the rainforests surrounding the Nortesund tributary of the Pandal. Esund's governing officials are worried about how to meet their energy demands needed to maintain economic growth without losing their burgeoning tourism industry.

(5) Dalik

In the northernmost headwaters of the Pandal basin, Dalik borders all four of its much smaller neighbors. Dalik is a large, wealthy country still exhibiting rapid economic development. Most of Dalik's population lives in large cities along the Tulgy and in the north of the country,

where large industrial fisheries, agriculture, mining, and large-scale manufacturing and industry have sustained a diverse economy. Politically, Dalik has used its economic and military power to achieve its goals in the region, backing a civil war in Panam and supplying weapons to the Tulsi in Gandor in the 1990s in order to procure raw goods and to distract the international community from its massive deforestation and mining operations, which involved relocating many minority ethnic populations. Today, Dalik suffers from high levels of pollution, and it hopes to green up its image by switching from its oil reserves to hydroelectric power. It has already two dams in the Pandal headwaters, and plans to build several larger dams within the next few years. Dalik has not joined any regional agreements or otherwise participated in river basin planning.

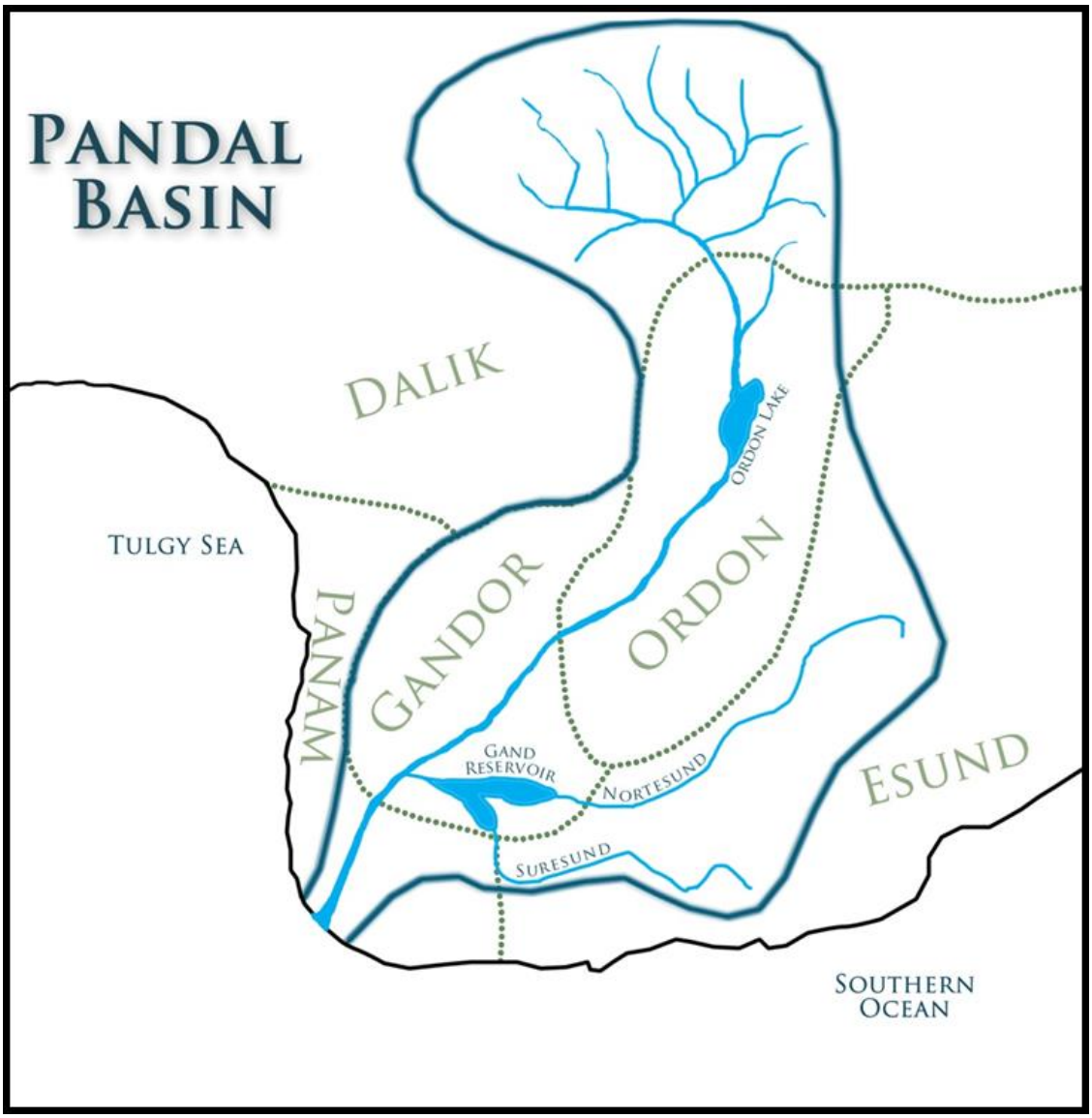
Additional Dalik challenges:

- Dalik is worried that the international community will oppose unilateral construction of dams in the Pandal headwaters. If hydropower production is delayed, the Dalik government is investigating new developments in hydrofracturing, which will make natural gas deposits in the east economically viable.
- Dalik's municipal water supplies in its large cities are contaminated to unsafe levels by mining and agricultural runoff. One political party in Dalik has proposed diverting water from the Panam to meet drinking water needs.

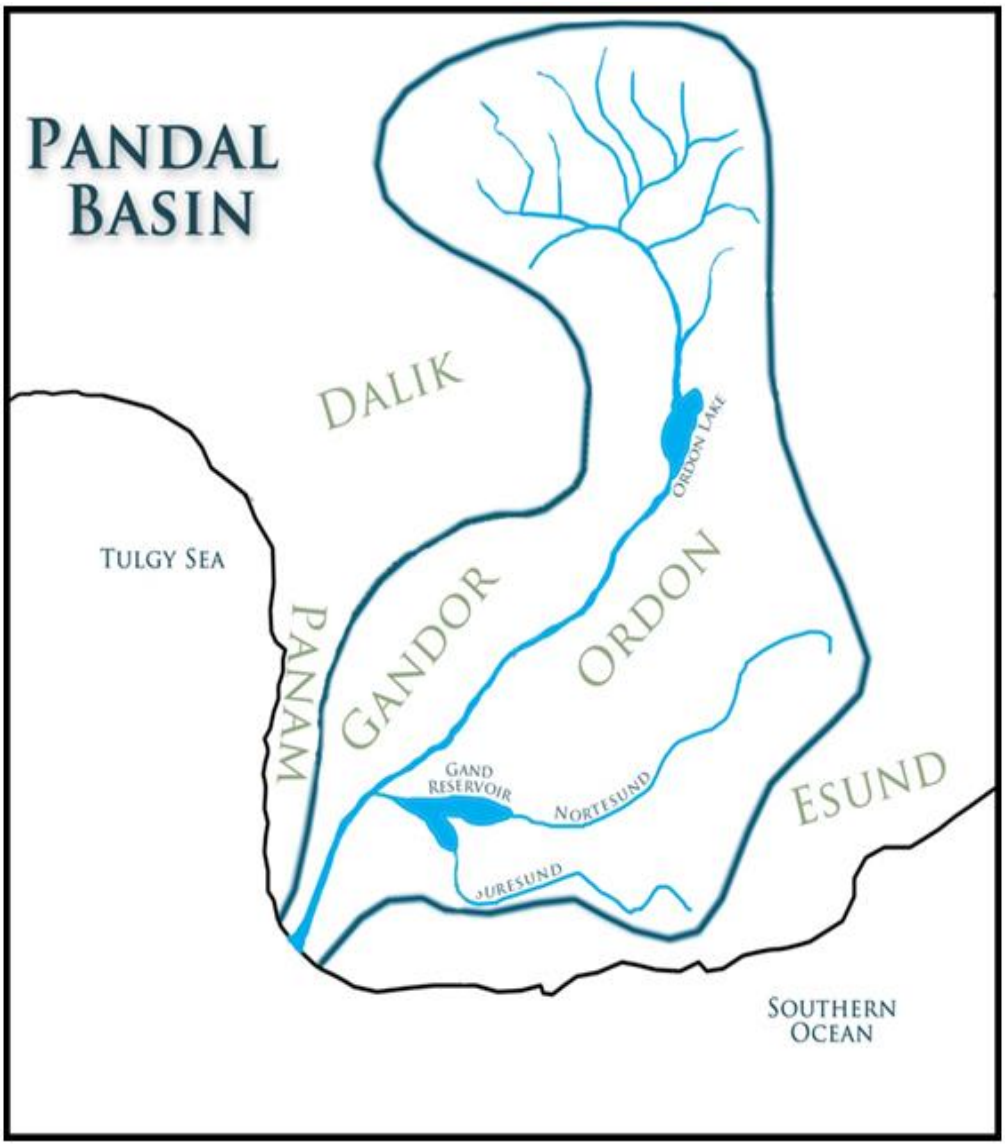
Summary of key issues and/or interests by state

Ordon	Gandor	Panam	Esund	Dalik
Priority is economic growth	Growing electricity needs	Subsistence agriculture (rice)	Industry & service sectors	Large population
Forestry	Mining	Coastal fisheries	Tourism	Wealthy
Hydropower potential	Agricultural land	Clothing production	Agriculture & irrigation needs	Rapid industrialization
Safe drinking water/sedimentation	Growing number of factories	Mangrove forest with endangered birds	Considering hydropower development	Agriculture, mining, large-scale manufacturing
Indigenous spiritual use of the river	Indigenous riverine interests	Flash floods from upstream dams	Indigenous subsistence agriculture	Pollution and drinking water contamination
Civil uprising	Subsistence agriculture	Salt water contamination of groundwater	Salt water contamination of groundwater	Interested in cleaner energy: hydro or natural gas
Landslides, erosion	Native fishery	Sea level rise	Potential ecotourism	Two dams in headwaters, more planned

Map of the Pandal basin with state borders


PANDAL
BASIN
DALIK
ORDON LAKE
TULGY SEA
PANAM
GANDOR
ORDON
GAND
RESERVOIR
NORTESUND
ESUND
SURESUND
SOUTHERN
OCEAN

Map of the Pandal basin with state borders removed



ANNEX V: BIBLIOGRAPHY

Agencia de Informacao de Mocambique 2010: Mozambique. Government approves Mphan-da Nkuwa Dam (18 August 2010). Available online at http://allafrica.com/stories/201008190343.html, checked on 29 November 2013.

Aguilar, Grethel / Iza, Alejandro 2011: Governance of shared waters: Legal and institutional issues. Gland: IUCN.

AMCOW 2012: Water security and climate-resilient development. Strategic Framework. Stockholm / Abuja: GWP / AMCOW.

Amy, Douglas 1987: The politics of environmental mediation. New York: Columbia University Press.

Backer, Ellen 2007: The Mekong River Commission: does it work, and how does the Mekong Basin's geography influence its effectiveness? In: Südostasien aktuell 4: 31–55.

Browder, Greg / Ortolano, Leonard 2000: The evolution of an international water resources management regime in the Mekong River Basin. In: Natural Resources Journal 40 (3): 499–531.

Browder, Greg 2000: An analysis of the negotiations for the 1995 Mekong agreement. In: International Negotiation 5 (2): 237–61.

Carius, Alexander / Dabelko, Geoffrey / Wolf, Aaron 2004: Water, conflict, and cooperation. In: Environmental Change and Security Project Report 10: 60-66.

Cederwall, Klas 2006: Dam safety and climate change. In: Johansson, Birgitta / Sellberg, Björn (eds.): Dams under debate. Stockholm: Formas.

Chen, Shaofeng 2011: Has china's foreign energy quest enhanced its energy security? In: China Quarterly 207: 600-625.

Compagnie Nationale du Rhone 2012: Xayaburi Dam Project. Clarifications from the Compagnie Nationale du Rhone. Press release of 2 August 2012. Available online at http://www.internationalrivers.org/files/attached-files/2012_08_02_press_release_cnr_xayaburi_dam_project.pdf, checked on 29 November 2013.

Cooper, Rachel 2012: The potential of MRC to pursue IWRM in the Mekong: trade-offs and public participation. In: Öjendal, Joakim / Hansson, Stina / Hellberg, Sofie (eds.): Politics and development in a transboundary watershed. The case of the Lower Mekong Basin. Heidelberg / London / New York: Springer.

Delli Priscoli 1983: Retraining the modern civil engineer. In: The Environmentalis 3: 137-146.

Delli Priscoli, Jerome / Moore, Christopher 1988: ADR training. Alexandria, VA: USACE.

Delli Priscoli, Jerome / Wolf, Aaron 2009: Managing and transforming water conflicts. Cambridge: Cambridge University Press.

Dombrowsky, Ines 2009: Revisiting the potential for benefit-sharing in the management of transboundary rivers. In: Water Policy 11 (2): 125-140.

Dore, John / Lebel, Louis 2010: Deliberation and scale in Mekong region water governance. In: Environmental Management 46 (1): 60-80.

Dore, John / Lebel, Louis 2010: Gaining public acceptance. A critical strategic priority of the world commission on dams. In: Water Alternatives 3 (2): 142-141.

Downs, Erica 2006: China's quest for energy security. Washington DC: Rand Corporation.

Durocher, Carine 2008: Benefit sharing to supplement compensation in resource extractive activities: the case of dams. In: Cernea, Michael / Mathur, Hari (eds.): Can compensation prevent impoverishment? Reforming resettlement through investments and benefit-sharing. Oxford: Oxford University Press, 317-357.

Égré, Dominique / Roquet, Vincent / Durocher, Carine 2002: Benefit sharing from dam projects. Phase 1: Desk Study. Final Report. Washington DC: World Bank.

Égré, Dominique / Roquet, Vincent / Durocher, Carine 2008: Benefit sharing to supplement compensation in resource extractive activities. The case of dams. In: Cernea, Michael / Mathur, Hari (eds.): Can compensation prevent impoverishment? Reforming resettlement through investments and benefit-sharing. Oxford: Oxford University Press.

Égré, Dominique 2007: UNEP Dams and Development Project: Compendium on relevant practices, 2nd Stage. Revised Final Report, Benefit Sharing Issue. No place: UNEP.

Elhance, Arun 1999: Hydropolitics in the Third World. Conflict and cooperation in international river basins. Washington DC: United States Institute of Peace.

Feitelson, Eran/ Haddad, Marwan 1998: Identification of joint management structures for shared aquifers: A cooperative Palestinian-Israeli effort. World Bank Publications.

Fisher, Roger / Ury, William 1981: Getting to yes. Longon: Hutchinson Business.

Fisher, Roger / Ury, William 1991: Getting to yes. Negotiating an agreement without giving in, 2nd ed. New York: Penguin Books.

Friend, Richard / Blake, David 2009: Negotiating trade-offs in water resources development in the Mekong Basin: Implications for fisheries and fishery-based livelihoods. In: Water Policy 11 (1): 13–30.

Giordano, Meredith / Wolf, Aaron 2002. The World's international freshwater agreements: Historical developments and future opportunities. In: Atlas of International Freshwater Agreements. Nairobi: UNEP.

GIZ 2012: Assessment of RBO-level mechanisms for sustainable hydropower development and management. Vientiane: GIZ.

GIZ 2013a: Training manual. Dealing with social aspects in hydropower development. Vientiane: GIZ.

GIZ 2013b: Training manual. Sustaining river basin ecosystems. Vientiane: GIZ.

Hensengerth, Oliver / Dombrowsky, Ines / Scheumann, Waltina 2012: Benefit-sharing in dam projects on shared rivers. Bonn: Deutsches Institut für Entwicklungspolitik (Discussion Paper). Available online at http://www.die-gdi.de/CMS-Homepage/openwebcms3.nsf/(ynDK_contentByKey)/ANES-8TPKLU/$FILE/DP%206.2012.pdf, checked on 29 November 2013.

Hensengerth, Oliver 2008: Vietnam's security cooperation in Mekong Basin governance. In: Journal of Vietnamese Studies 3 (2): 101-27.

Hensengerth, Oliver 2009: Transboundary river cooperation and the regional public good: the case of the Mekong River. In: Contemporary Southeast Asia 31 (2): 326-349.

Hirsch, Philip / Jensen, Kurt Mørck (eds.) 2006: National interests and transboundary water governance in the Mekong, Sydney: Australian Mekong Resource Centre / Danish International Development Assistance / The University of Sydney.

Hirsch, Philip 2006: Water governance reform and catchment management in the Mekong region. In: Journal of Environment and Development 15 (2): 184-201.

Hirsch, Philip 2012: IWRM as a participatory governance framework for the Mekong River Basin? In: Öjendal, Joakim / Hansson, Stina / Hellberg, Sofie (eds.): Politics and development in a transboundary watershed. The case of the Lower Mekong Basin. Heidelberg / London / New York: Springer.

Hydropower Sustainability Assessment Forum 2010: Trialling of the draft hydropower sustainability assessment protocol August 2009. Trialling Outcomes Report. Available online at http://www.hydrosustainability.org/IHAHydro4Life/media/PDFs/Protocol%20phase%201/Trialling/HSAF-Trialling_Outcomes_Report_Final_5MAR2010.pdf, checked on 29 November 2013.

ICEM 2010: Strategic environmental assessment of hydropower on the Mekong mainstream: Final report. Glen Iris / Victoria: ICEM.

ICPDR (n.d.): Activities & Projects. Guiding Principles on Sustainable Hydropower. Available online at http://icpdr.org/main/activities-projects/guiding-principles-sustainable-hydropower, checked on 29 November 2013.

ICPDR 2013: Guiding principles on sustainable hydropower development in the Danube Basin. Vienna : ICPDR. Available online at http://www.icpdr.org/main/sites/default/files/nodes/documents/guiding_principles_sustainable_hydropower_-_public.pdf, checked on 17 December 2013.

IEA 2010b: World Energy Outlook 2010. Paris: IEA.

IEA 2011: World Energy Outlook 2011. Paris: IEA.

IEA 2010a: Renewable Energy Essentials. Hydropower. Paris: IEA.

IEA 2012: Key world energy statistics. Paris: OECD/IEA. Available online at http://www.iea.org/publications/freepublications/publication/kwes.pdf, checked on 29 November 2013.

IEA 2013: World energy outlook special report. Southeast Asia energy outlook. Paris: IEA/OECD.

IFC 2012: IFC Performance Standards on Environmental and Social Sustainability. Washington D.C.: IFC. Available online at http://www.ifc.org/wps/wcm/connect/c8f524004a73daeca09afdf998895a12/IFC_Performance_Standards.pdf?MOD=AJPERES, checked on 29 November 2013.

IHA 2010: Hydropower sustainability assessment protocol. London: IHA. Available online at http://www.hydrosustainability.org/IHAHydro4Life/media/PDFs/Protocol/hydropower-sustainability-assessment-protocol_web.pdf, checked on 29 November 2013.

IHA 2013: Hydropower infrastructure contributes to water management in a climate-constrained world. Press Release. Available online at https://iha.box.com/shared/static/ljethpr6mdg8if0dneqc.pdf, checked on 29 November 2013.

International Commission on Large Dams 2011: Constitution. Paris: ICOLD.

Johns, Fleur et al. 2010: Law and the Mekong River Basin: a social-legal research agenda on the role of hard and soft law in regulating transboundary water resources. In: Melbourne Journal of International Law 11 (1): 154-174.

Kaufman, Edward (2002) Innovative problem-sovling workshops. In: John Davies and Edward Kaufman: Second track/ citizens' diplomacy. Concepts and techniques for conflict transdormation. Lanham, MD: Rowman & Littelfield: 171-247.

Khumsri, Malasri / Ruddle, Kenneth / Shivakoti, Ganesh 2009: Rights and conflicts in the management of fisheries in the lower Songkhram River Basin, Northeast Thailand. In: Environmental Management 43 (4): 557-570.

Kirmani, Syed 1990: Water, peace and conflict manageent. The experience of the Indus and Mekong river basins.In: Water International 15 (4): 200-205.

Klaphake, Axel 2005: Kooperation an internationalen Flüssen aus ökonomischer Perspektive: Das Konzept des Benefit Sharing. Bonn: Deutsches Institut für Entwicklungspolitik (Discussion Paper).

Lammers, Owen / Moore, Deborah / Preakle, Kay 1994: Considering the Hidrovia. A preliminary report on the status of the proposed Paraguay / Parana waterway project.Working Paper 3. Berkley CA: International Rivers Network.

Lankford, Bruce / Watson, Drennan 2007: metaphor in natural resource gaming; insights from the river basin game. In: Simulation & Gaming 38 (3): 421-442.

Lankford, Bruce et al. 2004: The river basin game: a water dialogue tool. Working Paper 75. Columbo: International Water Management Institute.

Lederach, John Paul 2003: The Little Book of Conflict Transformation, Intercourse PA: Good Book.

Lehner, Bernhard et al. 2011: High-resolution mapping of the world's reservoirs and dams for sustainable river-flow management. In: Frontiers in Ecology and the Environment 9 (9), 494–502. Map available online at http://sedac.ciesin.columbia.edu/downloads/maps/grand-v1/grand-v1-dams-rev01/dams-rev01-asia.pdf, checked on 29 November 2013.

Lewicki, Roy / Litterer, Joseph / Minton, John / Saunders, David 1994: Negotiation. Boston: Irwin.

Lewicki, Roy / Litterer, Joseph 1985: Negotiation. R.D. Irwin.

Lindström, Andreas / Granit, Jakob / Weinberg, Josh 2012: Large-scale water storage in the water, energy and food nexus. Perspectives on benefits, risks and best practices. Stockholm: SIWI (SIWI Paper).

Loures, Flavia / Rieu-Clarke, Alistair / Vercambre, Marie-Laure 2009: Everything you need to know about the UN Watercourses Convention. Gland: WWF.

MacQuarrie, Patrick / Viriyasakultorn, Vitoon / Wolf, Aaron 2008: Promoting cooperation in the Mekong region through water conflict management, regional collaboration, and capacity building. In: GMSARN International Journal 2: 175-184.

Magee, Darrin 2012: The dragon upstream. China's role in Lancang Mekong development. In: Öjendal, Joakim / Hansson, Stina / Hellberg; Sofie (eds.): Politics and development in a transboundary watershed. The case of the lower Mekong Basin. Heidelberg: Springer.

Magombeyi, M.S. / Rollin, D. / Lankford, Bruce 2008: The river basin game as a tool for collective water management at community level in South Africa. In: Physics & Chemistry of the Earth (33): 873-880.

Maslow, Abraham 1954: The Instinctoid Nature of Basic Needs. In: Journal of Personality, *22*(3): 326-347.

McCallum, Wayne 2008: Before the dam. A study of environmental impacts and community rights associated with the construction and operation of the approved Kirirom III hydropower scheme, Sre Ambel District, Southwest Cambodia. No place: American Friends Service Committee and Rivers Coalition in Cambodia.

McDowell, David / Scudder, Thayer / Talbot, Lee 2013: Laos - Nam Theun 2 multipurpose development project: environmental and social panel of experts. Washington DC: World Bank.

Mirumachi, Naho / Allan, Anthony 2007: Revisiting transboundary water governance: power, conflict, cooperation and the political economy. CAIWA conference paper. Available online athttp://www.newater.uni-osnabrueck.de/caiwa/data/papers%20session/F3/CAIWA-FullPaper-MirumachiAllan25Oct07submitted2.pdf, checked on 29 November 2013.

Mirumachi, Naho / Torriti, Jacopo 2012: The use of public participation and economic appraisal for public involvement in large-scale hydropower projects: Case study of the Nam Theun 2 hydropower project. In: Energy Policy 47: 125-132.

Mirumachi, Naho 2013: Transboundary water security. Reviewing the importance of national regulatory and accountability capacities in international transboundary river basins. London: King's College Department of Geography (Environment, Politics and Development Working Paper Series).

Mnookin, Robert / Peppet, Scott / Tulumello Andrew 2000: Beyond winnin. Negotiating to create value in deals and disputes. Cambridge, MA: Belknap Press.

Moore, Christopher 2003: The mediation process. Practical strategies for resolving conflict, 3rd ed. San Fransisco: Jossey-Bass.

Mostert, Erik 2003: Conflict and co-operation in international freshwater management: a global review. In: International Journal of River Basin Management 1 (3), 1-12.

MRC 2003: State of the basin report. Vientiane: MRC.

MRC 2004/5: The MRC Basin Development Plan. IWRM strategy for the lower Mekong Basin.Stakeholder participation (BDP Library Vol. 5). Vientiane: MRC.

MRC 2008: Regional multi-stakeholder consultation on the MRC hydro-power programme. Vientiane: MRC.

MRC 2009a: Lower Mekong hydropower database. Available online at http://geo.mrcmekong.org/geonetwork/srv/en/graphover.show?id=32969&fname=thumbnail.jpg&access=public, checked on 29 November 2013.

MRC 2009b: Preliminary design guidance for proposed mainstream dams in the Lower Mekong Basin. Available online athttp://www.mrcmekong.org/assets/Publications/Consultations/SEA-Hydropower/Preliminary-DG-of-LMB-Mainstream-dams-FinalVersion-Sept09.pdf, checked on 29 November 2013.

MRC 2010a: State of the basin report. Vientiane: MRC

MRC 2010b: Rapid basin-wide hydropower sustainability assessment tool. Vientiane: MRC.

MRC 2010c: Strategic Plan 2011-2015. Vientiane: MRC.

MRC 2010d: Initiative on Sustainable Hydropower. 2011-2015 document. Discussed at the first meeting of the ISH Regional Advisory Committee. Vientiane: MRC.

MRC 2011a: Knowledge base on benefit sharing, Volume 1 of 5. MRC ISH.

MRC 2011b: Integrated water resources management-based basin development strategy 2011-2015, Phnom Penh / Vientiane: MRC. Available online at http://www.mrcmekong.org/assets/Publications/strategies-workprog/BDP-Strategic-Plan-2011.pdf, checked on 29 November 2013.

Mukosa, Clement / Mwiinga, Pherry 2008: Transboundary issues on sustainable hydropower development in the Zambezi River Basin in the eyes of the Zambezi River Authority. Presentation at the Hydropower Sustainability Assessment Forum Meeting, 4 September 2008, Kafue Gorge Regional Training Center.

Nam Theun Second Power Company 2004: Laos - Second Nam Theun power project and second Nam Theun social and environment project. Washington D.C.: World Bank. Available online at http://documents.worldbank.org/curated/en/2004/11/7317750/laos-second-nam-theun-power-project-second-nam-theun-social-environment-project, checked on 29 November 2013.

National Geographic, published there courtesy of WWF: Braun, David (2010), Dog-eating catfish, other river giants threatened by Mekong dam plan, National Geographic, http://newswatch.nationalgeographic.com/2010/07/27/giant_catfish_threatened_by_mekong_dams/.

NBI (n.d.): Internal Documents - Review of 2010/11 and Jul – Dec 2011 workplans and remarks on RPTP Phase II Achievements.

NBI 2001: Nile Basin Regional Power Trade. Project document. Entebbe: NBI. Available online athttp://iwlearn.net/iw-projects/1094/reports/nile-basin-regional-power-trade-52p-208k.pdf/at_download/file, checked on 29 November 2012.

NBI 2011a: Nile Basin Sustainability Framework. Entebbe: NBI.

NBI 2011b: Comprehensive basin-wide study. Regional Power Trade Project. Entebbe: NBI.

Nesheim, Ingrid et al. 2010: The challenge and status of IWRM in four river basins in Europe and Asia. In: Irrigation and Drainage Systems 24 (3): 205-221.

Oregon State University: Transboundary freshwater dispute database. Available at http://ocid.nacse.org/tfdd/index.php, checked on 29 November 2013.

Osborne, Milton 2000: The Mekong: turbulent past, uncertain future. New York: Grove Press.

Osborne, Milton 2006: the paramount power: China and the countries of Southeast Asia. Sydney: Lowy Institute for International Policy.

Phillips, David et al. 2006: Trans-boundary water cooperation as a tool for conflict prevention and for broader benefit-sharing. Stockholm: Ministry for Foreign Affairs Sweden.

Pöyri 2011: Compliance Report, Government of Laos, Main Report: Xayaburi Hydroelectric Power Project Run-of-River Plan. Zürich: Pöyri.

Rajabu, Kossa 2007: Use and impacts of the river basin game in implementing integrated water resources management in Mkoji sub-catchment in Tanzania. In: Agricultural water management 94 (1-3): 63-72.

Richter, Brian et al. 2010: Lost in development's shadow: The downstream human consequences of dams. In: Water Alternatives 3 (2): 14-42.

Rieu-Clarke, Alistair / Moyinihan, Ruby / Masgig, Bjørn-Oliver 2012: UN watercourses convention user's guide. University of Dundee, IHP-HELP Center for Water Law. Available online at http://dl.dropboxusercontent.com/u/391260/UN%20Watercourses%20Convention%20-%20User%27s%20Guide.pdf, checked on 29 November 2013.

SADC (n.d.): Concept paper on benefit sharing and transboundary water management and development. Available online at http://www.icp-confluence-

sadc.org/sites/default/files/SADC%20concept%20paper_benefit%20sharing.pdf, checked on 29 November 2013.

SADC 2011: Transboundary water management in SADC: dam synchronisation and flood releases in the Zambezi River Basin Project. Gaborone: SADC Water Sector Coordination.

Sadoff, Claudia / Grey, David 2002: Beyond the river: the benefits of cooperation on international rivers. In: Water Policy 4 (5): 389-403.

Sadoff, Claudia / Grey, David 2003: Beyond the river: the benefits of cooperation on international rivers. In: Water Science & Technology 47 (6): 91-96.

Sadoff, Claudia / Grey, David 2005: Cooperation on international rivers – a continuum for securing and sharing benefits. In: Water International 30 (4): 420-427.

Sadoff, Claudia et al. (eds.) 2008: Share. Managing water across boundaries. Gland: IUCN, Available online at http://data.iucn.org/dbtw-wpd/edocs/2008-016.pdf, checked on 29 November 2013.

Schmeier, Susanne 2010: The organizational structure of river basin organizations. Lessons learned and recommendations for the Mekong River Commission (MRC). Technical Background Paper for the Mekong River Commission, Available online at http://www.mrcmekong.org/download/free_download/MRC-Technical-Paper-Org-Structure-of-RBOs.pdf, checked on 17 December 2013.

Schmeier, Susanne 2013: Governing international watercourses. River basin organisations and the sustainable governance of internationally shared rivers and lakes. New York: Routledge.

Scudder, Thayer 2005: The Kariba Case Study. Social Science Working Paper 1227. Pasadena: California Institute of Technology.

Shela, Osborne 2000: Management of shared river basins: the case of the Zambezi River. In: Water Policy 2, 65-81.

Singh, Sarinda 2009: World Bank-directed development? Negotiating participation in the Nam Theun 2 hydropower project in Laos. In: Development and Change 40 (3): 487-507.

Skinner, Jamie / Niasse, Madiodio / Haas; Lawrence 2009: Sharing the benefits of large dams in West Africa. Edinburgh: International Institute for Environment and Development.

Souksavath, Bousouk / Nakayama, Mikiyasu 2013: Reconstruction of the livelihood of resettlers from the Nam Theun 2 hydropower project in Laos. In: International Journal of Water Resources Development 29 (1): 71-86.

Subramanian, Ashok / Brown, Bridget / Wolf, Aaron 2012: Reaching across the waters. Facing the risks of cooperation in international waters. Washington DC: The World Bank.

Susskind, Lawrence / Cruikshank, Jeffrey 1987:Breaking the Impasse. Consensual Approaches to Resolving Public Disputes. New York: Basic Books.

Tanzi, Attila 2000: The relationship between the 1992 UNECE convention on the protection and use of transboundary watercourses and international lakes and the 1997 UN convention on the law of the non navigational uses of international watercourses. Report of the UNECE Task Force on Legal and Administrative Aspects. Geneva.

The Oil Drum 2011: The role of energy in economic growth. Available online at http://www.theoildrum.com/node/8476, checked on 29 November 2013.

Tumbare, Michael 1999: Equitable Sharing of the Water Resources of the Zambezi River Basin. In: Physical Chemistry of the Earth (B) 24 (6): 571-578.

Turton, Anthony 2008: The Southern African hydropolitical complex. In: Varis, Olli / Tortajada, Cecilia / Biswas, Asit (eds.): Management of transboundary rivers and lakes. Berlin and Heidelberg: Springer: 21-79.

UEA Water Security Research Centre (WSRC) 2013: Proceedings of the sixth international workshop on hydro-hegemony: transboundary water justice, 12-13 January 2013, London: UEA.

UN 1997: Convention on the law of the non-navigational uses of international watercourses (A/51/869). Adopted by the General Assembly, New York: United Nations. Available online athttp://untreaty.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf, checked on 17 December 2013.

UN Water 2008: Transboundary waters. Sharing benefits, sharing responsibilities (UN Water Thematic Paper). Available online at http://www.unwater.org/downloads/UNW_TRANSBOUNDARY.pdf, checked on 29 November 2013.

UNCED 1993: Agenda 21. Earth Summit – The United Nations Programme of Action from Rio. New York: United Nations Publications.

UNDP 2006: Human Development Report 2006. Beyond scarcity: Power, poverty and the global water crisis. New York: Palgrave Macmillan.

UNDP 2011: International waters: review of legal and institutional frameworks. UNDP-GEF International Waters Project. Available online at http://www.undp.org/content/dam/aplaws/publication/en/publications/environment-energy/www-ee-library/water-governance/international-waters-review-of-legal-and-institutional-frameworks/IW_Review_of_Legal_Instl_Frameworks_Project_Report.pdf, checked on 29 November 2013.

UNECE (n.d.): The UNECE Water Convention. Available online at http://www.unece.org/env/water/, checked on 29 November 2013.

UNECE 1991: Convention on environmental impact assessment (EIA) in a transboundary context. Espoo. Available online at http://www.unece.org/env/eia/about/eia_text.html, checked on 18 October 2013.

UNECE 1992: Convention on the protection and use of transboundary watercourses and international lakes. Available online at http://www.unece.org/env/water/text/text.html, checked on 18 October 2013.

UNEP Dams and Development Project 2007: Dams and development: relevant practices for improved decision-making. Nairobi: UNEP.

UNEP et al. 2002: Atlas of international freshwater management. Available online at http://www.transboundarywaters.orst.edu/publications/atlas/, checked on 29 November 2013.

UNESCO (n.d.): Capability for hydropower generation. Indicator profile sheet. Available online at http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/temp/wwap_pdf/Capability_for_hydropower_generation.pdf, checked on 29 November 2013.

UNESCO 2003: Water security and peace. A synthesis of studies prepared under the PCCP – Water for Peace Process. Paris: UNESCO / IHP / WWAP.

WCD 2000: Dams and development. A new framework for decision making.The report of the World Commission on Dams. London: Earthscan. Available online at http://www.internationalrivers.org/files/attached-files/world_commission_on_dams_final_report.pdf, checked on 29 November 2013.

Whitelaw, Ed / MacMullan, Ed 2002: A framework for estimating the costs and benefits of dam removal. In: BioScience52 (8): 724-730.

Wolf, Aaron / Newton, Joshua 2009: Case studies of transboundary dispute resolution: the La Plata Basin. In: Delli Priscoli, Jerome / Wolf, Aaron (eds.): Managing and transforming water conflicts. Cambridge: Cambridge University Press.

Wolf, Aaron 2002: Thematic maps. Visualizing spatial variability and shared benefits. In: UNEP: Atlas of International Freshwater Agreements. Nairobi: UNEP.

Wolf, Aaron et al. 1999: International river basins of the world. In: International Journal of Water Resources Development 15 (4): 387-427.

World Bank / ADB 2006: WB/ADB Joint paper on future directions for water resources management in the Mekong River Basin. Mekong Water Resources Assistance Strategy (MWRAS). Washington DC / Bangkok: World Bank, ADB.

World Bank 2006: Managing water resources to maximize sustainable growth: a country water resources assistance strategy for Ethiopia. Washington DC: World Bank.

World Energy Council 2010a: Water for energy. London: World Energy Council. Available online at http://www.worldenergy.org/documents/water_energy_1.pdf, checked on 29 November 2013.

World Energy Council 2010b: Survey of energy resources. London: World Energy Council. Available online at http://www.worldenergy.org/documents/ser_2010_report_1.pdf, checked on 29 November 2013.

World Water Assessment Programme 2009: The United Nations World Water Development Report 3: Water in changing world. Paris: UNESCO, London: Earthscan.

WWF 2013: Ecosystems in the greater Mekong. Past trends, current status, possible futures. Gland: WWF.

ZRA (n.d.)a: An overview of the environmental monitoring programme of the Zambezi River Authority. Available online at http://www.zaraho.org.zm/overview.html, checked on 29 November 2013.

ZRA (n.d.)b: ZACPRO Phase II project. Available online at http://www.zaraho.org.zm/zacpro.html, checked on 29 November 2013.

MRC-GIZ COOPERATION PROGRAMME BACKGROUND

GIZ is supporting the Mekong River Commission (MRC) in its work in poverty-alleviating and environmentally friendly development of hydropower, as well as in protecting the population from the negative impacts of climate change in the Lower Mekong Basin. GIZ is directly supporting experts and managers from the MRC Secretariat, the National Mekong Committees and the ministries for water, energy and environment in the member countries. The GIZ programme aims to achieve long-term, sustainable improvement to the livelihoods of the more than 60 million people in the Lower Mekong Basin.

The GIZ programme comprises the following components (http://www.giz.de/themen/en/30306.htm):

- Supporting the Mekong River Commission in organisational reform
- Supporting the MRC in pro-poor sustainable hydropower development
- Supporting the MRC in Adaptation to Climate Change in the Mekong region
- Adaptation to climate change through climate-sensitive flood management

Supporting the MRC in pro-poor sustainable hydropower development

GIZ is advising the Mekong River Commission (MRC) on developing and implementing instruments for testing and improving the sustainability of hydropower projects. This includes for example instruments for analysing the impacts of hydropower development in catchment areas as well as approaches for establishing benefit-sharing mechanisms within water catchment areas and beyond borders. In addition, GIZ is promoting the exchange of experiences between various river basin commissions involved in sustainable hydropower development. The project is also developing basic and advanced training measures on sustainable hydropower.

Network on Sustainable Hydropower Development in the Mekong Countries (NSHD-M)

The NSHD-M is integrated in the project 'supporting the MRC in pro-poor sustainable hydropower development' of the Mekong River Commission (MRC) - GIZ Co-operation programme. The Network was established in October 2012 by universities and research institutions in the Mekong countries Cambodia, China, Laos, Thailand and Vietnam. The network aims to

- enhance knowledge and skills on sustainable hydropower development (SHD) at academic and research institutions,
- share knowledge and experiences on SHD in the Mekong countries,
- increase awareness on SHD at all levels of decision making,
- strengthen the capacity of stakeholders, including planners and decision makers, to cope with the challenges of SHD.

The network and its activities in the Mekong River Basin are supported by GIZ on behalf of the Federal Ministry for Economic Cooperation and Development (BMZ).

Further information on NSHD-M goals, activities and partners: www.cdri.org.kh/index.php/nshdmekong.

Contacts: klaus.sattler@giz.deandthomas.petermann@giz.de

About the authors

Alexander Carius is co-founder and Managing Director of adelphi. The core topics of his research and consultancy work are: resources and governance, climate and energy, and development and security. He provides advice on institutional matters with respect to environmental and development policy, policy integration and the development of regional and multilateral cooperation frameworks. He advises federal ministries, aid agencies, the European Commission and various international organisations. Since 1995, he has managed more than 200 national and international research and advisory projects with interdisciplinary teams.

Aaron T. Wolf is a Professor of Geography in the College of Earth, Ocean, and Atmospheric Sciences at Oregon State University. His research and teaching focus on the interaction between water science and water policy, particularly as related to conflict prevention and resolution. All told, he is (co-) author or (co-) editor of seven books, and close to fifty journal articles, book chapters, and professional reports on various aspects of transboundary waters, from the local scale to the international. A trained mediator/facilitator, he directs the Program in Water Conflict Management and Transformation, through which he has offered workshops, facilitations, and mediation in basins throughout the world (www.transboundarywaters.orst.edu).

Diana Nenz works as a Project Manager with adelphi. She is focusing on the topics of transboundary water resources management and development and climate change adaptation. Currently, she is working on regional solutions for transboundary water cooperation and on the mitigation of water risks utilising cooperative actions between the private sector, public administration and civil society. She is advising on policy and strategy development and the required institutional change, as well as on concrete implementation concepts for cooperation projects. To date, Diana Nenz gathered practical experience on transboundary water cooperation in East Africa, the Middle East, Asia and Europe. From 2009-2011 she has been working for GIZ as an advisor for NBI. She studied environmental sciences and international environmental policy at the University of Technology in Berlin, the Wageningen University in the Netherlands and the Hebrew University in Israel.

Oliver Hensengerth is Lecturer in Politics at Northumbria University in Newcastle, UK. He works on environmental and freshwater governance in China and Cambodia and on transboundary water governance in the Mekong River Basin with a particularly focus on institutional change and hydropower. Dr Hensengerth gained his PhD from the Department of East Asian Studies at the University of Leeds in 2006. After his PhD, he worked for the Institute of Development and Peace (INEF) at the University of Duisburg-Essen and was a postdoctoral fellow at Johns Hopkins University (School of Advanced International Studies, Washington DC) and Chatham House in London in the Transatlantic Postdoc Fellowship for International Relations and Security. Since then he has worked for the Universities of Essex, Warwick and Southampton and has conducted consulting work for GIZ and the German Development Institute. Dr Hensengerth joined Northumbria University in January 2012.

Julie E. Watson is a PhD Student of Geography in the College of Earth, Ocean, and Atmospheric Sciences at Oregon State University. Her research focuses on understanding and enhancing transboundary water cooperation and conflict transformation. Julie previously earned a MS in Water Resources Policy & Management from Oregon State University and completed an internship with the Center for Strategic and International Studies' Global Strategy Institute.

Elsa Semmling works as a Project Manager at adelphi. Her work focuses on environmental policy, specifically on topics related to the use of resources and transformation to a Green Economy. At adelphi she is involved in several projects related to German and international environmental policy and also deals with questions regarding sustainable water management, amongst others in the MENA region. Elsa Semmling holds a French-German degree in Economics; she studied at the Universities of Lyon, France, and Leipzig. During her Master thesis, she worked on the economical dependence on commodities and analysed its consequences on the economical structure of emerging countries in Latin America.

Janine Uhlmannsiek is a Project Assistant at adelphi, working primarily in the field of water resources management and development. She studies political science at the Free University of Berlin and is especially interested in issues related to international relations, with a particular emphasis on sustainability, development and human rights. In the course of her studies, she also spent a semester at the Laval University in Québec, Canada. As an intern at the German Environmental Foundation and at Human Rights Watch, Janine Uhlmannsiek gained first practical experience.

Imprint

Published by the
Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Registered offices
Bonn and Eschborn, Germany

Mekong River Commission - GIZ Cooperation Programme
P.O. Box 9233
Vientiane, Lao PDR
T ++856 21 263263 ext 3061
mrc@giz.de

HCD subcomponent Sustainable Hydropower Development Network:
Network for Sustainable Hydropower Development in the Mekong countries (NSHD-Mekong)
www.cdri.org.kh/nshdmekong
www.giz.de/themen/en/30306.htm

Responsible
Dr. Philipp Magiera (philipp.magiera@giz.de)

Editors
Thomas Petermann (thomas.petermann@giz.de)
Klaus Sattler (klaus.sattler@giz.de)

Authors
Alexander Carius
Aaron T. Wolf
Diana Nenz
Oliver Hensengerth
Julie E. Watson
Elsa Semmling
Janine Uhlmannsiek

Design and layout
GIZ

Photo credits
© GIZ/Lucas Wahl

Place and date of publication
Vientiane, January 2014

GIZ is responsible for the content of this publication.

On behalf of the
German Federal Ministry for Economic Cooperation and Development (BMZ)

Network for Sustainable Hydropower Development in the Mekong countries (NSHD-Mekong)