

D. 2.1: Assembled Report on the Case Study Review Workshops



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Twin2Go Coordinating twinning partnerships towards more
Adaptive governance in river basins

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1 Introduction – Summary

Following the development of the methodological framework described in D1.3, Twin2Go hosted five Case Study Review Workshops to apply the framework on the case studies from the participating Twinning Projects BRAHMATWIN, WETwin, CABRI-Volga, ASEM WaterNet, NeWater, TWINLATIN and TwinBas.

Between March and June 2010 over a hundred experts participated in one of the workshops or provided information for 29 case studies from Europe, Latin America, Africa and Asia. A case is considered to be the national part only of the basin in case of transboundary rivers. The five workshops brought together an international mix of scientists and representatives from government, river basin organisations, business, civil society, and non-governmental organisations, as well as Twin2Go team members to discuss water governance and to collect data for eighty-six selected regime, context and performance parameters.

Through this comparative analysis of different water management regimes the project gains new insights into adaptive governance, and can initiate dialogues for mutual learning between these basins and with other water governance professionals. The combination of regions, countries and river basins at each workshop provided a robust first test of the methodological framework and triggered thoughtful comparisons between the water basins reviewed. The list of reviewed basins and workshops is presented in Table 1.

Table 1: List of workshops and Basins

Workshop	Basin/Country	Twinning Project
Berlin, Germany, 05-07.05.2010	Amudarya/Uzbekistan	NeWater
	Elbe/Germany	NeWater
	Guadiana/Spain	NeWater
	Rhine/TheNetherlands	NeWater
	Tisza/Hungary	NeWater
Chiang Mai, Thailand, 25-27.03.2010	BangPakong/Thailand	ASEM WaterNet
	RedRiver/Vietnam	ASEM WaterNet
	Volga/Russia	CABRI <i>Volga</i>
Guwahati, India, 03-04.06.2010	Brahmaputra/Bhutan	BRAHMATWINN
	Brahmaputra/India	BRAHMATWINN
	Brahmaputra/Nepal	BRAHMATWINN
Santiago de Chile, Chile, 27-28.04.2010	Baker/Chile	TwinLatin
	Biobio/Chile	TwinBas
	Catamayo/Ecuador	TwinLatin
	Catamayo/Peru	TwinLatin
	Cauca/Colombia	TwinLatin

	Cocibolca/Nicaragua	TwinLatin
	Cuareim/Uruguay	TwinLatin
	Guayas/Ecuador	WETwin
	Paute/Ecuador	TwinLatin
	Quaraí/Brasil	TwinLatin
Loskopdam, South Africa, 14-15.04.2010	Kyoga/Uganda	WETwin
	Niger/Mali	WETwin
	Okavango/Namibia	TwinBas
	Olifants/SouthAfrica	WETwin
	Orange/SouthAfrica	NeWater
--	Norrström/Sweden	TwinLatin
	Nura/Kazahstan	TwinBas
	Thames/UK	TwinBas

The methodological framework gave participants a solid basis for the comparative work, encouraged rich discussions and provided a layered set of insights that drew on the varied experiences and expertise. The framework's questionnaire was discussed during brainstorming sessions that focused on the indicator scoring as well as the choice of indicators themselves. Part of the challenges in applying the methodological framework was the difficulty in differentiating progress on paper from changed practices on the ground. Additionally, laws and appropriate regulation may exist, but the implementation of those laws is impeded by the lack of control mechanism. Many participants also agreed that involving further experts into a discussion on the questionnaire may give a more nuanced understanding of the scores.

Due to the different backgrounds and work experience of participants, the knowledge exchange included research results as well as concrete best practices. This exchange of lessons from existing every-day practices by stakeholders showed that a diverse set of adaptive water governance options are either considered or already in place in the reviewed river basins. Among the conclusions reached in the workshops was the fact that many river basins analysed received similar scores, even though they find themselves in different socio-economic contexts with varied historical, social, political, economic, religious and ecological backgrounds. Among the main challenges to adaptive governance identified were stiff bureaucratic structures. An existing context of transition in the legal and institutional framework, on the other hand, presents a good opportunity to place adaptive water governance on the agenda; this is currently the case in many Latin American countries, where new national water laws are under discussion.

1.1 Methodological framework

The applied method must be able to cope with the heterogeneity of the cases and correspondingly the heterogeneity of the issues addressed and methods used. This excludes quantitative comparisons based on surveys or meta-analyses. Furthermore the questions addressed in Twin2Go ask for a systemic approach rather than an emphasis on specific

variables. The method that seems to be most robust towards heterogeneity in data and the need to fill knowledge gaps are indicators – checklist and/or score cards.

First the consortium has agreed on three essential elements that need to be addressed to be able to make a comparison of governance regimes. These elements are the structure of the water governance regime, its performance and the context of that performance.

The context in which a water governance regime is embedded has a strong influence in the regime and its performance. Hence similar institutional reforms may lead to quite different outcomes as a consequence of the context. To move away from simplistic panaceas context variables need to be taken into account. Regarding the governance regime the focus is mainly on structural characteristics whereas the performance is emphasising the process dimension – e.g. formal institutions prescribing universal and non-discriminatory access to safe drinking water are part of the regime, whereas the actual extent of equitable and inclusive access is part of the performance.

In a next step, project partners have selected a set of indicators, which present and describe the three domains best possible. Finally a comprehensive scoring system was developed, which allows an easier comparison of the river basins. This methodology was applied to the case studies of the Twin2Go project.

Twin2Go developed a methodological framework, which builds on approaches from the projects involved. A questionnaire and an accompanying guidance document (see Twin2Go D1.3) serve to collect case study data from several EU twinning projects. This is the basis for testing hypotheses about factors that influence the success or failure of water governance.

The questionnaire comprises 86 indicators¹ in three sections: (1) Water Governance Regime, (2) Context and (3) Performance. The section *Water Governance Regime* focuses on specific water governance properties in a case study. It deals with the regulatory framework, actor networks as well as power relationships. Furthermore, it deals with interaction patterns across administrative levels. The *Context* section serves to examine the societal and environmental dimensions in a case study as well as the incorporation of Good Governance Principles in national water legislation. Finally, the *Performance* section measures the impacts of water governance. It deals with progress made towards water-related Millennium Development Goals, the implementation of Good Governance Principles in practice as well as properties of stakeholder participation and the response to climate change.

For most indicators, one value has to be selected from a set of pre-defined scores based on expert judgement. For example, the indicator “Presence of complementary informal institutions for water management” offers the three possible scores “(A) Complementary informal institutions play a dominant role”, “(B) Complementary informal institutions exist, but do not dominate”, and “(C) Complementary informal institutions are unimportant”. The context and performance sections also build on indicators from standardised, international data collections, e.g. “Water Availability (mm/year)”, “Corruption Perception Index”, and “Proportion of total population using an improved drinking water source”.

The questionnaire and the guidance document serve to collect data from various basins during a series of six Case Study Review Workshops, to which case experts are invited. After the workshop series, Twin2Go is going to prepare and perform analyses of the data collected. Comparative analyses will serve to identify, which water governance properties work well and how the context influences performance.

¹ Twelve further indicators were added after the Twin2Go Synthesis Workshop. These indicators primarily served to assess environmental performance.

2 Workshop report: Berlin, 05-07.05.2010

Report by Christian Knieper, Björn Fokken, Kathrin Knüppe (USF)

During the Case Study Review Workshop in Berlin, data about five basins in one region (Europe, Russia & NIS) were collected following the methodology developed by Twin2Go (WP1).

2.1 Selected case studies

The workshop served to collect data about case studies from the NeWater project, which ran from 2005 to 2009 within the 6th EU Framework Programme. NeWater had addressed adaptive water management under uncertainties. Major research topics during the project had been water governance, stakeholder participation, social learning, tools for adaptive management, and ways to handle uncertainties.

In total, NeWater had dealt with seven case studies (see Fig. 1), the Amu Darya, Elbe, Guadiana, Nile, Orange, Rhine and Tisza basins. Five² of these case study basins were addressed during the workshop in Berlin, each with a focus on a national part:

- Amu Darya (Uzbekistan), Elbe (Germany), Guadiana (Spain), Rhine (the Netherlands), Tisza (Hungary)

NeWater's Orange case study was addressed at the Case Study Review Workshop in South Africa, in order to save travel costs for the invited experts.

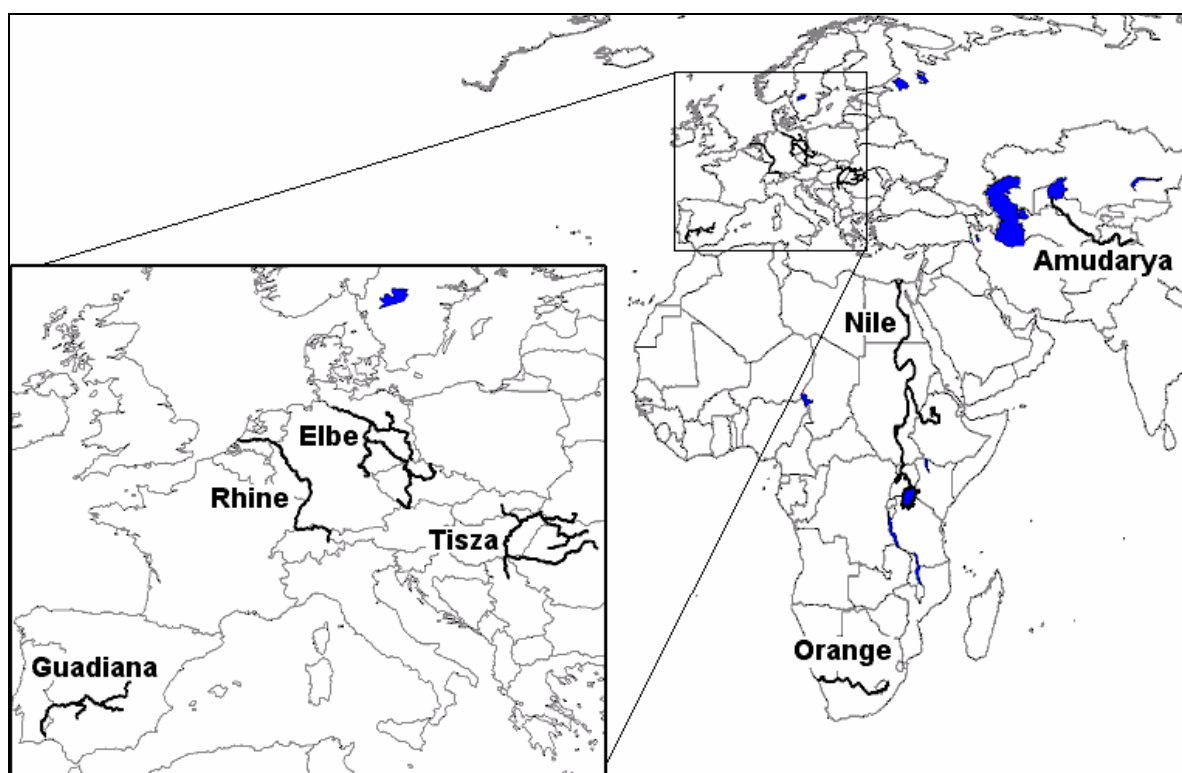


Fig. 1: Case study basins of the NeWater project (source: www.newater.uos.de)

² See the basin fact sheets (<http://www.twin2go.uos.de/downloads/118-basin-fact-sheets>) for a description of the basins.

All case study basins of the NeWater workshop have in common that they have strongly been influenced by human activities. Three basins (Elbe, Guadiana, and Rhine) are located in European countries with advanced economies, where most inhabitants enjoy a relatively high standard of living. Here the European Water Framework Directive (WFD) defines general principles for water management, which must be adopted in the nations' water management policies. The Tisza and Amu Darya rivers are located in post-communist transformation countries, albeit in different geographical areas (Hungary: Central Europe, Uzbekistan: Central Asia). Both Hungary and Uzbekistan had authoritarian governments (Austro-Hungarian Empire, Soviet Union) in the past, which favoured top-down legislation and large-scale technical projects to modify the river landscape. In Hungary, democratisation, market economy and European integration became the new basic conditions after the break-down of communism and started transforming Hungary's society and economy. This influenced Hungarian water management; today, the WFD also applies to this country. Uzbekistan's water management structures are still influenced by former Soviet structures and characterised by a top-down approach.

In all case studies, the river landscapes have strongly been influenced and modified to fulfil human needs, especially with regard to agriculture and transportation. Intensive irrigation takes place in the Amu Darya and Guadiana basins. Droughts represent major environmental problems in these areas as well as for the Elbe. Floodings are serious issues for the Rhine and Tisza, but also for the Elbe. In all case studies, water management is more or less characterised by stiff bureaucracies. In the European cases, public participation has to play an important role in water management, as prescribed by the WFD.

Climate change is expected to affect all case study basins, albeit in different ways. If the average temperatures rise and precipitation patterns change, this will affect flow regimes and ecosystems in the river basins, with consequences for human societies and economies. A comparison of various climate change projections³ reveals that a decrease in precipitation is particularly likely in the Guadiana basin. Melting glaciers are expected to modify the flow regimes of the Rhine and Amu Darya. In general, it is assumed that climate change will lead to a higher number of extreme weather events, e.g. floodings and droughts, to which water management in the case studies has to respond.

2.2 Methodology applied

The objective of the Case Study Review Workshop was to elicit expert knowledge about the five case studies with regard to properties of the water governance regime, context and performance. To achieve this, the workshop organisers sent the questionnaire as well as the accompanying guidance document (see deliverable 1.3) to the invited experts some weeks prior to the workshop and asked them to provide data on the indicators where possible. Hence, lots of case study data were filled in before the workshop.

The workshop started on May 5th at 13.30 with a plenary session. Claudia Pahl-Wostl gave an introduction to the main aims of Twin2Go and the NeWater workshop. The experts briefly presented their case studies and major governance challenges. After all participants had become familiar with each other and the various case studies, they split into small groups to address the case studies. The following two days were spent to complete the case study questionnaires. The groups mainly discussed governance aspects, climate change impacts and the implementation processes of available institutions of the respective case. Plenary sessions complemented the group work and allowed to discuss problems when working on the indicators in the case questionnaires.

³ cf. indicator 67 of the questionnaire from the workshop

The workshop ended with a first comparison between the different cases, which served to check if the indicators were addressed in a consistent way across all cases. A final discussion at noon on May 7th facilitated an outlook on the upcoming assessment of the questionnaire results and how the Twin2Go team was going to build upon these results to analyse governance in the various river basins and to make overall conclusions.

2.3 Summary of presentations and discussion

The workshop opened up with a plenary session including an intro-presentation hold by Prof. Dr. Claudia Pahl-Wostl from USF. This session took almost 2.5 hours and served basically for a comprehensive outlook of the upcoming days and the workshop contents and structures.

The presentation dealt with the following points of interest:

- General goals of Twin2Go; including how to review, assess, synthesise, and consolidate outcomes of Twinning projects
- Brief summary of the work packages and work flow of Twin2Go
- Introduction of all seven twinning projects and the project partners: CABRI-Volga, NeWater, Brahmawinn, ASEM WaterNet, WETwin, TwinBas, Twinlatin
- Current state of research; what has been done so far in Twin2Go and who was responsible for specific tasks
- Conceptual and methodological background of the questionnaire; including the context, regime and performance
- Explanation of the 'diagnostic approach' as a context sensitive solution for all case studies and to improve the performance of water governance and management
- Goals and contents of this Case Study Review Workshop
- Outlook of the assessment of the questionnaire results

The workshop participants had also the possibility to ask major questions and to address ambiguities regarding the questionnaire and the methodological background. There was a need for clarification regarding the following questions and matters of fact:

- Validation process. Who is responsible for the evaluation and what is going to happen with the questionnaire results?

In the case of the NeWater case study workshop the results will be evaluated by the USF team. A further workshop is scheduled during September in Stockholm for the assessment of the questionnaires of all river basins examined in the Twin2Go Project.

- Is it possible to derive policy recommendations?

Yes it is possible and it is one general goal of the project to accelerate the pace at which water management practices and water policy move towards integrated approaches.

- Publication issues. What kind of scientific outcome (regarding general outcomes of the Twin2Go project) can be expected?

The results of the project and intermediate results are planned to publish in scientific journals. Another possibility is to publish a book including all Twin2Go objectives, approaches, results, and policy recommendations.

After the introduction the case study experts started to work on the questionnaire.

2.4 Amu Darya: Description of work done, achievements (problems encountered, recommendations)

Maja Schlüter, Darya Hirsch and Nicole Kranz were invited to the workshop as experts for the Amu Darya basin. Maja Schlüter and Darya Hirsch had been involved in the Amu Darya case study of the NeWater project and are well familiar with governance structures in the basin, especially with regard to the Uzbek part. Maja Schlüter was the leader of the NeWater case study. She is currently employed at the Leibnitz-Institute of Freshwater Ecology and Inland Fisheries. Darya Hirsch works at the United Nations University. Nicole Kranz was involved in NeWater, too. She is an expert in governance issues, especially with regard to the role of private actors in environmental and health policy in developing and transition countries. She is employed at the Ecologic Institute and at the Freie Universität Berlin.

The experts received the questionnaire and the guidance document some weeks prior to the workshop, so that they had time to prepare. Unfortunately, Darya Hirsch had to cancel her participation at short notice. Claudia Pahl-Wostl supported Maja Schlüter and Kathrin Kranz in filling the questionnaire, since she had conducted research in the Uzbek Amu Darya basin during NeWater. Difficulties concerning single indicators were discussed in the plenum and are documented in the questionnaire. After the workshop, Maja Schlüter asked Darya Hirsch and Elke Herrfahrdt-Pähle from the German Development Institute to post-process the Amu Darya questionnaire, in order to include further expert knowledge.

2.5 Elbe: Description of work done, achievements (problems encountered, recommendations)

For the workshop, we invited Ilke Borowski, Valentina Krysanova and Cornelius Laaser. All participants worked for the NeWater Project and were or are currently involved in several projects related to climate change funded by the EC Framework Programme 7.

Ilke Borowski works for Seeconsult (Society-Economy-Ecology-Consulting) GmbH. Seeconsult GmbH is an internationally active consulting company operating in the working area of participative planning for the environment. Valentina Krysanova works at the Potsdam Institute for Climate Impact Research (PIK). Her research interests are ecohydrological modelling at the river basin scale, climate impact assessment, land use change impact assessment and adaptation to climate change in water management. Cornelius Laaser, also a member of PIK, focuses on sustainable water resource management and especially on all aspects of the European Water Framework Directive. His interests also cover the topics climate change, land use change, nature conservation and sustainable soil management.

A few weeks before the workshop started we sent out the questionnaire. So the experts had enough time to prepare themselves by studying the questionnaire intensively. They pre-filled a lot of answers and marked ambiguities and misunderstandings related to nearly a dozen of questions. During the group discussions it was possible solve the problems they had with single questions.

As the participants were well prepared, the Elbe questionnaire was completely answered in the scheduled time and there was enough time to discuss the `critical` questions intensively. The delivered expert knowledge provided high qualitative information.

The questions 3, 4, 10, 11, 12, 25, 41, 50, 52, 62, 66, 67, 74, 76, 81 were the most discussed ones. Most times the experts addressed misunderstandings on basis of formulation and

recommended formulations, which make the questions more unambiguous. All these recommendations are documented in the Elbe questionnaire.

Sometimes the scoring schemes were responsible for the controversies. Nonetheless, nearly every question could be answered after profound discussions. But the experts could not give clear answers despite deep discussions to the questions 62, 76 and 81. This had different reasons, e.g. inappropriate scoring or no access to required information. All suggestions are documented in the Elbe questionnaire.

2.6 Guadiana: Description of work done, achievements (problems encountered, recommendations)

We invited Pedro Zorrilla Miras and Pedro Martínez Santos as case study experts for the Guadiana Basin. Both participants work at the *Department of Geodynamics*, Complutense University of Madrid and have several years of work experience in the Guadiana Basin. Both experts did their PhD research in the Guadiana Basin and are familiar with the ecological as well as the socio-economic challenges.

The experts prepared themselves by studying the questionnaire intensively. Some questions were answered before the actual workshop started, and they noted ambiguities and misunderstandings regarding certain questions. Most of them could be answered during the plenary session at the beginning of the workshop.

The Guadiana questionnaire was completed by the end of the workshop, and the experts provided useful and high qualitative information. Nonetheless, some questions concerning economical tools were difficult to answer due to the specific situation in the Guadiana basin (question 13-16). The high number of illegal wells and associated uncertainties regarding the pumping rates make it difficult to provide statements or measure results about the efficiency of economic instruments. Question number 21 – the only one - was left out, since the experts were not able to answer this question.

Further the experts outlined additional specific case-study indicators:

- Instruments for groundwater-surface water conjunctive use
- Degree of transparency of the linkages between water use (quantity) and economic activities (value); this indicator is able to describe the benefit of individual farmers as well as of the socio-economic sector of the Guadiana Basin
- Degree of implementation; to which extent are formal and informal institutions applied/implemented on the ground?

The general focus of this case study was given to the Upper Guadiana Basin, since the experts' experience are related to this specific area. Most research issues during the NeWater project were also done in this area (see the fact sheet of the Upper Guadiana Basin on the project website <http://www.twin2go.uos.de/downloads/118-basin-fact-sheets>).

After the workshop, another expert [who wanted the name not to be published] was involved in the post-processing of the Guadiana questionnaire. She is the director of the UN-Water Decade Programme on Advocacy and Communication.

2.7 Rhine: Description of work done, achievements (problems encountered, recommendations)

We invited Maarten Hofstra and Saskia Werners as Rhine experts to the workshop. Maarten Hofstra works at Rijkswaterstaat, which is part of the Dutch Ministry of Transport, Public Works and Water Management. He has special expertise in water policy and water governance. Saskia Werners was involved in the NeWater Project. Her main research interest is adaptation to climate change in water management. Saskia Werners is based at the Centre for Water and Climate of Wageningen University and Research Centre in the Netherlands.

A few weeks before the workshop started we sent out the questionnaire. So the experts had enough time to prepare themselves by studying the questionnaire intensively. They pre-filled a lot of answers and marked ambiguities and misunderstandings related to several indicators. During the group discussions they could solve the problems they had with single questions.

As the participants were well prepared, the Rhine questionnaire was completely answered in the scheduled time and there was enough time to discuss the `critical` questions intensively. The delivered expert knowledge provided high qualitative information. Difficulties concerning single indicators as well as general comments and suggestions are documented in the Rhine questionnaire.

2.8 Tisza: Description of work done, achievements (problems encountered, recommendations)

The focus of the Tisza case study was on the Hungarian part of the river catchment. Jan Sendzimir and János Fehér were invited as experts for the Tisza. Jan Sendzimir works as a researcher at the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria. He had performed field studies during the NeWater project with regard to informal learning processes in the Hungarian Tisza, which aimed for more adaptive water management practices. János Fehér works at the Environmental Protection and Water Management Institute (VITUKI) in Budapest. He has several decades of experiences in working on the Hungarian Tisza. Within the scope of the workshop preparation, János Fehér discussed water governance issues with colleagues from VITUKI (e.g. Judit Gáspár), so that scores for most indicators in the Tisza questionnaire could be determined prior to the Case Study Review Workshop.

The workshop served to discuss the scores chosen for the Tisza and to determine the missing scores. This happened in group work. Difficulties concerning indicators were discussed in the plenum. The most controversial indicator was no. 8, "*National basin organisation or comparable arrangement*". No formal basin organisation exists that is responsible for the total Hungarian part of the Tisza catchment. Instead, several sub-basin organisations care for water management and are relatively independent on management issues. This issue as well as further remarks and suggestions concerning several indicators are documented in the Tisza questionnaire.

Despite good progress during the workshop, final scores could not be determined for indicators 18, 19, 79 and 80. These indicators were post-processed after the workshop. For this, Mr. Fehér consulted

- the water management sector of the newly organised Ministry of Rural Development (to which the previous Environmental and Water Ministry had been integrated),
- the Agricultural and Food Sciences Centre of the University of Debrecen, and
- the Trans-Tisza Region Environmental, Nature Protection and Water Inspectorate.

Due to the post-processing, data collection could be finalised for all indicators.

The case study data suggest that many aspects of Adaptive and Integrated Water Management have been adopted for the Hungarian part of the Tisza catchment. General challenges related to the context are the medium effectiveness of formal institutions as well as strong modifications in the river. Hungary is advanced with regard to the water-related Millennium Development Goals and Good Governance Principles. Climate change adaptation is an important issue in Hungarian water management, even if some difficulties exist when it comes to implementation.

2.9 Results from the questionnaire application for the case studies

The questionnaire results for the Amu Darya, Elbe, Guadiana, Rhine and Tisza case studies have been uploaded to the <http://www.twin2go.uos.de/downloads/35-basin-questionnaires>. Please refer to these documents for case-specific scores and comments.

2.10 Discussion and/or comments on the results of the questionnaire application

After data collection, the Twin2Go members and case study experts made a first comparison of the basins' scores. One goal of this comparison was to detect indicators where scores had been selected based on different criteria by the case study groups. In this way, some scores were adjusted to achieve a more consistent set of basin scores. The second goal was to make a first, general assessment of the case studies. The comparison mainly dealt with the water governance regime and its performance. The context was considered only to a limited extent, mainly with regard to the inclusion of the good governance principles in national legislation. For most basins, the score "A" dominates, which indicates good values for properties of the water governance regime and its performance. Especially in the Rhine, Tisza and Elbe cases score "A" is very dominant, followed by score "B". In the Guadiana, score "A" is not as strongly dominant as in the former cases. The Amu Darya case shows a different assessment result. Here score "C" dominates, followed by score "B".

A more detailed analysis is required within the scope of the Twin2Go synthesis.

2.11 General conclusions and recommendations

The Case Study Review Workshop for the NeWater turned out to be a productive event. The participating experts were very committed and provided a lot of data about the governance regimes, contexts and regime performances in their case study basins. It was useful to distribute the Twin2Go questionnaire to the experts some weeks prior to the workshop. In this way, they could become familiar with the topics of interest and fill in case study data. As a consequence, many parts of the case questionnaires were already filled at the workshop beginning, and data collection could focus on those indicators, where difficulties or different judgements existed.

The workshop duration of 2.5 days was sufficient. Actually, less time was needed due to the good progress during the workshop. The working atmosphere was excellent. The reason may be the high commitment of the experts as well as the fact that most workshop participants were familiar with each other due to their collaboration in the NeWater project. Even though the collaboration with the case study experts was very productive, it might have been beneficial to invite not only researchers, but also to involve governmental representatives or non-state stakeholders. In combination with a higher number of participants per case, this would have

allowed to consider more diverse perspectives when filling the case questionnaires. Data collection in small case groups played a major role during the workshop. In addition, several plenary sessions took place to introduce the participants to the workshop, to enable feedback on the work done so far and to provide an outlook to further steps in Twin2Go. This allocation of working time to group work and complementary plenary sessions facilitated productive data collection.

The experts made several suggestions concerning how indicators in the questionnaire could be improved. These suggestions can be realised if feedback from the other Case Study Workshops supports these ideas.

3 Workshop report: Chiang Mai, 25-27.03.2010

Report by Louis Lebel (USER), Elena Nikitina (EcoPolicy), Nina Poussenkova (IMEMO), Bach Tan Sinh (NISTPASS), Sukontha Aekaraj (DWR, MNRE, Thailand)

This report documents a workshop held in Chiang Mai on the 25-27 March 2010 to analyse 3 basin case studies for the Twin2Go project. At the Chiang Mai workshop three river basins from two international projects were studied: the Volga from the CABRI project; Red River and Bang Pakong basins from the ASEM WaterNet project.

3.1 Selected case studies

The workshop made assessments of three basins from two projects. The workshop was held as collaborative event between the CABRI and ASEMWaterNet projects so as to build on existing collaborations with respect to stakeholder engagement and adaptive water governance in basin management.

Volga (CABRI Project)

The Volga is the largest river system in Europe with some 2,600 tributaries (Fig. 2). Covering 13 percent of the territory of Europe, its basin is 1,358 million sq. km in size and the river flows for 3,530 km to the Caspian Sea. The basin includes a huge delta whose wetlands are considered to be the best conserved in Europe. About 40 percent of Russia's population resides in the Volga basin. Thirty nine Russian Federation subjects are entirely or partly located in the basin. The Volga basin, while accounting only for 8 percent of Russia's territory, contributes nearly 45 percent of the country's industry and 50 percent of its agriculture. Through its water-ways and canal systems, the Volga Route connects five European seas and regions. Over the past fifteen years annual polluted water discharges into the Volga basin declined by 34% (down to 7.3 billion cubic m in 2005). However, there is a number of areas within the Volga basin where the environment is still seriously stressed. Overall, while not ideal, the water quality (according to chemical and biological parameters) in the Volga is better than that of the Rhine and the Elbe. Within the Volga basin, the problem of drinking water is high on the environmental agenda. Among major challenges for ensuring access to high quality water are the problems relating to modern technical facilities, inefficient purification and disinfection systems, deficiencies in municipal infrastructure for drinking water supply, poorly treated sewage, ineffective urban waste water management and leakages from water distribution networks. As a result, only 15 percent of treated waste waters meet very stringent national standards. Almost none of the major cities in the Volga basin are supplied with drinking water that complies with the existing national and WHO quality standards.

Among other water-related concerns in the Volga is inefficient water use: the level of water per capita consumption in the basin is about 1.2-1.7 times higher than that in the West. Water losses in distribution networks in the regions of the Volga basin account annually for about 25% of the drinking water consumption. The major causes of this are inadequate economic mechanisms and incentives provided to households, businesses and agriculture to consume water efficiently and/or to save water.

Other water-related challenges in the Volga basin include the conservation of biodiversity and habitats. About 23 species of the Caspian Sea fish (including sturgeon) spawn in the Volga River. The biodiversity of the Volga Delta is of global importance, since it has intact ecosystems, relict plant species and about twenty endemic fish sub-species.

The Volga carries 80 percent of the fresh water inflow to the Caspian Sea with the usual nutrients and polluting substances. The Delta along with the part of the Lower Volga is the only segment of the Volga where the river flow is not regulated by the Volga cascade. It depends on the upper parts of the river for the level of water supply: the highly regulated level of water flow is usually lower than required for the normal functioning of water eco-systems. The Volga Delta is very valuable because it serves as a natural purification filter where upstream polluted waters undergo physical, chemical and biological purification flowing through its natural ecosystems.

Although the Volga River is highly regulated by the cascade of eleven dams and artificial reservoirs, the basin is regarded as a flood prone area. About 4.7 million basin residents are vulnerable to floods. Floods damage agricultural crops and disrupt infrastructure and economic activities. In the Volga basin the approximate pattern of floods during the last century is as follows: 4 catastrophic floods, 10 medium floods, 9 thousands small floods. Floods risk ranks high on the basin natural disaster reduction agenda. Today, policies and measures in this area are quite well institutionalised in Russia, and flood risk reduction efforts are more advanced than environmental protection ones. Due to high regulation of the river flow among the major problems during the freshet and seasonal flood period is the coordination of hydrological regimes through the entire basin, as well as control over the regularly occurring freshet floods on its tributes and small rivers. Water shortages and droughts in the arid regions of the Volga lower flow are among serious risks.

The construction of the Volga's artificial reservoirs has resulted in serious social tension due to the resettlement of households and the loss of precious cultural sites that have been flooded by the Volga's "artificial seas." Another problem is that most of hydro-technical facilities in the Volga basin had been constructed over five decades ago. As a result of recent under-investment in the maintenance of major infrastructure, many of them had aged, and their safety is flagged as a major security concern. Recently, a number of government programmes for hydro-technical facilities rehabilitation had been put forward, and additional investment into their modernisation are being secured.

Currently, in the Volga basin, like in many other Russian regions, the social and demographic risks, and hence, the societal vulnerabilities, are quite high. Significant portion of the Volga basin's population live in poverty. About 43 percent has income lower than the minimum subsistence level, and about one third is unemployed, or is unofficially employed. Among the most alarming signs of human insecurity is the declining population, which has been the case since the early 1990s. Mortality rates are higher than the birth rates, while life expectancy (66 years) has also declined during the 1990-2000s. Also, environmental awareness and responsibility in the society are at a low level due to recent marginalisation of the population in the Volga regions and due to the still valid Soviet heritage of suppressed democracy. However, problem solving in this field is associated among other things with rapid formation of a middle class which is expected to contribute to enhancing the ecological awareness and action.

Industrial and agricultural potential of the Volga Basin accounts for almost half of the national total. Natural resources (oil, gas, forests), power generation, manufacturing and agriculture contribute to the basin's high economic potential. The importance of the Lower Volga is also increasing due to recent developments in oil and gas sector, including the offshore production in the Caspian Sea and in the coastal areas near the Volga delta. The rapid growth of modern corporations, especially in the energy sector is among the major drivers of innovation and sustainable development in the basin. Consequently, there is an increasing diversity of actors with a variety of interests towards the sustainable development agenda.

The Volga is the part of diversified European waterways which connects the Volga, Don and Neva and their basins, besides five seas in the north, south and west of the European Russia. The cascade of artificial reservoirs and eleven hydropower stations on the Volga is one of the

largest flatland hydropower cascades in the world. This system regulates water levels so as to enable navigation (Volga is navigable for about half a year; it is navigable for 2.6 thousand km.). During the 1990s, the role of river transport declined. Today inland water transport in the basin is poorly integrated into the Russian and the European transport system.

Important correlations are identified between the main trends in socio-economic situation in the Volga and its environmental impacts. During the nineties significant decline in water pollution was registered largely attributable to economic crisis. The main reason has been the reduction in industrial and agricultural production. During this period a comparatively modest share in the reduction of wastewater discharges has been achieved through installation of new purification facilities and technological innovation. However, the latter's potential in the basin is enormous. According to official statistics, during the 2000s installation of water purification facilities has almost doubled in Russia, from 231 thousand cubic m per day in 2000 to 489 thousand in 2006.

Four major climatic belts are distinguished within the Volga basin. The entire region is located within the seasonal soil frosting zone. Climate change in the Volga basin is registered during the last century, and it will proceed further. The mean temperatures for summer and winter periods might increase by 1-3 degrees C during the next century. Warming is accompanied by increase in annual precipitation: some estimates suggest that climate change in the region might result in growth of annual precipitation up to 3-6% during 2011-2030 period, and during 2041-2060 mainly winter precipitation might increase – up to 11%, with its possible stabilisation or decline in summer periods. The northward spread of flora and fauna boundaries is predicted. Climate change will result in changes in hydrological regime and increase in water flow in the Volga basin: from 4-7% in 2011-2030 and up to 11-16% increase in 2080-2099. The frequency of droughts might increase in the mid- and low Volga regions against its 36-40% registered during the 20th century. Although Volga flow is highly regulated by artificial dams and reservoirs the number and magnitude of floods, particularly during spring period, will increase.

The analysis of the Volga basin during the Chiang-Mai workshop was largely based on the findings and achievements of the “CABRI – Cooperation Along a Big River: Institutional coordination among stakeholders for environmental risk management in the Volga basin” international project of the EC, FP6. CABRI was aimed at expanding cooperation, sharing lessons between river basins in Europe, expanding stakeholder networks, coordinating research and consolidating links between science and practice in environmental risk management in large river basins in the EU, Russia and the New Independent States (NIS). Generally assessed as a success story of the European international research, CABRI was based on a partnership of seventeen organisations from Russia and from seven EU countries, including universities, private research institutes, industry, NGOs and international organisations dealing with a variety of aspects in environmental risk management.



Fig. 2: The Volga basin

Red River (ASEM WaterNet)

ASEM WaterNet is the acronym of the project “Multi-stakeholder platform for ASEM S&T cooperation on sustainable water use” (see: www.asemwaternet.org). ASEM WaterNet was funded under the EU Sixth Framework Programme. The overall goal of the project was to promote science and technology cooperation between Europe and Asia in various areas related to river basin and water management. Work package 5 of this project “explored and promoted best practices in water governance with emphasis on the human and institutional dimensions and participatory approaches”. The scorecard developed by this work package was an important input into the design of the Twin2Go comparative methodology. Valuable experiences in this project with work in the Red River basin in Vietnam and Bang Pakong basin in Thailand led to their inclusion in the Twin2Go project as case study basins.

The Red River is the second largest river in Vietnam. It is an international river originating in China, and traversing much of northern Vietnam before emptying into the East Sea. Administratively, the Red River basin covers, or overlaps with, 26 provinces, and its population totals 28 million (in 2002), including Hanoi city (Fig. 3: The Red River sub-basins in Vietnam). It supports a large irrigated area (650,000 ha, mostly in the delta) and is subject to recurrent flood

problems. The Red River Delta (RRD) Region consists of 11 provinces and covers 17% of the basin in Vietnam. The upper basin covers about 70% of the Northern Highlands (NH) Region including 8 complete provinces and parts of 7 more.



Fig. 3: The Red River sub-basins in Vietnam

The first Committee for Red River Water Control and Development was established in 1961 and its permanent office later became the Institute for Water Resources Planning and Management (IWRPM) and, then, the current IWRAP of MARD (Nghia 2004). In April 2001 MARD created the Red–Thai Binh River Basin Planning Management Board (more simply Red River basin Organization, or RRBO) through Decision No. 38/2001 (Fig. 4).

During the 2001-2003 period RRBO conducted conventional activities including data collection and management, field investigations on the exploitation of floodplains between Nam Dinh and Ninh Binh, assisting the state regarding the construction of large scale hydropower works in Son La and Tuyen Quang, examining the Red River flood corridor and the embankment of the Red River in Ha Noi, assessing the scope for water supply schemes and hydropower projects, commenting on the strategic plan of national aquaculture development and extension (Nghia 2004). The lack of funding, office facilities, and operational guidelines for the RRBO, were held as the main constraints to proper data management and communication, and to field investigations of the current exploitation of the basin (Molle & Hoanh 2008).

The operation regulation of the RRBO was specified by a ministerial decision in April 2004. The RRBOs' role is to serve as technical coordinating and advisory bodies to MARD, "assessing planning alternatives, basic investigation projects, inventory and assessment of water resources in the river basin; [and] submitting to MARD and authorised state agencies follow-up recommendations and proposals". Other missions include data exchange and management, coordination with other ministries and agencies, capacity building and awareness-raising (Nghia 2004; Molle & Hoanh 2008).

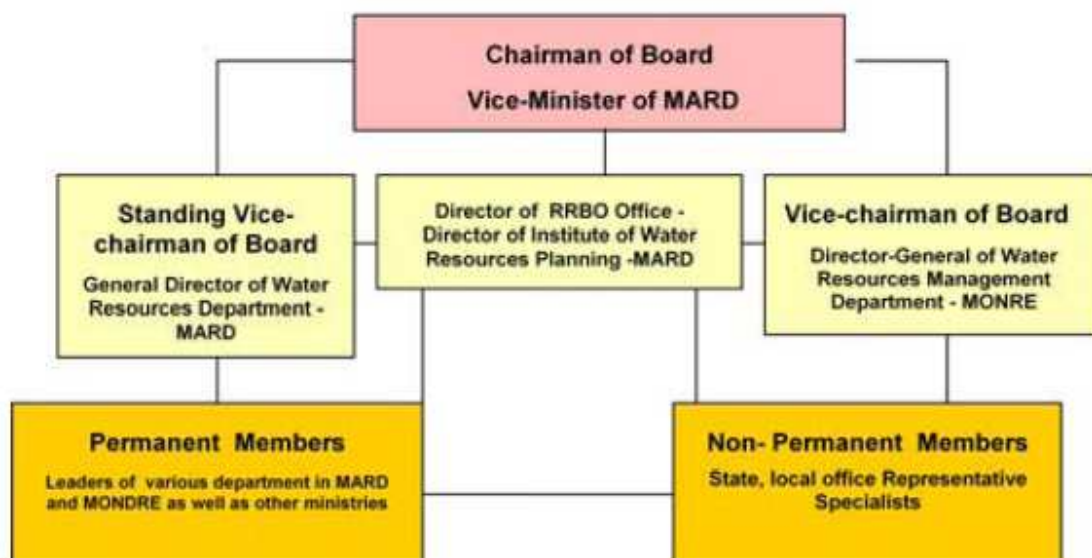


Fig. 4: Structure of the Red River Basin Organisation

Bang Pakong (ASEMWaterNet)

The Bang Pakong-Prachin Buri and Upper Tonelesap River Basins are located in eastern Thailand (Fig. 5). The Basins cover territory in 4 provinces: Nakhon Nayok, Chachoengsao, Prachin Buri and Sakaeo. The northern part of the first basin is in the mountain range that divides Nakhon Nayok and Prachin Buri provinces from Nakhon Ratchasima province and flows into the Gulf of Thailand. The second, Upper Tonelesap, basin drains across the border into Cambodia and eventually exits to the sea in the Mekong Delta. The two basins are treated as a water management region in several initiatives, but for some analyses, such as water balances and allocation modelling, separately.

The Bang Pakong, Prachin Buri and Upper Tonlesap River Basin have drainage areas of 6,422 km², 9,592 km², and 2,656 km², respectively. The Bang Pakong river basin consists of three sub-basins: Nakhon Nayok, Thalot and Main Bang Pakong Basins while the Prachinburi River Basin is comprised of four sub-basins: Khlong Phra Sathung, Khlong Phra Prong, Mae Nam Hanuman, and Main Prachinburi sub-basin.

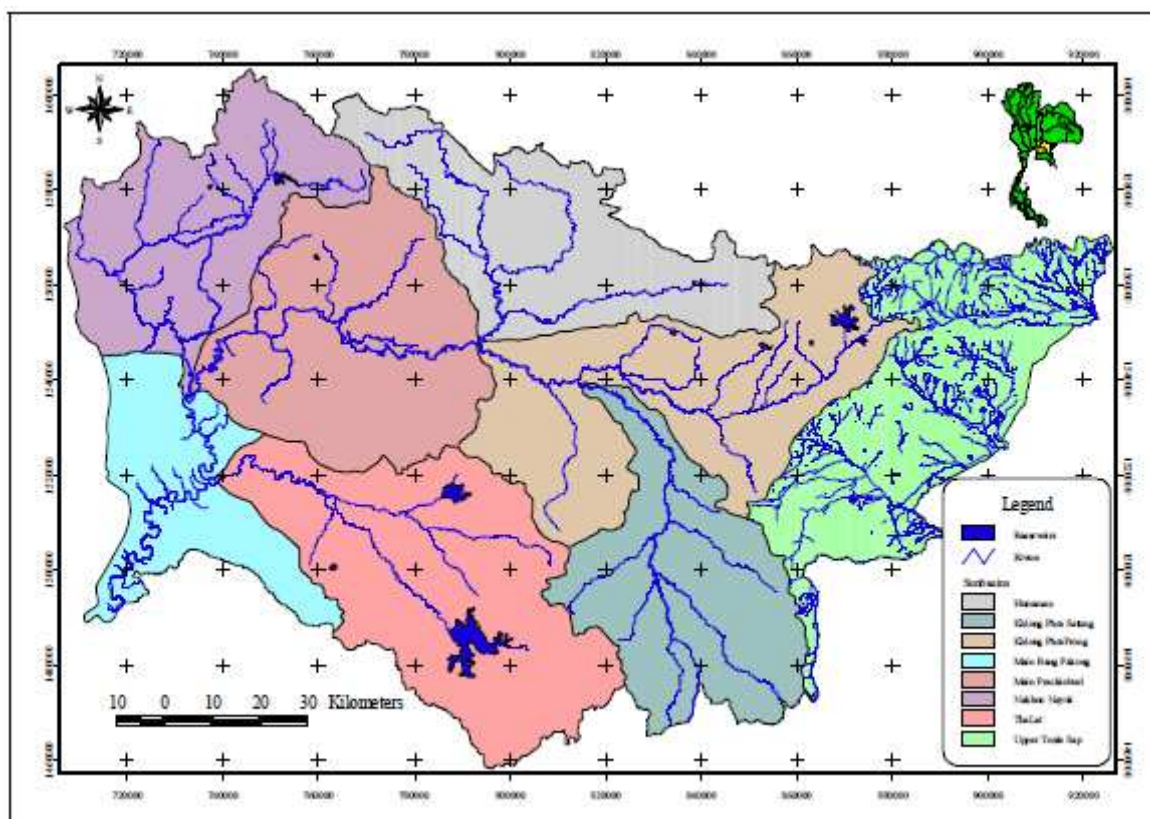


Fig. 5: Bang Pakong and neighboring river basins in Thailand

The basin has a population of just over 2 million inhabitants. The majority of the population live in peri-urban settings. Important uses of water include agriculture, industry, and for ecosystem conservation. The main crops grown in the area are rice, cassava, sugar cane, pineapple and corn.

The Bang Pakong River Basin Committee (BPRBC) was established in 2001 and membership revised in 2003. During 2001-2003, it was the only RBC from 29 across the country that had a representative of the private sector as its chairman. Although membership is very diverse, with representation of government, business, civil society and local communities, dialogue activities have led to better appreciation of water management issues among stakeholders. The Committee works to ensure that issues discussed are informed by observational data from the government agencies, research and local experiences in the river basin.

Previous projects like the Bang Pakong Dialogue Initiative have established trust and learning processes. Stakeholders increasingly share data and information and are cooperating to establish a system for water allocation in the river basin. Coordination of stakeholders can be supported by exchanging data, scientific knowledge and local wisdom.

3.2 Methodology applied

Copies of a draft version of the questionnaire were circulated to participants prior to the workshop to help with initial preparations including selection of most suitable representatives to attend the Chiang Mai workshop. The final version of the questionnaire and guide became available shortly

prior to the workshop and was also circulated to basin-level teams and the version used in the workshop. Not all members of basin-level teams were able to participate in the review workshop in Chiang Mai.

For this reason small working group meetings were held before and after the main workshop to allow other key stakeholders who could not attend the main event to contribute, in Hanoi (Red River), Bangkok (Bang Pakong) and Moscow (Volga) – See section 8.2 for details of participants. These supporting events focused mostly on those parts of the questionnaire requiring expert judgment.

The main Twin2Go workshop was held over three days (25-27 March). The governance regimes of three river basins in Asia and in Europe (Volga, Red River, Bang Pakong) were assessed using the framework developed by the Twin2Go project (see deliverable 1.3).

The team carrying out the analyses in each basin were multidisciplinary and represented both science and practice. All participants from Russia and from EU are partners in the CABRI-Volga project. This included representatives from civil society and business.

The participants who participated in the Red River working group in the Chiang Mai workshop included several individuals who were not involved in the original ASEM WaterNet activities in the Red River but had important water management or river basin policy in Vietnam and thus able to contribute to governance analysis.

The participants who participated in the Bang Pakong working group in the Chiang Mai workshop were largely from the Department of Water Resources, the agency responsible for implementing IWRM and basin management approaches in Thailand. Several members of the local committee were unable to attend the main event because of conflicts in schedules and instead were engaged in follow-up meetings in that basin.

Prior to the Chiang-Mai workshop, copies of a draft version of the questionnaire were circulated to participants to help with initial preparations, surveys of essential background information and also for selection of most suitable experts to attend the Chiang Mai workshop. The final version of the questionnaire and guide became available to basin-level teams shortly prior to the workshop. Team members had some time to study the questionnaire and find materials and data on certain specific issues discussed in the questionnaire, e.g. texts of relevant laws and by-laws, programmes, action plans and reports. Preparatory informal meeting was held in Moscow on March 15 in IMEMO, Russian Academy of Sciences, prior to the Chiang Mai workshop. It was attended by Chiang Mai participants and by experts who were not able to take part in the Chiang Mai workshop, and members of the Russian team have communicated extensively with their colleagues via e-mail to discuss various aspects of the Volga issues. Experts who could not attend the workshop in Chiang Mai shared their ideas on the problem and provided valuable information (numerical data, maps, tables, proposals on scoring) to the workshop participants.

3.3 Summary of presentations and discussion

The Twin2Go workshop was held as a joint event with the REWIND project studying similar water governance issues in some of the same river basins in Asia. REWIND is funded by the Asia-Pacific Network for Global Environmental Change.

The first day was dedicated to presentation and discussion of a wider set of basin-level case studies of stakeholder participation and the governance of water-related insecurities (droughts and floods). Several basins beyond those analysed in detail for Twin2Go were discussed including the Amur, Ob in Russia, Upper Ping and major rivers draining the Eastern Himalayas

like the Brahmaputra-Ganges and Mekong. These presentations and analysis provided useful background to issues dealt with in completing the questionnaires later in the workshop.

The first half of the second day began with two policy roundtables and was attended by full complement of participants. Two facilitated policy roundtables were used to share understanding of key concepts and diversity of basin experiences prior to the more systematic and formal completion of the questionnaires in basin working group. The first focused on identifying opportunities for improving the quality of stakeholder participation in river basin management through exchange of good practices and success stories. The second extended the analysis in the first roundtable to focus on those elements crucial to adaptive management and policy in river basin management. In both roundtables the potential for transfer and modification of experiences across basins was explored.

The second half of day 2 and all of day 3 were dedicated to the analysis of the governance regimes of three river basins in Asia and in Europe (Volga, Red, Bang Pakong) using the assessment framework developed by the Twin2Go project. Most of this time was spent in river basin working groups working with a lot of discussion in the dominant languages of each basin: Russian, Vietnamese and Thai.

A final plenary session reported back on problems and suggested improvements and additions to the questionnaire. There was also some discussion about the use of the findings from individual basins with suggestions on how variables might be scored, aggregated and related to each other. There was agreement to carry out a more detailed analysis of the “comments” for at least the three basins discussed at the workshop. It was also agreed that the initial results of the global comparisons should be presented and discussed as inputs and background to the next Regional Best Practices Workshop planned for late in 2010 or early 2011. Further details of interpretations, comparisons and recommendations are given in the following section.

3.4 General Comments: Method and Problems Encountered

The Chiang Mai workshop was quite a success in terms of practical arrangements. The combination of several projects/river basins from different regions and countries in one workshop is a useful approach since it allows for broader overview, comparisons, interactions between experts, and exchange of experiences worldwide. The Chiang Mai workshop shows that it is essential to invite representatives of various stakeholder groups - not only scholars, but also members of business community, government authorities, international bodies and NGOs. Such combination provides a significant synergetic effect. Two ice-breaker Policy Round Tables organised prior to the expert brain-storming was a good experience for launching the workshop as it allowed invited experts and practitioners to exchange views, opinions, and to get to know each other better.

The size of each of the three river basin expert groups was optimal 5-7. It was a very sensible approach to mix national participants and international experts (who had a prior experience in the given basin) in each expert group, because it permitted sharing of “internal” and “external” views on the issues and analysing domestic problems against the background of broader international trends.

Sufficient time was provided for the scoring exercise to do the scoring itself, to fill in comments, to have a final round of discussions to verify results. Certain homework to be done by experts is essential. Many of them brought reference materials for their work on the Questionnaire, which was very useful.

It was very important for the success of the workshop that the organisers made some clear-cut introductory remarks about the a) ‘theme’ of the workshop, b) goals and c) scoring method.

Since the workshop proved a success, the issues discussed were highly relevant, and some original and innovative ideas were generated, it might make sense to organise dissemination of the results among a broader audience, including through their publications in scientific journals and in professional mass media.

However, despite the obvious success of the workshop, while preparing for the event and during the discussions in working groups, experts have identified certain technical and conceptual problems connected with the Questionnaire:

- In the Questionnaire there is the lack of clear formulation of indicators/questions relating to water governance regimes. Despite existence of 2 sections ‘Design’ and ‘Performance’ there are gaps in indicators to evaluate the existing design, e.g. rules and schemes on paper and actual practices. Indicators as formulated do not provide for the clear picture. As a result scoring depends on whether experts consider the “existence” of a rule or the level of its “implementation” to be of paramount importance. For example, this problem was particularly serious in the Russian case study. Subsequently, such questions should either be paraphrased, e.g. “Does the law on water use exist” - in this case the score would be “A”. “Is this law effectively implemented?” – in this case the score would be “C” or even “D”. Or the availability of laws and regulations should be simply identified (experts should answer “Yes” or “No”).
- Consequently, the section “Performance” should be improved, expanded and strengthened in order to reflect evaluation of possible gaps in regime design and its performance in practice. So far, it looks quite inconsistent and contains a lot of loopholes. It needs amendments and improvements in the course of Twin2Go.
- The “Performance’ section is fragmented, it does not provide a comprehensive picture evaluating water governance regime performance. It covers only goals towards providing safe drinking water and access to sanitation. Other important goals related to sustainable water use/conservation in economic sectors are not covered at all. It is a big gap in methodology. For example, neither the goal of ‘floods risk reduction’, or water shortages is covered. However, they are among priority stated targets in many basins and countries.
- “Good governance principles’ in “Performance” section overlap with “Context” section.
- “Stakeholder participation” is poorly evaluated. This issue should be developed further. For example, it should reflect how the behaviour of different stakeholders changes (*or not*) under the regime impact. Assessing the stakeholder efforts in response to the existing regime is among the most important sub-sections for evaluation of regime performance.
- Lack of attention to water ownership (rights) in questionnaire. The questions on this very important topic are not well thought out and do not investigate the topic comprehensively enough. However, this section requires professional legal expertise to develop.
- Some questions in the Questionnaire are not clearly formulated (e.g. third party access; presence of competing informal institutions, etc). Thus, as a result, experts in all groups spent a lot of extra time trying to guess what questions as formulated in the questionnaire really mean (even taking into account explanations given in the Guide).
- Certain questions (e.g. concerning permit trading system) seem to be relevant only for a limited number of countries where such practices are implemented.

- In addition to questions demanding expert assessment, the Questionnaire contains certain purely informative quantitative questions for which no expert judgement is required (answers in the form of numerical data to be extracted from referenced publications is simply found through Internet). Moreover, a certain proportion of such questions have social/economic focus, while the other part is related to natural sciences. It does not make sense to waste valuable time of experts making them search for this hard data in Internet (particularly if this data is outside of their field of expertise). Answers to such questions could be found in Internet by students working on the programme or technical staff. It might make more sense to add qualitative questions describing the real situation in the given country (e.g. level of NGOs activity and influence, attitude of population towards environment protection and climate change; quality and quantity of available information on water issues, level of businesses' environmental awareness and responsibility, etc.) In such cases, expert assessment will be required, and it will add value to the project.
- 'Environmental Dimension' section, if possible, should reflect better regional variations in some river basins. Particularly it concerns such large river basins, as, for example, the Volga. The average indexes do not provide the necessary overall picture.
- Indicators reflecting assessment of climate change, and possible adaptation options, should be formulated in such a way so as to reflect a) already registered changes and b) mid-term and long-term changes/impacts/responses. Especially, time-frames for the future changes/impacts during the 21 century are really important as the scales of change might vary in different time perspectives, thus defining the responses and adaptation strategies.
- Surprisingly, despite the 'adaptive water governance' focus of Twin2Go, the 'adaptation' dimension is poorly reflected and emphasised in **all sections** of the Questionnaire.

4 Workshop report: Guwahati, 03-04.06.2010

Report by Prof. Wolfgang-Albert Flügel, Anita Bartosch (FSU-Jena)

The following provides a review of the Case Study Review Workshop associated with Twin2Go which was held in Guwahati, NE India at 3rd and 4th of June 2010. During this workshop three regions within the Upper Brahmaputra River Basin are analysed following a methodology developed by the Twin2Go project consortium (WP1).

4.1 Selected case studies

BRAHMATWINN (EU/FP6) was conducted to enhance capacity to carry out a harmonised integrated water resources management (IWRM) approach as addressed by the European Water Initiative in headwater river systems of alpine mountain massifs already impacted from climate change, and to establish transfer of professional IWRM expertise, approaches and tools based on case studies carried out in the twinning river basins of the Upper Danube in Europe and the Upper Brahmaputra in South Asia.

The Upper Brahmaputra River Basin (UBRB) as defined upstream of the town Guwahati in Assam, NE-India ($A = 514,717 \text{ km}^2$) is shared by China ($282,950 \text{ km}^2$), Bhutan ($43,546 \text{ km}^2$) and NE India ($188,111 \text{ km}^2$), where in Assam the river forms a braided channel pattern with severe bank erosion (Fig. 6). For further analysis in the frame of the Twin2Go project Nepal was selected, as a Himalayan state where the entire country is lying within the Ganga-Brahmaputra River basin. It serves as a comparison case to Bhutan. Both have to cope with similar challenges with regards to climate change and IWRM implementation.

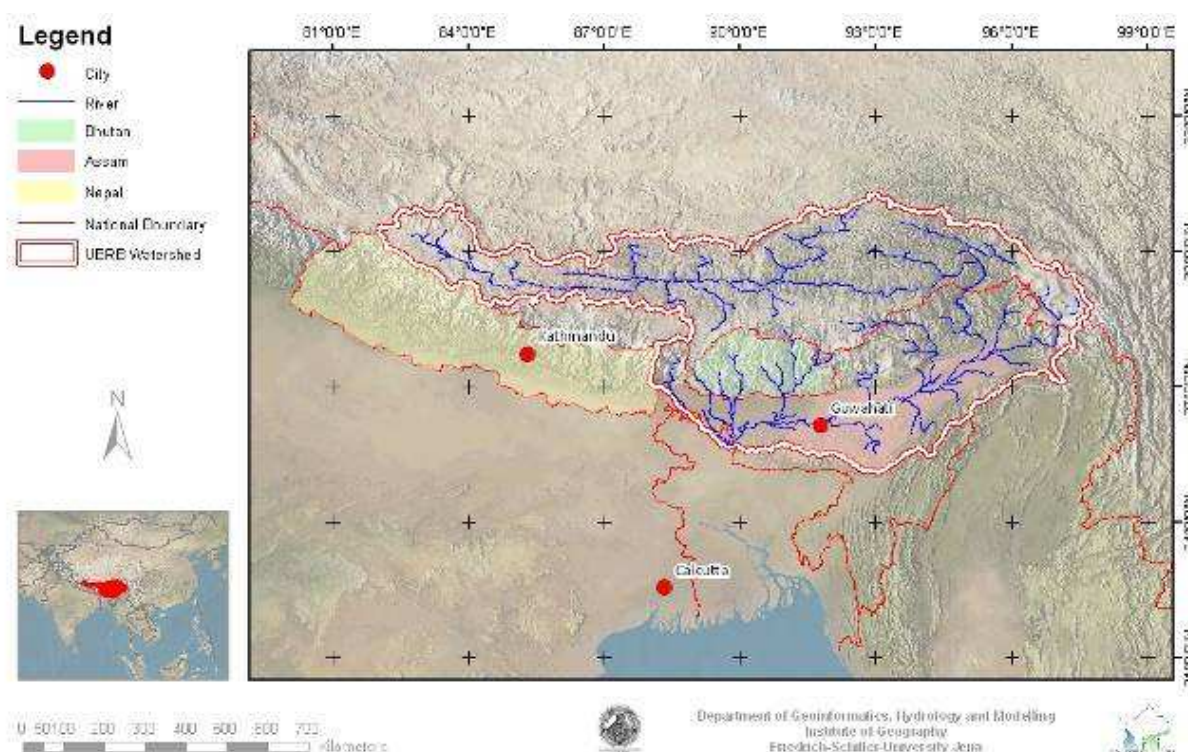


Fig. 6: Map of the Upper Brahmaputra River Basin

Glacier retreat and permafrost thaw in high mountains, e.g. the Alps, Himalaya and the Quinghai-Tibetan Plateau, have presently reached an extent and speed that are without historical precedence (Karma et al. 2003, Subba, 2001). Enhanced by ongoing climate change this is likely to have substantial impacts on the hydrological dynamics, i.e. a shift in seasonal river discharge, flood generation, and less summer runoff from melting snow and ice resources. Changing discharge regimes impact the implementation of IWRM both in the urban and rural domain and are likely to change vulnerabilities of sensitive management systems with respect to floods, droughts and erosion.

The comprehensive assessment and analysis research studies carried out by the BRAHMATWINN project in the UBRB provided numerous insights of natural and socio-economic process dynamics of IWRM and impacts that can most likely be expected from ongoing climate change.

With respect to IWRM and impacts of climate change the following conclusions were derived:

- Temperature is projected to increase in both basins in the coming decades with the higher values in the region of the Tibetan Plateau. Thus, parameters directly dependent on temperature, like potential evapotranspiration, are also assumed to show clear trends. This will have a severe impact on the hydrology of the river basins.
- Precipitation trends are less clear. Annual precipitation is projected not to change significantly, but seasonal amounts are. Different climate change indicators, like the length of the longest dry periods, indicate more frequent and prolonged droughts. However, there is no simultaneous tendency to less flooding events.
- The water resources bound in glacier-ice in both twinning basins have decreased significantly in the recent decades. This trend will according to most climate scenarios continue although the actual down-stream impact of these changes to the run-off regime will become less significant with increasing distance to the glacier covered headwaters.
- In general the region of Assam can be considered as a one with significantly high aquifer vulnerability regarding floods. The main reason is a presence of very shallow aquifers in all over the area, where the typical depth to groundwater below surface ranges up to 5 meters.
- The importance of wetlands as a source of livelihood services and quality is often not appreciated well enough by the local population and population growth therefore is directly linked with progressing drainage of wetlands. The challenge is to get relevant policy levels, decision making parties and stakeholders involved to appreciate the value of wetlands with respect to their unique biodiversity and hydrological ecosystem functions (ESF) and related ecosystem services (ESS).
- To implement successfully measures in regard to disaster risk reduction and climate change adaptation actors from national governments, provincial administrations and local authorities need to plan interventions based on specific locations. The spatial representation of risk, visualising the extent of hazard or the distribution of vulnerability is therefore needed to successfully implement and address such strategies.
- IWRM implementation in the UBRB is lacking due to conflicts between up- and downstream countries and inappropriate governance structures. There is a clear need to improve the appreciation of upstream-downstream relations and associated land management challenges (e.g. soil erosion, landslides, and deforestation).

The results presented herein summarise in brief the different project deliverables which are published in detail on the project home page (<http://www.brahmatwinn.uni-jena.de/>). They have been produced and analysed consecutively in three project phases according to the integrated structure of the project.

For the Case Study Review Workshop in Guwahati, India, focus was given on the riparian states Nepal, Bhutan and NE-India. These states have to cope with similar challenges in the context of climate change, meanwhile governance systems differ significantly. The analysis of these three case studies allows a detailed study how different governance regimes in neighbouring countries with a similar context in the natural dimension cope with climate change and expected consequences.

4.2 Methodology

The workshop was held in Guwahati, NE India. Stakeholders from the three case studies in India, Bhutan and Nepal were invited. Indian stakeholders came from different north-eastern states, but the main focus was given to the federal state of Assam.

Additionally, stakeholders from Bhutan were invited. The entire state of Bhutan lies in the territory of the Upper Brahmaputra River Basin (see Fig. 6). Nepalese stakeholders were invited to give useful insights to the water management in Nepal and in the Himalayan area in general. Nepal was not a case study within the BRAHMATWINN project, but was selected, because it is strongly supposed to give useful insights and serves best for comparison with the neighbouring country Bhutan. The context in both countries is more or less the same, but their dealing with IWRM issues is different.

The process of filling out the questionnaires started in the second half of the first day. Therefore the participants were grouped together according their national interests. The groups started by considering the domain of governance *regime*, then context and finally performance. After each domain, a selected representative from each group presented insights to all the workshop participants. These presentations stimulated in-depth and wide ranging discussions both within the specific groups and between the participants of the three riparian countries of the Upper Brahmaputra River Basin. As such, these joint discussions had the effect of knowledge transfer and mutual learning.

For the presentation of the performance domain a preparation time of 10 minutes was given to the stakeholders to summarise major outputs in a few bullet points. Major question was what are the main insights and feelings towards progress of implementation towards sustainable water resources management.

The discussion was led by the former BRAHMATWINN project partner Dr. Craig Hutton, a specialist in governance issues in the Himalayan area from the GeoData Institute at the University of Southampton.



Fig. 7: BRAHMATWINN Case Study Review Workshop participants at Landmark Hotel in Guwahati, India

In the late afternoon of the second workshop day, a boat trip at the Brahmaputra River was organised, whereby all stakeholders were invited. This boat trip allows getting a better impression of the wide and powerful river system and the problems, with which Assam has to cope; like flooding and erosion. The trip further ensures a lively discussion, especially between stakeholder from riparian states in a loosely atmosphere. Remaining questions and issues, as well as further cooperation and upcoming Twin2Go activities were discussed. Up- and downstream topics and the requirements of different water using sectors were a major point in the discussions.



Fig. 8: Boat trip at Brahmaputra River



Fig. 9: Brahmaputra River at Guwahati

4.3 Summary of presentations and discussion

The two day workshop started with a brief introduction to the Twin2Go project and what it is aimed to achieve. Major objectives were presented and how they are planned to be realised within the two years project run-time. This presentation contains a lot of general project information; including funding, target regions and the motivation of the project. Following major insights from the BRAHMATWINN project were presented to the participating stakeholders. Prof. Flügel then summarised the project objectives and results. Storylines were provided, which show how projected climate change impacts the human and natural environment in the selected case studies. The presentation was given to make stakeholders familiar with project outcomes and already gained insights with respect to water management practices.

In the next block, the developed Twin2Go methodology for the assessment of governance systems and their performance was introduced to the workshop participants. Therefore it was first pointed out, what the importance of this analysis is: an analysis of the performance of current governance regimes and in-depth analyses of governance regimes and dependencies of different factors within a given context. The three elements of the methodological framework were described in detail, so that the stakeholders could have a deep understanding of the domains governance regime, context and performance and their relations.

Dr. Hutton gave a presentation about utilising indicators for the assessment of progress towards adaptive governance based on the example of the EU Water Framework Directive to give stakeholders an idea, how an IWRM is formulated in Europe.

The different discussion blocks for the three elements of the framework, attended by all stakeholders were helpful to get a general idea how water management works and which issues are identified as problems and barriers for the implementation. A first comparison of the Brahmaputra riparian states with regards to water governance issues was conducted during the workshop days.

Finally discussions were instigated to navigate to selected key questions, whereby participants were asked to write down answers within their group in bullet points. Those were afterwards discussed in the entire group of all stakeholders from the three case studies.

4.4 Description of work done, achievements (problems encountered, recommendations)

The workshop was organised to be held in Guwahati/ Assam, because most of the stakeholders within the BRAHMATWINN Assam case study framework came from this area. Further it was easy to invite Nepalese and Bhutanese stakeholders to come to India, because there were no restrictions for entry to India. In consequence of the close location of the three test sites, it was feasible within the budget to invite stakeholders from various departments to get a broad stakeholder community. This is necessary to score all the indicators. Many of the indicator questions are very detailed and could only be answered by specialists in a specific field.

In preparation for the Case Study Review Workshop, some indicators specific to the environmental context have been filled in advance. These indicators could be already made available due to literature research and application of data bases.

Problems encountered during the workshop listed below:

- Regarding the method:
 - Sometimes not clear, if indicators focus on watershed or national level
 - Clarification needed: what is the difference between permit and licence
 - Some indicators are not of concern in the case studies: environmental taxes, permits (No.18-21)
 - Global data bases are used to pre-fill score for some indicators, but these sources often provide values older than 10 years, e.g. from 1995. Advantage is that those values are available for each country and comparable, but question is how meaningful they are, stakeholders have sometimes agreed on another score, based on actual numbers.
- Regarding WS:
 - Some invited Indian participants were not able to attend the workshop

4.5 Discussion and/or comments on the results of the questionnaire application

During the discussions characteristics of each case study were pointed out.

In Assam the planning works on a multiple level, there is always a state and community level. Environmental taxes and permits do not exist, which is the case in most countries in this area. The governance system in Assam is characterised by many traditional institutions (informal). The system has a centralised structure. Awareness concerning climate change is low, and there is a lack of an accepted policy for IWRM in Assam. Conflicts occur between districts, e.g. due to inter-basin water transfers. In Assam it is important to coordinate the diversity of institutions and awake awareness.

Bhutan has just released a new water bill. The apex body in the country is the National Environmental Commission. The policy is centralised, but the implementation locally decentralised. Conflicts exist between the water users hydropower - environment and irrigation - drinking water. In general there is a good progress towards adaptive governance, it is well researched, strong awareness exists and the situation is totally different to India in terms of the implementation of IWRM.

In Nepal the Water Resources Act from 1992 serves as an umbrella act. An Integrated Water Resources Policy is in implementation, which follows the global principle of IWRM. Conflicts exist between water users hydropower- irrigation and irrigation- drinking water. The system is based on informal regulations, and in terms of IWRM implementation we can match the progress in Nepal between Indian and Bhutan.

Finally a permit system does not exist in all three case studies.

After going through the questionnaire and discussing few selected indicators and sub domains two more general questions were asked to focus the discussion on the issues of interest:

What are the main insights and feelings towards progress of implementation towards sustainable water resources management? (write down bullet points)

Nepal:

- Stated goal: Provision of drinking water and sanitation to all by 2017, now almost 90% of households have access to drinking water, but in terms of sanitation only 50%, situation worst in rural areas (goal not achieved and will not be achieved)
- Needed to strengthen legal framework, the environmental protection act 1997 is criticised because it includes commercial interest regarding hydropower
- Consultation: public hearing before launching any project since 1997 is a tradition
- Climate change: although everybody is talking about, it has not been regularised by law; plan for action is under formulation; NAPA is incorporated
- 3 priority problems:
 - Efficiency
 - Solving conflicts among competitive users
 - Basin level organisations
- IWRM adopted in plans, but not incorporated in legislation, now in process of formulation

Bhutan:

- Climate change as key issue
- Significance of legal frameworks, NEPA act 2000 (National Environment Protection Act), NAPA climate change investigations for mitigation of GLOFs (NAPA = National Adaptation Programme of Action)
- Participation

India:

- Lack of data and information
- Participation
- Climate change: ground information is missing
- Efficiency: high water availability, supply/demand efficiency
- Prioritisation
- IWRM with focus on basin level approach

For Nepalese stakeholders it is important to adapt at local level to climate change. Communities should be aware and adapt. Nepal plans multipurpose dams. Here consultation is a big issue, because the resettling of people is a major challenge and the Environmental Act requires public hearing, e.g. the price of land between government and people is the result of negotiations.

Indians raised the issue of dam constructions only built for hydropower interest, but without storage function. Multi-purpose dams could protect downstream areas. Because of downstream flood issues and the upstream economical interest with hydropower conflicts on the national level arise. Series of dams were established without consultation. Recently in India the proposal of two big dams was now converted to three dams due to consultation processes. India has identified the watershed approach and transboundary issues as very important; Assam is mainly affected by Bhutan in terms of water flows.

What are the main barriers for successful IWRM in your country? (write down bullet points)

Bhutan:

- A lack of capacity: capacity building is needed to implement IWRM

- Cross-sectoral coordination between organisations and communication between areas
- Implementation of law

India:

- Legal framework
- Transboundary issues (state and international level)
- Implementation of law
- Lack of data

Nepal:

- Legal framework: lack of political commitment and implementation of IWRM, work on basin level despite borders (watershed approach)
- Infrastructure to implement IWRM

The **implementation of law** has been identified as a major issue in Bhutan and India. The **legal framework** has been identified as a barrier for the implementation of IWRM in India and Nepal.

The implementation of governance differs between areas. The implementation can be applied in one area better than in another one within the same country. It is a challenge to identify drivers for the implementation and barriers. Because law is the same within a country, the implementation process has to be improved.

Indians suggested a committee for monitoring, because corruption is one of the major barriers. The discussion about is already addressed. This is an issue, which is considered (recognition).

Nepalese participants identified as main cause politics, because of the different political parties, whereby opposition parties oppose projects. Bhutanese declared again capacity as a reason (missing skills).

The **cross-sectoral coordination** has also been identified as a barrier for the implementation of IWRM. In Nepal the hydropower sector serves as a good example. The Ministry of hydropower, the Ministry of Environment and the Ministry of Forests are dealing with it, while each Ministry is operating under different acts. There is always a conflict and the question has to be answered, what is more important. There exists no legal mechanism for trade out; conflicts are mostly solved with political pressure. In Assam conflicts sometimes arise between departments. In most cases, it is difficult to come to an agreement between stakeholders.

Transboundary issues were identified in Nepal and India. In Nepal these issues are important, because all rivers in Nepal join the Ganga. Altogether there exist three treaties, which deal with management in up- and downstream areas. India has to deal with transboundary issues on a multiple level. On the inter-state level there exist e.g. some agreements with Bangladesh, but also conflicts arise between areas in India, e.g. due to inter-basin transfer (river linking).

Finally the **lack of data** has been identified by stakeholders of all case studies. Bhutan has a quiet good data base, but there is still a problem of capacity. People cannot give the data, because in many cases it is not known who is responsible for specific data. The problem in India is similar. No single body is responsible for the data. This makes it especially difficult for foreigners to get data. Another reason is that data are often classified as secret, like it is the case with river discharge data of the Brahmaputra. In Nepal data are easily available, but the quality of data is a problem, especially hydro-meteorological data.

In all riparian states, the quality of data is not ensured, especially in the higher Himalayan ranges, where it is quiet difficult to access stations, e.g. in snow covered, remote areas.

4.6 General conclusions and recommendations

The questionnaire structure is quiet good for the purpose of the analysis. A problem is that some indicators are very specific and can only be answered by experts; therefore a broad community of stakeholders from various fields is needed. Some indicators were not easily to understand just through reading the guidance document and needed a further explanation. Some other indicators are not of concern in the case studies of the BRAHMATWINN project, e.g. environmental taxes and permits.

5 Workshop report: Santiago de Chile, Chile, 27-28.04.2010

Report by Patrick Debels (Soresma)

The 2-day workshop in Santiago de Chile was initially planned to be held in March 2010. It was to take place at the facilities of UN ECLAC, who has done a lot of work on water governance in Latin-America through its Division for Natural Resources and Infrastructure. However, as a consequence of the mega-earthquake that took place on February 27, 2010, the workshop had to be postponed until April 2010, and another venue had to be sought as a consequence of damage to UN ECLAC's infrastructure.

During the workshop 7(+1) Latin-American basins were analysed using the methodology developed under WP1.

5.1 Selected case studies

Several Latin-American basins have been the subject of research during previous “twinning” projects (co-)financed by the EC under the 6th and 7th Framework Programmes for Research and Technological Development.

- The **TWINBAS** project (EC FP6) aimed at the “twinning” of river basins from Europe (2), Africa (1), Central Asia (1) and Latin-America (1) for filling gaps in knowledge and methods in order to further promote implementation of a harmonised Integrated Water Management approach in the selected case study basins. Although in practice many of the project's activities were geared towards the creation of additional information on the physical environment through monitoring and modelling (incl. climate change), the project also included a work package on the institutional and legal framework for IWRM, and aimed to make concrete suggestions for moving forward towards the development of RBM plans.
- The **TWINLATIN** project (EC FP6) had a very similar scope as the TWINBAS project, but a different geographic focus: TWINLATIN was specifically geared towards twinning European (2) and Latin-American (5) case study basins. Besides the strong focus that was put on improving public participation, some of the more interesting outcomes from the TWINLATIN project – to name just a few of them – consisted of considerably improved baselines (water availability, quality) for several of the basins, calibrated and validated modelling applications and first analyses ever of the potential impacts of climate change on water resources for several of these basins. TWINLATIN provided the impulse for the creation of the River Basin Commission for the Brazilian part of the Quaraí-Cuareim. A country environmental assessment for Nicaragua by the World Bank made extensive use of the results from TWINLATIN in its formulation of recommendations for the management of the Cocibolca Basin.
- At the time of the Santiago de Chile workshop, the **WETWIN** project (EC FP7) was halfway its second year of execution. The project, which focuses on improving the integration of wetlands into water resources management at the river basin level with the aim of promoting the use and protection of wetland ecosystem services while maintaining good wetland ecological status, includes a single case study basin from Latin-America.

During the workshop held in Santiago de Chile, regime, context and performance of (adaptive) water governance systems were analysed for all 7 Latin-American case study basins from the TWINBAS, TWINLATIN and WETWIN projects. Information for an additional Ecuadorian basin was provided by an invited expert from the Ecuadorian Ministry of Environment, which currently runs the UNDP-

implemented, GEF-funded “PACC” project (the “Adaptation to Climate Change” project), and which includes a chapter on adaptive water governance.

Out of the 7 Latin-American case study basins, 4 are transboundary basins. However, at the wider basin-level, the (terrestrial) Argentinean part of the Baker Basin can be approximately considered as “hydrologically” inactive. In the case of the Cocibolca Basin, whose terrestrial part is shared by Nicaragua (~80%) and Costa Rica (~20%), only Nicaragua was a partner to the project. Only 2 out of these 4 transboundary basins were thus studied in their full binational dimensions.

Case study basins considered at the Twin2Go workshop:

- **Biobío** Basin, Central Chile (TWINBAS)
- **Baker** Basin, Southern Chile (TWINLATIN)
- **Upper Cauca** Basin, Colombia (TWINLATIN)
- **Cuareim-Quaraí** Basin, Uruguay-Brasil (TWINLATIN)
- **Catamayo-Chira** Basin, Ecuador-Peru (TWINLATIN)
- **Cocibolca** Lake Basin, Nicaragua (TWINLATIN)
- **Guayas** Basin, Ecuador (WETWIN)
- **Paute** Basin, Ecuador (PACC)

5.2 Methodology

Logistical considerations

After joint consultation with the members of the Twin2Go Consortium, it was decided to conduct the governance analyses for all Latin-American case study basins from previous twinning projects in a single workshop. This decision was based on (i) the benefits for the purposes of the workshop and project of enabling discussions and exchange of information and opinions among the experts from all Latin-American case study basins; (ii) logistical/language considerations (Spanish language facilitation to participants by Patrick Debels, member of the Soresma Twin2Go team with vast experience working in Latin-America), and (iii) organisational (cost-efficiency) considerations.

The workshop was organised and conducted by Soresma, the Consortium member responsible for bringing the experiences from the TWINLATIN project into Twin2Go. In this context, Soresma assumed additional responsibilities by including 2 additional case study basins, 1 from both the TWINBAS (Biobío Basin) and WETWIN (Guayas Basin) projects. However, the European case study basins “Thames” and “Norrström” – which were also included as reference basins in the TWINLATIN project – were not considered by Soresma, as they were also included in the preceding TWINBAS project. The Consortium members responsible over TWINBAS (DHI) and WETWIN (Vituki) provided the financial support for the participation of the representatives from their respective Latin-American case study basins in the Latin-American Twin2Go workshop.

In order to optimise the available resources, Santiago de Chile was chosen as a strategic location for holding the workshop: it constituted a relatively central location when considering the departure points of the participating representatives for the different case study basins (including 2 Chilean basins and several basins along the Andean axis). The UN ECLAC, whose Division on Natural Resources and Infrastructure has conducted considerable work on water governance in Latin-America, has its seat in Santiago de Chile. Unfortunately, although initially the workshop would have been hosted by UN ECLAC, due to the damage caused by the September 27 earthquake an alternative venue (and date) for the event had to be sought. The extra costs caused by not having available the ECLAC facilities at the time of the workshop meant that some additional care needed to be taken with regard to the total number (and origin of departure) of workshop participants. However,

the minor impacts caused by this were compensated for by the direct support to the basin analyses provided by the facilitator of the workshop, Patrick Debels (Soresma), who was directly involved in the research activities conducted at several of the case study basins (in particular: Biobío, Baker, Cocibolca) under the three mentioned twinning projects.

Workshop participants consisted of a mixture of experts-basin representatives from mostly Academia and Government Institutions that directly participated in the TWINBAS, TWINLATIN and WETWIN twinning projects. The team was further strengthened through participation of the experts Pedro Jacobi of the University of Sao Paulo, Brazil (“GovAGUA” Project, EC Alfa), Fausto Alarcón (“PACC” project, Ministry of Environment, Ecuador) and Tulio Santoyo (GTZ, Regional Government of the Piura Region, Peru).

A workshop briefing paper, conceptual notes on the Twin2Go project and its methodology as well as the introduction to the questionnaire and the questionnaire itself were produced in the Spanish language by Soresma and provided to the workshop participants prior to the event.

Content

The workshop started with a brief introduction to the general objectives and work plan (flow chart) of the Twin2Go project, this as to clearly illustrate the relevance and importance of the participants’ contributions (work on the questionnaires) within the context of the project’s methodological approach, and how this would finally constitute the basis for providing interesting feedback, recommendations and lessons learnt (based on the project’s final results) to both the participants themselves as well as to the wider WRM/water governance community in Latin-America and beyond.

This introduction was followed by keynote sessions provided by experts from UN ECLAC on Water Governance and the Institution’s experiences from their work on river basin organisations in Latin-America. New participants (non-twinning project representatives) were given the opportunity to briefly introduce their work.

More specific concepts and methodologies required for filling in the questionnaires were then explained. Participants were grouped according to geographic area of expertise (basin and/or country), and the work on the questionnaires was initiated.

While achieving progress in filling in the questionnaires, potential issues regarding certain criteria/questions that were identified by one or several individual groups were then discussed and resolved between all participating groups in an attempt to obtain an as homogeneous as possible interpretation, prior to providing a response. In many cases, the separation of possible responses in a reduced number of obligatory standardised classes was felt by participants as being too restrictive/artificial. The opportunity was therefore offered to use the “+” and “-” sign in combination with the class letter, this as to introduce additional nuances. Workshop participants were recommended to provide additional comments in such cases (as well as in cases of lack of consensus), this as to document the reasoning behind their choice. Questionnaires were provided and filled in in Spanish.

5.3 Presentations

Besides the introductory sessions on the Twin2Go project, the methodology for the questionnaire and its role in the broader conceptual framework of the project, as well as some shorter presentations on key aspects of some of the case study basins, the following keynote presentations were given during the morning sessions of the first workshop day:

- *Basin organizations and Water Governance, activities of UN ECLAC, lessons learnt (Andrei Jouravlev and Michael Hantke, UN ECLAC, Chile)*
- *Experiences of the Water Round Tables (“mesas de agua”) in Copiapo and Huasco, Chile (Ylang Chevaleraud, Fundación Chile)*
- *The GOVAGUA Project (Alfa programme, EC): achievements, lessons learnt, challenges for the future (Pedro Jacobi, USP, Brazil)*
- *Adaptive water governance in Ecuador (Fausto Alarcon, PACC Program, Ministry of Environment, Ecuador)*

During the introductory presentations, governance was once more clearly defined and the importance of the good governance principles of “transparency”, “accountability” and “participation” (considering its different levels as defined by Arnstein, 1968) was stressed. Other important issues brought forward during these presentations included the importance of enabling macroeconomic settings, the need for establishing management organisations with a clear and unambiguous focus on water, with well-delineated responsibilities, complementary to, compatible with and not overlapping with those of other organisations, the importance for success of a healthy balance of compatible top-down and bottom-up initiatives, and the importance of stimulating participation of all interested parties and of good access to information. The issue of the difficulties for such basin organisations to auto-finance themselves in the short and medium-term was raised, and the associated risks of appropriation of these organisations and associated decision-making processes by power groups was highlighted. Progress from a project on strengthening adaptive water governance in the context of climate change in Ecuador was illustrated.

The materials from these presentations have been brought together for further reference into the intranet of the Twin2Go website (www.twin2go.eu).

5.4 Discussion

In general, the procedure of characterising the water governance system for the different case study basins through a series of indicators related to the governance regime, its performance and the natural and socio-economic context in which it is embedded, and conducted in a regional workshop setting, was perceived as a very interesting experience. Two main reasons were indicated: (i) the experience in itself of conducting this systematic analysis of conditions, performance and context, was perceived by the participants as “enriching” and promotes further reflection and/or integration of the considered concepts in the context of their daily work; (ii) the expectancy was created of further guidance for enhanced water governance that may result from the synthesis of questionnaires obtained from a larger number of river basins from around the world.

However, some relevant practical issues related to the procedure also came forward:

- Several of the indicators could only be obtained at the national level; conditions at the basin scale may however be very different from the “national mean situation”; there exists a risk of bringing into the analysis a mixture of scores, some of which are clearly valid at the basin level while others reflect the “national mean”;
- Even within a single basin – especially in the case of some of the major basins – conditions that need to be evaluated through the scores, may be very heterogeneous in space;
- Certain current conditions in a basin may be the consequence of the historical context, and therefore not be a response to the currently (recently?) implemented governance systems; due consideration has to be given to this possibility during the synthesis process

- For certain indicators class limits for the separation of scores were perceived as very artificial and too limited, making it difficult to unambiguously score “the real world” into one of the available classes. In order to partially overcome these limitations and in order to assist participants in making their decisions, “+” and “-” signs were used to allow communicating nuances and/or level of confidence regarding the assigned scores. The possibility to provide additional comments to the scoring process for each indicator was very important in this context.
- Subjectiveness, uncertainty and fuzziness related with the scoring process result in a major comparative relevance/meaningfulness for analysis and interpretation purposes of clearly opposite or well-separated scores. Depending on the parameter and the associated procedure used for defining score classes, due care may/will need to be taken when deriving interpretations which are (at least to a certain extent) based on immediately adjacent score classes.
- For synthesis analysis purposes however, scores do need to be brought back to the previously assigned, limited number of classes. Comments and signs can assist in this context the further post-processing and are thus important to further homogenise the scoring process among the different case studies and workshops.
- Additional clarification regarding the precise interpretation of certain indicators was often required from the facilitator. Under such conditions, the risk exists of the interpretation by a specific facilitator not to be fully aligned with the interpretation made by facilitators of other regional/twinning project workshops. In order to avoid or reduce the risk for potential impacts from these different interpretations on the final synthesis results (combined analysis of all questionnaires from all workshops), participants were suggested to provide additional comments and/or justifications for those indicators where interpretation of its specific meaning may have resulted somewhat ambiguous. If divergent interpretations among different workshops would be confirmed, certain levels of post-processing, or even elimination of certain indicators may be required or recommendable.

5.5 General conclusions and recommendations

In general, the workshop was perceived as a very interesting experience by all participants, with the systematic analysis of conditions, performance and context being considered as an “enriching” experience providing the opportunity to “look at the bigger picture” of water management/governance. Participants expressed a deep interest in being kept informed about the outcomes of the analyses that would be conducted based on their inputs.

Besides several of the aspects that were mentioned before, an important side effect of the workshop was the “networking” opportunity given to participants from previous twinning projects, as well as from other regional initiatives outside of the context of EC FP projects; i.e. to come together, strengthen and extend their existing networks, and to discuss and exchange experiences on a topic highly relevant to the broader IWRM community in Latin-America: many of the continents’ countries are in the process, or have recently finished the development of new/reformed policy, legal and institutional frameworks for integrated water management. The potential severe consequences of climate change in several parts of the Continent, and the inability of established frameworks to deal with increasing variability make that the lessons taken home from the workshop by the participants may be the seeds for important further contributions to enhanced adaptive governance in the Latin-American Region.

Upon finalisation of the workshop, filled-in questionnaires from all 7 Latin-American case study basins were available for the synthesis analysis.

6 Workshop report: South Africa, 14-15.04.2010

Report by Tom D'Haeyer, Patrick Debels (Soresma).

During the workshop 5 African basins were analysed following a methodology developed by Twin2Go (WP1).

6.1 Selected case studies

The 5 basins represented a large spread across Africa; with

- One basin in West-Africa: The Niger in Mali. The Niger in Mali is one of the case studies in the WETwin Project (Fig. 10). Since this project is focussing on tools and methods for improving wetlands management and the integration of wetlands in River Basin Management, most data available is specific to the Inner Niger Delta. However for the review national data was used and several scores refer to the Niger Basin Authority.
- One basin in East-Africa: The Upper White Nile, specifically looking at the Kyoga Basin. The Kyoga Basin is one of the 4 Water Management Zones in Uganda. These zones have been newly identified since a few years following the latest water sector reform study in Uganda (~2005). The major changes following the reform study is a shift from centralised to catchment based management which is being implemented on a pilot scale. For the Kyoga Basin the proposed institutions have not yet been put in place. The Basin is one of the case studies in WETwin, although very little work has been done on basin level. The project in Uganda is specifically working on the Namatala Wetland.
- Three basins in Southern Africa: The Olifants River (South Africa), the Orange River (Fig. 1) which is transboundary and the Okavango which is also transboundary. The Olifants River is a WETwin case study site (Fig. 10), in this case the actual study area is the Ga-Mampa wetland. The Orange River is a case study from the NeWater project, though transboundary only the South African part of the basin was analysed for the purpose of Twin2Go. Also the Okavango – a TWINBAS study site (Fig. 11) - is a transboundary basin.

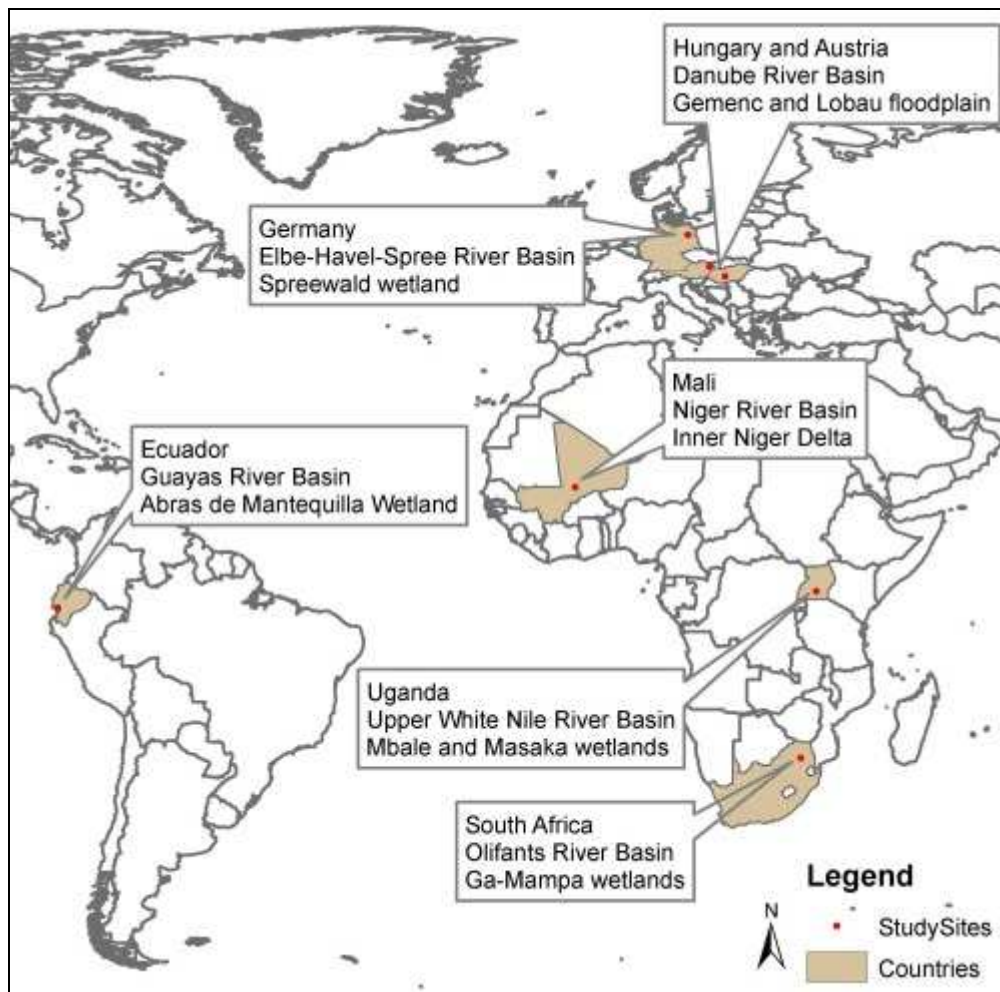


Fig. 10 WETwin Case study areas

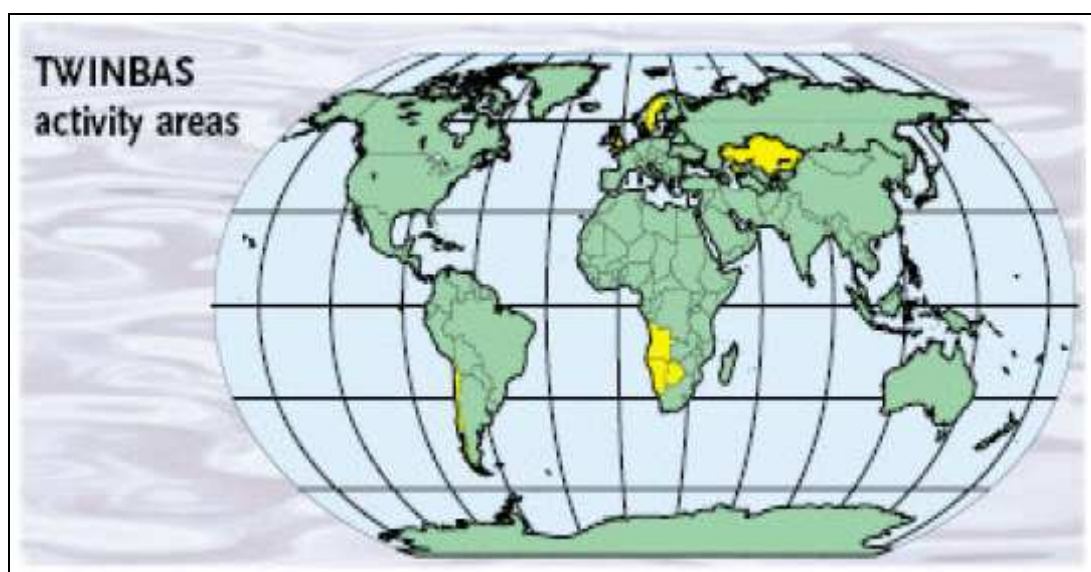


Fig. 11 TWINBAS Case study areas

6.2 Methodology

The workshop was a combined event serving both WETwin and Twin2Go, as had been planned and budget for (Twin2Go Description of Work). The theme of the Workshop was “Evaluation of wetland management options and adaptive water governance in river basins”.

- Attendance;
 - (1) Overall attendance ~ 30 persons (WETwin-Twin2Go joint plenary session with keynote presentations)
 - (2) Analysis basins ~ 14 (Mali=2, Uganda=2, Okavango=1, Olifants= 0, Orange= 3 / DHI=1, Soresma=2, USF=1, WI=1, UNESCO-IHE=1)
- Keynote presentations; a mix of presentations related to wetlands and river basin management, decision support and governance. For the purpose of Twin2Go it would have been better to have less presentations, the level of presentations was good (high) and appreciated by participants.
- Group work; the analysis has been carried out in two Groups. One group for Mali (Niger Basin) and Uganda (Kyoga Basin / Upper White Nile), the second group for the Olifants, Orange and Okavango Basins. Group work started with a presentation of the basins; about 10 minutes per basin had been planned but presentations took longer than this. Presentations were followed by a quick round to assess how much had been prepared in advance for each case study, what had been the bottlenecks and how to organise the analysis/discussion on day 2 of the workshop. Since most participants left day 2 at 1pm, time was far too short to discuss all questions.

From the perspective of the WETwin project, the aim of this fourth twinning workshop was to provide background information as well as a discussion ground for the further development and evaluation of management options for the WETwin case study wetlands, within the context of their hosting river basins.

The fourth Twinning Workshop of the WETwin project, co-organised by the International Water Management Institute IWMI South Africa Office and the WETwin coordinating institutions VITUKI and SORESMA, was held at the Loskop Dam, South Africa in April 2010.

6.3 Summary of presentations and discussion

Keynote sessions introducing both general aspects as well as regional settings regarding the topic of the workshop were provided by Chris Dickens (U. of KwaZulu-Natal), Uri Shamir (Israel Institute of Technology), Claudia Pahl-Wostl (U. of Osnabrueck), Eiman Karar and Chris Moseki (Water Resources Commission, South Africa), Eusthatia Bofilatos (Department of Water Affairs, South Africa) and Eugen Nowak (Spreewald stakeholders, Germany).

- **Keynote 1:** Chris Dickens, Institute of Natural Resources, U. of KwaZulu Natal - **“Guideline for the incorporation of wetlands into catchment management strategies”**
- **Keynote 2:** Uri Shamir, Professor Emeritus, Faculty of Civil and Environmental Engineering, Stephen and Nancy Grand Water Research Institute, - Israel Institute of Technology - **“DSS, management options”**

- **Keynote 3:** Claudia Pahl-Wostl, Professor for Resource Management, University of Osnabrueck, Germany - ***“Adaptive water governance; context, regime, performance”***
- **Keynote 4:** Eiman Karar, Director Water Resources management, Water Research Commission, South Africa - ***“Water policy and climate change”***
- **Keynote 5:** Eustathia Bofilatos. Director, Water Management: Institutional Governance. Department of Water Affairs, South Africa - ***“Establishment of coherent institutional arrangement to ensure improved governance of water”***
- **Keynote 6:** Eugen Nowak - ***“Water governance and renaturation measures the Spreewald Biosphere Reserve – Participation of Stakeholders***

6.4 Discussion

- Comments with the scores are added in the basin reports as discussed during the workshop.
- It needs to be noted that both for the Inner Niger Delta as well as for the Kyoga basin only one local expert participated in the review. This was due to budget limitations. Despite several attempts it has not been possible to mobilise local experts to fill in the questionnaire in advance and/or let them travel to South Africa. This means that results for both cases need to be treated with caution. Nevertheless, for both rivers also the respective WETwin case study leaders participated in the workshop and subsequent discussions, as well as other WETwin members familiar with these basins or governance issues in general. Participants: Nimanya Cate (NETWAS Uganda), Dr. Rose Kaggwa (NWSC Uganda/ WETwin), Tom D’Haeyer (Soresma/WETwin-Twin2Go), Chris Baker (WI/WETwin), Elena Ostrovskaya (UNESCO-IHE/WETwin), Cisse Navon (DNH Mali), Kone Bakary (WI/WETwin), Diallo Mori (WI/WETwin).
- The Olifants River was under-represented since local stakeholders present had not been thoroughly informed on Twin2Go and moreover were rather drawn to the parallel session on management options taking simultaneously. The questionnaire has been filled partly based on the Orange questionnaire since many indicators are national and both rivers have similarities. And answers have been checked and completed by WETwin members.
- The Okavango was represented by an expert who wants the name not to be published and by Kim Raben (DHI). Additional scoring is needed to complete the questionnaire. Both participants took part in the discussion and scoring for the 3 southern African basins.
- The Orange River has been thoroughly discussed. The experts included Eiman Karar (WRC), Chris Dickens (INR), Chris Moseki (WRC), Claudia Pahl-Wostl (USF/Twin2Go) all of whom have been involved in NeWater and Patrick Debels (WETwin/Twin2go). Selected indicators were pre-filled by Christian Knieper (USF/Twin2Go).
- There has been no time for a ‘wrapping up’ session to catch impressions of participants and to discuss the synthesis and next steps in the project, a situation also to be avoided.
- ‘Aftercare’ is needed. Since we have not been able to score all questions for all basins some homework needs to be done. This entails a few risks; late completion and differences in interpretation of certain questions, which could not be discussed in groups.
- Composition and size of groups; for the cases of the Niger, Kyoga and Okavango only one or two persons per basin have been involved. This was maybe too little. In the case of Mali the

scoring was mostly done by a civil servant, in the case of Uganda by a representative from an NGO; similar situations in Mali and Uganda seemed to be scored slightly better for the case of Mali than for Uganda. Only through cross-checking and comparing the answers and supporting information can be assessed if situations are significantly different and hence merit a different score or if it is rather a question of different appreciation of a comparable situation.

6.5 General conclusions and recommendations

Lessons learned

- Combining with another workshop has complicated matters, particularly since the local organiser had little to do with Twin2Go.
- Mobilising stakeholders / experts for the WETwin basin has been a challenge, since the project focus is on wetlands with limited work being done with regard to governance in river basins, whereas the commitment demanded from participants in terms of preparation was considerable.
- Thorough preparation is required!
- Sufficient time is needed for discussion; 1½ for scoring is probably a minimum.
- Taking enough time for introducing the method, participants and basins is strongly suggested.
- Working in two groups has allowed to make progress, but there has been no common discussion or exchanges between both groups. As a result not all questions have been scored in the same way. Throughout the discussions certain questions, hypotheses or scores may have been slightly changed or interpreted in a specific way. This may complicate comparison between basins and synthesis in the next stage, even though changes or discussions have been noted down in comments. This remark may of course also be valid when comparing the analysis at different workshops. Chances are that we will need to consult stakeholders again during synthesis to get additional information on certain scores.
- There has been quite some confusion on what was scored on the basin level and what was scored on the national level or on the national part of the basin.

Status at the end of workshop

Niger:

- The questions had all be scored in advance, some scores have been adjusted during the discussions
- Some information will be double checked or supporting information will be provided

Kyoga:

- The questions had been scored in advance for about 50-60%
- Questions that remained blank will be filled by the stakeholders who were present, some questions will be discussed with competent authority (Directorate Water Resource Management).

- Uganda has initiated WRM reforms (decentralisation & catchment management) since 2007 and hence is still pretty much in an early implementation stage making. For the Kyoga basin in particular, a catchment management project has recently been started, but little information is known so far.

Olifants:

- No stakeholders were present and no preparation had been done
- Many questions can be scored in the same way as the Orange. IWMI and UNESCO-IHE (WETwin partners) are working on institutions issues within the WETwin project and may be able to complete the questionnaire. To be followed by Tom/István.

Orange:

- Questions to be filled on the basis of international data sources (online available) had been prepared by USF. Stakeholders had not been able to prepare the questionnaire thoroughly. The participation of three highly knowledgeable persons who had previously been participating in NeWater made up for the lack of preparation.
- Scoring on the spot and allowing sufficient discussion may have led to more accurate or representative scoring compared to the scores for the other basins (?)
- Questions that have not yet been scored will be completed by the participants, follow-up by USF.

Okavango:

- Only one expert present, who had not been able to prepare the analysis
- Questionnaire to be completed, follow-up by DHI.

7 Workshop report: Copenhagen (*Cancelled*)

7.1 Introduction and working methodology

As part of the implementation of the Twin2Go project it was the task of DHI to prepare a regional case study report on the basins which participated in the TwinBas project. TwinBas, which was finalised in 2008, is an EU-funded project which aims at filling gaps in knowledge and methods in order to enable implementation of a harmonised Integrated Water Resources Management (IWRM) approach that addresses the European Water Initiative. By twinning five river basins, two in Europe (Norrström in Sweden, Thames in UK), Okavango (Namibian part) in Africa, Nura in Kazakhstan and Bio-Bio in Latin America and tying together water researchers with key expertise on these rivers, a critical mass of experience and knowledge was mobilised. An important part of the objective was to build the capacity to carry out IWRM in all the five river basins, building on European approaches to water resources management with the Water Framework Directive in focus, as well as on third countries expertise and experience.

The aim of the Twin2Go and the regional case studies is to review, compare, synthesise, and consolidate the outcomes of a series of EU-funded projects – in this case TWINBAS – that undertook research on specific IWRM issues in basins around the world, to draw context-sensitive but transferable approaches for improving adaptive water resources management with regards to adaptive water governance, to formulate policy-relevant best practices and tools for implementing adaptive water governance and for improving the uptake of research results, and to disseminate outcomes efficiently to relevant stakeholders at the policy level.

The report presents assessment of three of the basins, which was part of the TwinBas focussing on application of tools for basin management in the Nura Basin in Kazakhstan, as well as the basins which apply the EU Water framework Directive procedures – i.e. Thames River in UK and Norrström in Sweden.

Bio-Bio in Chile was included in the regional Case Study Workshop in Chile undertaken by the Twin2Go partner Soresma as a follow-up to the Twinlatin and WETwin EU funded projects. The funding of the participation of the participants from Bio-Bio came from DHI budget of regional Case Study Review Workshop. Soresma will report the questionnaire from Bio-Bio.

The TwinBas river basin Okavango in southern Africa was analysed as part of the regional Case Study Workshop in South Africa, April 14. - 15. DHI participated in the workshop and prepared for the participation of the CEO of the case study expert and the follow-up of the finalisation of the questionnaire.

For the remaining three basins Nura Basin in Kazakhstan, as well as the basins which apply the EU Water framework Directive procedures – i.e. Thames River in UK and Norrström in Sweden, DHI planned a workshop in May, which due to lack of availability of experts to participate in the workshop was postponed to end of June. As also the planned end of June workshop had too little participation and in order to meet the deadline for preparing the Regional Case Study Report, DHI pre-filled the questionnaires and has then completed the questionnaires in collaboration with local experts from the basins through bilateral consultations. In the case of the Thames basin it was not possible to identify local experts to engage in the process of filling in the questionnaire. Hence, the Thames basin scores are assigned based on relevant literature⁴. Following an evaluation of the results during the Twin2Go Synthesis Workshop (Stockholm, 01-02/09/10) an

⁴ Environment Agency (2009): Water for life and livelihoods. River Basin Management Plan Thames River Basin District; Environment Agency (2009): Water for life and livelihoods. Annex H – Adapting to Climate Change; and TWINBAS (2007): Twinning European and third countries' river basins for development of integrated water resources management methods.

addendum was made to the questionnaire with some additional indicators. The same experts have been consulted in order to assign scores to these.

7.2 Objective of the Regional Case Study Report

The objective of the report (questionnaire) is to:

Provide a basis for analysis of the governance regime of several river basins using a common assessment framework and to identify features which support or hinder adaptive water governance.

Results TwinBas Basins

Following is the list of case study basins where analyses are enclosed.

Basin	Country	Related Twinning project
Norrström	Sweden	TwinBas
Thames	UK	Twinbas
Nura	Kazakhstan	Twinbas

7.3 Comments to the results

In general it is found that the results of the analyses of the three basins reported in this Regional Case Study Report do not allow any conclusions to be drawn. In general it can be seen however that the results of the analysis of the two basins (Thames and Norrström) which apply the EU Water Framework, are in almost the same level of economic and social development, have similar levels of capacity, are in the same climatic zone and show quite similar results of the analyses. They both differ significantly from the analysis of the Nura basin in Kazakhstan.

8 Basin reports

8.1 About the questionnaires / quality assessment

Questionnaires were filled with the participation of more than a hundred experts at Case Study Review Workshops, with support of individual experts and Twin2Go staff. This resulted in a variety of interpretations. In some cases the scoring scheme was not followed exactly, alternative possibilities were added, multiple scores were given for the same indicator, indicators were not scored at all or only a comment was added. For certain indicators moreover no scoring scheme had been given in the guidance document which resulted in a large number of different values.

The resulting scores were copied in an Excel Workbook and prepared for analysis. The data processing is described in sub-deliverable “D. 2.3-1 Case study data”.

All 29 basin reports (questionnaires) are added to the Twin2Go website. Table 2 gives an overview of the reports.

Table 2: List of basin reports (questionnaires)

	Basin/Country	Workshop	Status Basin Rep.
1	Amudarya/Uzbekistan	Berlin, 05-07.05.2010	Complete and well documented, although not all the scores are explained... <i>Remark: some case study specific indicators were added with regard to effectiveness of implemented formal institutions or enforcement of legal provisions, and the rule of law.</i>
2	Baker/Chile	Santiago de Chile, 27-28.04.2010	Questions scored, comments for many indicators missing.
3	BangPakong/Thailand	Chiang May, 25-27.03.2010	Complete and well documented. <i>Remark: some case study specific indicators were added with regard to the capacity and authority of basin organisation.</i>
4	Biobio/Chile	Santiago de Chile, 27-28.04.2010	Questions scored, comments for many indicators missing.
5	Brahmaputra/Bhutan	India, 03-04.06.2010	Two indicators are scored as n/a, all scores are commented, often with references to (legal) documents.
6	Brahmaputra/India	India, 03-04.06.2010	Completed, most scores have been motivated in the comments column, not all though.
7	Brahmaputra/Nepal	India, 03-04.06.2010	One indicator is scored as n/a, most scores are well commented, often with references to (legal) documents.
8	Catamayo/Ecuador	Santiago de Chile, 27-28.04.2010	Questions scored, comments for many indicators missing. <i>Several additional indicators have been added</i>
9	Catamayo/Peru	Santiago de Chile, 27-28.04.2010	Questions scored, comments for many indicators missing.

	Basin/Country	Workshop	Status Basin Rep.
10	Cauca/Colombia	Santiago de Chile, 27-28.04.2010	Questions scored, comments for many indicators missing.
11	Cocibolca/Nicaragua	Santiago de Chile, 27-28.04.2010	Questions scored, comments for many indicators missing.
12	Cuareim/Uruguay	Santiago de Chile, 27-28.04.2010	Questions scored, comments for many indicators missing.
13	Elbe/Germany	Berlin, 05-07.05.2010	Complete and well documented.
14	Guadiana/Spain	Berlin, 05-07.05.2010	Complete and well documented. <i>Remark: some case study specific indicators were added with regard to groundwater-surface conjunctive management, transparency and application of measures.</i>
15	Guayas/Ecuador	Santiago de Chile, 27-28.04.2010	Well documented + additional indicators added!
16	Kyoga/Uganda	South Africa, 14-15.04.2010	Completed; well documented; scores reflect mostly national situation and expert judgements, as few documents are available on the basin. Since no government staff has participated in the review, some scores may reflect particularly the opinion of civil society groups
17	Niger/Mali	South Africa, 14-15.04.2010	Complete and all scores briefly documented. The scores may tend to reflect the government's opinion mostly. Some scores are referring to the Niger Basin Authority where others are national or specific for the Inner Niger Delta.
18	Norrström/Sweden	--	Scored completely and well documented
19	Nura/Kazakhstan	--	Scored completely but no comments
20	Okavango/Namibia	South Africa, 14-15.04.2010	Several scores are missing and no comments added.
21	Olifants/South Africa	South Africa, 14-15.04.2010	Completed
22	Orange/South Africa	South Africa, 14-15.04.2010	All but 3 scores are filled. Well documented
23	Paute/Ecuador	Santiago de Chile, 27-28.04.2010	Well documented + additional indicators added!
24	Quaraí/Brasil	Santiago de Chile, 27-28.04.2010	Questions scored, comments for many indicators missing.

	Basin/Country	Workshop	Status Basin Rep.
25	RedRiver/Vietnam	Chiang Mai, 25-27.03.2010	Complete and well documented. <i>Remark: some case study specific indicators were added with regard to the capacity and authority of basin organisation.</i>
26	Rhine/TheNetherlands	Berlin, 05-07.05.2010	Complete and most questions briefly commented. Some additional indicators are suggested but are not scored. (Number of ministries involved, salt intrusion, privatisation).
27	Thames/UK	--	No comments available.
28	Tisza/Hungary	Berlin, 05-07.05.2010	Complete and thoroughly documented. <i>Information on droughts and maps added in annex</i>
29	Volga/Russia	Chiang Mai, 25-27.03.2010	All questions filled and well documented

8.2 List of cases and involved experts

A list of participating experts for each of the basin reports (questionnaires) is added in Table 3. Twin2Go thanks all experts for supporting the project and providing valuable knowledge.

Table 3: List of basin reports

	Basin/Country	Contributing Experts	Twin2Go Staff
1	Amudarya/Uzbekistan	Maja Schlüter (NeWater researcher, now at the Leibniz-Institute of Freshwater Ecology and Inland Fisheries) Nicole Kranz (NeWater researcher from the Ecologic Institute, now also at the Freie Universität Berlin) <i>Darya Hirsch (after workshop)</i> <i>Elke Herrfahrdt-Pähle (after workshop)</i>	Björn Fokken (USF) Claudia Pahl-Wostl (USF) Christian Knieper (USF) Kathrin Knüppe (USF)
2	Baker/Chile	Robinson Torres Fabian Espinoza Francisco Riestra Nombre Apellido	Patrick Debels (Soresma)

	Basin/Country	Contributing Experts	Twin2Go Staff
3	BangPakong/Thailand	Ms. Sukontha Aekaraj (Dep. of WR, Director of Foreign Relations and International Cooperation Division) Dr. Kanapoj Wandee (Dep. of WR, Director of Water Allocation Division) Ms. Ratda Suhataikul (Dep. of WR, Foreign Relations Official) Mr. Pathai Panturothai (WR regional office, Secretary to Bang Pakong RBC) Mr. Parinya Vajaluklurk (WR regional office, Policy and Plan Analyst) Mrs. Bussabong Chaokanha (Member of Bang Pakong River Basin Committee) Mr. Man Purotaganon (Thai Water Partnership)	Louis Lebel (USER) Elena Nikitina (EcoPolicy)
4	Biobio/Chile	Ramón Daza Hernan Alcayaga Rafaela Retamal	Patrick Debels (Soresma)
5	Brahmaputra/Bhutan	Cheki Dorji (Royal University of Bhutan) Karma Dupchu (Ministry of Economic Affairs) Karma Chhopel (National Environment Commission) Kelzang Tenzin (Ministry of Agriculture) Ugyen Rinzin (Ministry of Health) Ext. Expert: Craig Hutton (Geodata Institute, Southampton)	Prof. Wolfgang-Albert Flügel (FSU - Jena) Anita Bartosch (FSU - Jena)
6	Brahmaputra/India	Nayan Sharma (IIT-Roorkee, India) Amiya Sharma (RGVN- development support organization) Trilochan Baruah (Brahmaputra Board, Ministry of Water Resources) Nawajyoti Sharma (Ministry of Development of NE region, DONER) Pradip Sharma (Cotton College) Anup Mitra (Government of India) Tapan Dutta (Government of India) Padma Sharma Goswami (Cotton College) B. K. Tiwari (North-Eastern Hill University) Rabin Jyoti Khataniar (Patkai Christian College)	Prof. Wolfgang-Albert Flügel (FSU - Jena) Anita Bartosch (FSU - Jena)
7	Brahmaputra/Nepal	Rajesh Thapa (ICIMOD) Kishore Thapa (Water and Energy Commission) Joshi Kamal Ram (Ministry of Environment)	Prof. Wolfgang-Albert Flügel (FSU - Jena) Anita Bartosch (FSU - Jena)
8	Catamayo/Ecuador	Bart Delvaux Fausto Alarcón Paul Herrera lido	Patrick Debels (Soresma)

	Basin/Country	Contributing Experts	Twin2Go Staff
9	Catamayo/Peru	Bart Delvaux Tulio Santoyo	Patrick Debels (Soresma)
10	Cauca/Colombia	Oscar Tosse Amparo Duque	Patrick Debels (Soresma)
11	Cocibolca/Nicaragua	Isaías Montoya Blanco	Patrick Debels (Soresma)
12	Cuareim/Uruguay	Silvana Alcoz	Patrick Debels (Soresma)
13	Elbe/Germany	Valentina Krysanova (NeWater researcher from the Potsdam Institute for Climate Impact Research) Cornelius Laaser (NeWater researcher from the Ecologic Institute) Ilke Borowski (NeWater Researcher, now consultant at Seeconsult GmbH)	Björn Fokken (USF) Claudia Pahl-Wostl (USF) Christian Knieper (USF) Kathrin Knüppe (USF)
14	Guadiana/Spain	Pedro Martínez-Santos (NeWater researcher from the Complutense University of Madrid) Pedro Zorrilla Miras (NeWater researcher from the Complutense University of Madrid) <i>[Not to be published, as wished by the expert]</i>	Kathrin Knüppe (USF)
15	Guayas/Ecuador	Paúl Herrera Fausto Alarcón	Patrick Debels (Soresma)
16	Kyoga/Uganda	Nimanya Cate (NETWAS) Dr. Rose Kaggwa (NWSC) <u>WETwin partners participating in the Review Workshop:</u> Chris Baker (Wetlands International) Elena Ostrovskaya (UNESCO-IHE)	Tom D'Haeyer (Soresma)
17	Niger/Mali	Cisse Navon (Direction National Hydraulique, Mali) Kone Bakary (Wetlands International, Mali) Diallo Mori (Wetlands International, Mali) Maiga Abdoussalam (Wetlands International, Mali) <u>WETwin partners participating in the Review Workshop:</u> Chris Baker (Wetlands International) Elena Ostrovskaya (UNESCO-IHE)	Tom D'Haeyer (Soresma)
18	Norrström/Sweden	Lennart Sorby (Director, Norra Östersjöns Water District) Malin Pettersson (Norra Östersjöns Water District)	Palle Lindgaard-Jørgensen (DHI) Kim Raben (DHI)

	Basin/Country	Contributing Experts	Twin2Go Staff
19	Nura/Kazakhstan	<i>[Not to be published]</i>	Palle Lindgaard-Jørgensen (DHI) Kim Raben (DHI)
20	Okavango/Namibia	<i>[Not to be published]</i>	Palle Lindgaard-Jørgensen (DHI) Kim Raben (DHI)
21	Olifants/SouthAfrica	Patience Mukuyu (UNESCO -IHE) Robyn Johnston (IWMI) [Addendum] <i>Largely based on Orange questionnaire as scored by:</i> Eiman Karar Chris Dickens Chris Moseki	István Zsuffa (VITUKI) Patrick Debels (Soresma) Tom D'Haeyer (Soresma)
22	Orange/SouthAfrica	Eiman Karar (Water Research Commission of South Africa) Chris Dickens (INR) Chris Moseki (Water Research Commission of South Africa) <i>Evaluation of results by:</i> Sabine Stuart-Hill (SH) Elke Herrfahrdt-Pähle (EH)	Claudia Pahl-Wostl (USF) Patrick Debels (Soresma) Christian Knieper (USF)
23	Paute/Ecuador	<i>Paúl Herrera</i> <i>Fausto Alarcón</i>	Patrick Debels (Soresma)
24	Quaraí/Brasil	Fernando Meirelles	Patrick Debels (Soresma)
25	RedRiver/Vietnam	Dr. Bach Tan Sinh (NISTPASS, Ministry of Science and Technology, Vietnam) Dr. Dao Trong Tu (Deputy-General Secretary, Vietnam National Mekong Committee, Vietnam) Ms. Pham Tuyet Mai (Institute of Water Resources Planning, Planning, MARD, Vietnam) Mr. Pham Nam Hung (Department of Water Resource Management, MONRE, Vietnam)	Louis Lebel (USER) Elena Nikitina (EcoPolicy)
26	Rhine/TheNetherlands	Maarten Hofstra (Expert from Rijkswaterstaat, Dutch Ministry of Traffic and Water Management) Saskia Werners (NeWater researcher from Wageningen University)	Björn Fokken (USF) Claudia Pahl-Wostl (USF) Christian Knieper (USF) Kathrin Knüppe (USF)
27	Thames/UK	Thomas Myles	Palle Lindgaard-Jørgensen (DHI) Kim Raben (DHI)

	Basin/Country	Contributing Experts	Twin2Go Staff
28	Tisza/Hungary	János Fehér (VITUKI) Judit Gáspár (VITUKI) Jan Sendzimir (NeWater researcher from the International Institute for Applied Systems Analysis) István Zsuffa (VITUKI) János Maginecz (VITUKI)	Björn Fokken (USF) Claudia Pahl-Wostl (USF) Christian Knieper (USF) Kathrin Knüppe (USF)
29	Volga/Russia	Wim Cofino (Wageningen University, Netherlands) Marina Fomenko (CADASTER Institute, Russia) Georgy Fomenko (Resources and Consulting, Russia) Alexander Ivanov (N. Novgorod State University on Architecture and Civil Engineering, Russia) Oleg Kaschenko (N. Novgorod State University on Architecture and Civil Engineering, Russia) Jacques Ganoulis (UNESCO Chair and Network INWEB. Hydraulics Laboratory, Civil Engineering Department Aristotle, Greece) Nina Poussenkova (Institute for World Economy and International Relations Russian Academy of Sciences, Russia) Yaroslav Sennik (AMMOPHOS, Russia) Olga Smaragdova (DESTIMA, Russia)	Elena Nikitina (EcoPolicy)

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Karma, Ageta, Y., Naito, N., Iwata, S. and Yabuki, H. (2003): Glacier distribution in the Himalayas and glacier shrinkage from 1963 to 1993 in the Bhutan Himalayas. *Bulletin of Glaciological Research*, 20, 29-40.

Subba, B. (2001): Himalayan Waters. – The Panos Institute, South Asia, 286 p. TERI (no year). Socio-economic scenarios for climate change impact in India. Available at: [HTTP://WWW.INFOBRIDGE.ORG/ASP/DOCUMENTS/3775.PDF](http://www.infobridge.org/asp/documents/3775.pdf)

Annex 1: Additional documents

Basin reports (questionnaires) on <http://www.twin2go.uos.de/downloads/35-basin-questionnaires>

1. T2G_D2.1_AMU-DARYA-UZBIKISTAN_WEB.pdf
2. T2G_D2.1_Baker_Chili_WEB.pdf
3. T2G_D2.1_BangPakong_Thailand_WEB.pdf
4. T2G_D2.1_Biobio_Chile_WEB.pdf
5. T2G_D2.1_Brahmaputra-Bhutan_WEB.pdf
6. T2G_D2.1_Brahmaputra-India_WEB.pdf
7. T2G_D2.1_Brahmaputra-Nepal_WEB.pdf
8. T2G_D2.1_Catamayo_Ecuador_WEB.pdf
9. T2G_D2.1_Catamayo_Peru_WEB.pdf
10. T2G_D2.1_Cauca_Colombia_WEB.pdf
11. T2G_D2.1_Coccibolca_Nicaragua_WEB.pdf
12. T2G_D2.1_Cuareim_Uruguay_WEB.pdf
13. T2G_D2.1_Elbe_Germany_WEB.pdf
14. T2G_D2.1_Guadiana_Spain_WEB.pdf
15. T2G_D2.1_Guayas_Ecuador_WEB.pdf
16. T2G_D2.1_Kyoga-Uganda_WEB.pdf
17. T2G_D2.1_Niger_Mali_WEB-draft.pdf
18. T2G_D2.1_Norrstrom-Sweden_WEB.pdf
19. T2G_D2.1_NURA_KAZAKSTHAN_WEB.pdf
20. T2G_D2.1_OKAVANGO_NAMIBIA_WEB.pdf
21. T2G_D2.1_Olifants_SouthAfrica-WEB.pdf
22. T2G_D2.1_ORANGE-SOUTH-AFRICA_WEB.pdf
23. T2G_D2.1_Quarai_Brasil_WEB.pdf
24. T2G_D2.1_RedRiver_Vietnam_WEB.pdf
25. T2G_D2.1_RHINE-THE_NETHERLANDS_WEB.pdf
26. T2G_D2.1_THAMES_UNITEDKINGDOM_WEB.pdf
27. T2G_D2.1_Tisza-Hungary_WEB.pdf
28. T2G_D2.1_Volga_Russia_WEB.pdf

Basin fact sheets available on <http://www.twin2go.uos.de/downloads/118-basin-fact-sheets>

1. Twin2Go_Factsheet_AmuDarya.pdf
2. Twin2Go_Factsheet_BangPakong.pdf
3. Twin2Go_Factsheet_Elbe.pdf
4. Twin2Go_Factsheet_Guadiana.pdf
5. Twin2Go_Factsheet_RedRiver.pdf
6. Twin2Go_Factsheet_Rhine.pdf
7. Twin2Go_Factsheet_Tisza.pdf
8. Twin2Go_Fact_Sheet_Baker.pdf
9. Twin2Go_Fact_Sheet_Catamayo.pdf
10. Twin2Go_Fact_Sheet_Cuareim-Quarai.pdf
11. Twin2Go_Fact_Sheet_Guayas.pdf
12. Twin2Go_Fact_Sheet_Kyoga.pdf
13. Twin2Go_Fact_Sheet_Lake Cocibolca.pdf
14. Twin2Go_Fact_Sheet_Nabajuzzi.pdf
15. Twin2Go_Fact_Sheet_Niger.pdf
16. Twin2Go_Fact_Sheet_Norrstrom.pdf
17. Twin2Go_Fact_Sheet_Olifants.pdf
18. Twin2Go_Fact_Sheet_Thames.pdf
19. Twin2Go_Fact_Sheet_Upper Cauca.pdf
20. Twin2Go_Fact_Sheet_volga.pdf
21. Twin2Go_Fact_Sheet_Brahmaputra.pdf

Presentations and workshop documents available on www.Twin2Go.eu (intranet)

Workshop	Presentations
Berlin, 05-07.05.2010	Twin2Go_WS_Berlin_Annex1-Participants.pdf
Chiang Mai, 25-27.03.2010	Twin2Go_WS_Thailand_Annex1-PresentationMaterials.pdf
Guwahati, 03-04.06.2010	Twin2Go_WS_India_Participants.pdf
Santiago de Chile, 27-28.04.2010	Twin2Go_WS_Chile_Annex1-WorkshopAgenda-ParticipantsList.pdf Twin2Go_WS_Chile_Annex3-Intro-Debels.pdf Twin2Go_WS_Chile_Annex4-keynote-Jouravlev.pdf Twin2Go_WS_Chile_Annex5-keynote-Hantke.pdf Twin2Go_WS_Chile_Annex6-keynote-Chevaleraud.pdf Twin2Go_WS_Chile_Annex7-keynote-Jacobi.pdf Twin2Go_WS_Chile_Annex8-keynote-Alarcón.pdf Twin2Go_WS_Chile_Annex9-keynote-Santoyo.pdf Twin2Go_WS_Chile_Annex10-basinPresentations.pdf
South Africa, 14-15.04.2010	Twin2Go_WS_SouthAfrica_Governance_Pahl-Wostl.pdf Twin2Go_WS_SouthAfrica_GovernanceSA_Karar-Moseki.pdf Twin2Go_WS_SouthAfrica_Institutional_Bofilatos.pdf Twin2Go_WS_SouthAfrica_intro.pdf Twin2Go_WS_SouthAfrica_IWRM_Dickens.pdf Twin2Go_WS_SouthAfrica_KyogaBasin.pdf Twin2Go_WS_SouthAfrica_NigerBasin.pdf Twin2Go_WS_SouthAfrica_OKACOM.pdf Twin2Go_WS_SouthAfrica_OrangeBasin.pdf Twin2Go_WS_SouthAfrica_Spreewald_Nowak.pdf