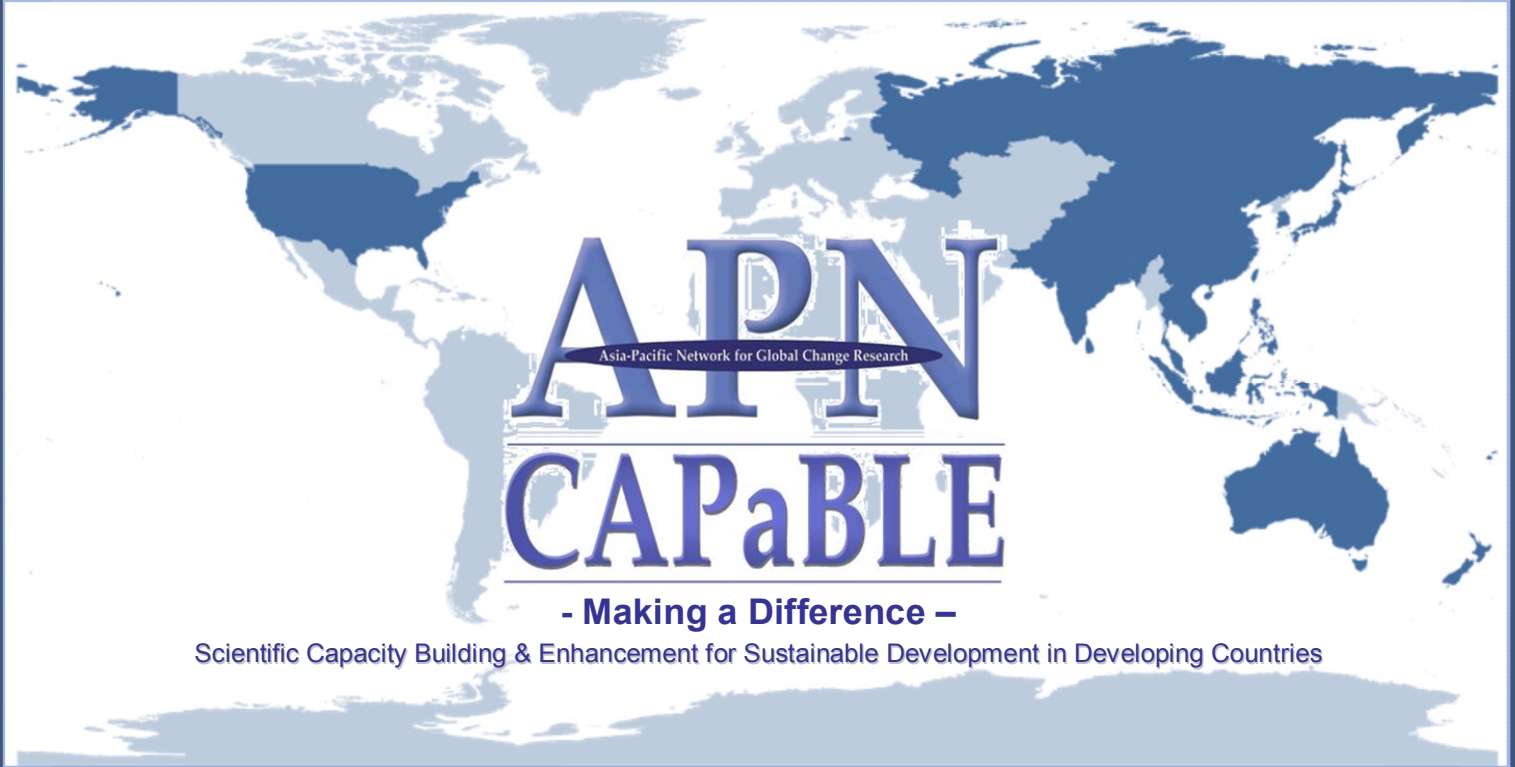


Governing Critical Uncertainties: Climate Change and Decision-Making in Transboundary River Basins



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Governing Critical Uncertainties: Climate Change and Decision-Making in Transboundary River Basins

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OVERVIEW OF PROJECT WORK AND OUTCOMES

Non-technical summary

A capacity building workshop was held in Chiang Mai, Thailand, 21–23 January 2013 to help increase understanding of the implications of analytical and normative uncertainties associated with climate change and other large-scale drivers for the governance of trans-boundary river basins. The mix of participants in terms of countries, expertise and disciplines allowed for a critical perspective on issues in several key transboundary river basins including the Indus, Ganges, Brahmaputra and Mekong. The deliberations underlined that in Asia, complex power relations demand explicit consideration of normative uncertainty in addition to the conventional focus on analytical uncertainty. Power imbalances, for instance, were noted as an important barrier to the flow of information and sharing of data, which increases uncertainty. It was recognized that it is often easier and more appropriate for negotiations to focus on sharing the benefits of water than just on the allocation of physical water flows. Participants and trainers jointly developed a set of propositions on uncertainty and the governance of transboundary river basins under a changing climate and committed to completing a co-authored synthesis article around some of these.

Keywords

- Uncertainty
- Transboundary River Basins
- Earth System Governance
- Asia
- Climate Change
- Capacity Building

Objectives

The main objectives of the project were:

1. Increasing understanding of early-career researchers of normative and analytical uncertainty as problem characteristic of global environmental change governance.
2. Expanding understanding of early-career researchers of the governance challenges posed by the uncertainties created by rapid land-use and water-use changes in the context of a changing climate for the management of transboundary rivers in the Asia-Pacific region.
3. Bringing together a community of researchers working on earth system governance in general and transboundary water governance in particular to jointly learn, stimulate dialogue and initiate new research endeavours.
4. Enabling early career researchers from the Asia-Pacific region to participate in an international workshop and to receive feedback and support from established colleagues and their own peers as well as policy makers.
5. Strengthening and broadening the network of early-career governance researchers in the Asia-Pacific region under the Earth System Governance Project's umbrella.

6. Contributing to the Flagship Activity on Earth System Governance and the Water Systems, as outlined in the Earth System Governance Project Science and Implementation Plan.

Amount received and number years supported

The Grant awarded to this project was:

US\$ 40,000 for Year 1

Activity undertaken

A three day workshop was held from 21-23 January 2013 at the Kantary Hills Hotel in Chiang Mai, Thailand. The workshop was organized by the Unit for Social and Environmental Research, Faculty of Social Sciences, Chiang Mai University and the Earth System Governance Project, sponsored by the Asia-Pacific Network for Global Change Research, and endorsed by the Global Water System Project. Five keynote speakers presented lectures on various aspects of governance under uncertainty in the field of Transboundary River Basins in Asia, and 14 early career researchers from the Asia-Pacific region presented case studies on governance and uncertainty of specific river basins in Asia.

Results

The workshop was well received by participants and trainers. In addition to stimulating academic discussions and knowledge transfer, the workshop practically served to reducing uncertainty by creating trust, exchanging views and information, and establishing relationships and social learning between the participants from many countries that share river basins. Participants and trainers developed a set of propositions on uncertainty in governance of transboundary river basins under climate change during the workshop that can serve as basis for future work and reference.

Relevance to the APN Goals, Science Agenda and to Policy Processes

The workshop succeeded in enhancing collaboration between researchers (both leading scientists and early-career researchers) in the region. It will built capacity of early-career researchers to better understand and shape future research on the normative, analytical and political aspects and implications of uncertainty for environmental governance. The workshop offered an opportunity for all participants to create new networks, strengthen existing connections and develop new ideas that could lead to greater synergies and improved research findings within the research community. The proposed workshop thus directly addressed APN's goal to support regional cooperation in global change research on issues relevant to the region (APN Strategic Plan, goal 1, instruments a and b), and through developing capacity of individual early career researchers the workshop also contributed to improving the scientific capabilities of nations in the region (APN Strategic Plan, goal 3). In particular, it contributed to improved understanding of the issue area Climate Change and Climate Variability as outlined in the APN Strategic Plan as well as many sub-items of the indicative topics like the institutional dimensions of global change in the domain of crosscutting concerns. The workshop also succeeded as an important networking opportunity and platform to initiate and combine momentum for new research on governance under uncertainty under the umbrella of the

Earth System Governance Project, hence has been of direct relevance to cooperation with global change networks and organisations (APN Strategic Plan, goal 4).

Self evaluation

The workshop was well structured to allow for detailed discussions from a variety of disciplinary perspectives; and from a variety of geographical and cultural backgrounds. This showed to be important and fruitful to overcome the general problem that all science is context-bound in the person of the scientist: Bringing together early-career scientists working on case studies on the same river-basins from different sides of the border generated genuinely new insight and mutual understanding and learning. Collaboration between the involved institutional actors (APN, USER, Earth System Governance Project) went very smoothly in the preparation and implementation phase, and the local team in Chiang Mai operated highly professionally thereby enabling participants and trainers to focus on content of the workshop. Overall, the objectives have been met.

Potential for further work

There is a great potential for further work. Building on the propositions on the politics of uncertainty and transboundary water governance, developed during the workshop, the organizers, trainers and participants aim at a collaboratively written scientific article that will combine theoretical elaborations on governance under uncertainty with the empiric case-studies from a number of Asian Pacific transboundary river basins as prepared and presented by the participants. Through an email list, participants also are keeping in contact and share relevant information and ideas for collaboration.

Publications (please write the complete citation)

This workshop did not yet produce any publications directly. A joint publication is in preparation. Inspired by the exchanges of knowledge and information, and enabled by the new collaborations and connections from the workshop, a number of publication ideas have emerged and will be followed up by the participants, if necessary with the support of the organizing institutions.

References

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Acknowledgments

We would like to acknowledge the generous funding of the Asia-Pacific Network for Global Change Research that made this workshop possible. We would also like to acknowledge the excellent work of the staff of the Unit for Social and Environmental Research at Chiang Mai University in administering the grant and efficient technical and administrative support during the workshop that enabled trainers, chairs and participants to focus on content.

Preface

Uncertainty has become the normal context in which regional water governance takes place. In order to address the challenges of certainty in transboundary water governance, a capacity building workshop for early career governance researchers in the region has been held successfully in Chiang Mai, Thailand from 21-23 January 2013. The workshop enabled joint learning and network development, stimulated dialogue and initiated new research endeavours.

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1.0 Introduction

Uncertainty has become the normal context in which regional water governance takes place. Early career researchers are often actively involved in policy debates about global environmental change in their home countries, and will have to undertake the research to better understand and deal with uncertainties in transboundary river basin governance.

Earth System Governance — a global research alliance — is the largest social science research network in the area of governance and global environmental change. The Earth System Governance research alliance takes up the challenge of exploring political solutions and novel, more effective governance mechanisms to cope with the current transitions in the biogeochemical systems of the planet. The normative context of this research is sustainable development; earth system governance is not only a question of institutional effectiveness, but also of political legitimacy and social justice.

The Earth System Governance Project —a long-term research project and global research network under the auspices of the International Human Dimensions Programme on Global Environmental

Change (IHDP) and soon joining Future Earth — is open to all social and natural scientists who are engaged in research on the governance of coupled socio-ecological systems, at all levels. Its global network includes many of the most prominent scientists in the field, along with numerous PhD students and early-career researchers. The Earth System Governance Project already plays an important role in conducting, synthesizing, and sharing research on environmental governance including the role of knowledge and uncertainty at all levels, from the local to the regional and global, and emphasizes the inclusion of young scholars in these endeavors.

The Earth System Governance Project has a strong presence in Asia and the Pacific and recognizes that this region will face particularly grave challenges if global environmental change continues unabated. To facilitate strategic thinking about how to address the governance challenges related to uncertainty and transboundary river basin governance in Asia and the Pacific, and to better prepare the next generation of scholars for the task, we held a three-day workshop to build capacity amongst early career governance researchers in the region in Chiang Mai, Thailand, 21-23 January 2013. Five keynote speakers presented lectures on various aspects of governance under uncertainty in the field of Transboundary River Basins in Asia, and 14 early career researchers from the Asia-Pacific region presented case studies on governance and uncertainty of specific river basins in Asia.

1.1. Thematic Focus

The workshop's topic has been imbedded in the broader research framework of the Earth System Governance Project. The Earth System Governance research alliance advances a research strategy (Biermann et al. 2009; 2010a; 2010b) that is organized around five analytical problems: The problem of the overall architecture of earth system governance, of agency beyond the state and of the state, of the adaptiveness of governance mechanisms and processes and of their accountability and legitimacy, and of modes of allocation and access in earth system governance. These research problems have been identified based on an analysis of the current state of research, of recent theoretical developments, as well as societal demands.

In addition, the research strategy emphasizes four crosscutting themes that are crucial for the study of each analytical problem but also for the integrated understanding of earth system governance: The role of power, knowledge, norms, and scale.

Finally, the Earth System Governance research alliance advances the integrated, focused analysis of case study domains in which researchers combine research on the analytical problems and crosscutting themes, and collaborate with the natural sciences. One of these is the global water system.

The Earth System Governance Science and Implementation Plan (Biermann et al. 2009) outlines the research programme in detail and is available in English, Japanese, and Spanish at www.earthsystemgovernance.org.

The workshop was inspired by this analytical framework, in particular the crosscutting theme of **knowledge** and the **global water system** research domain.

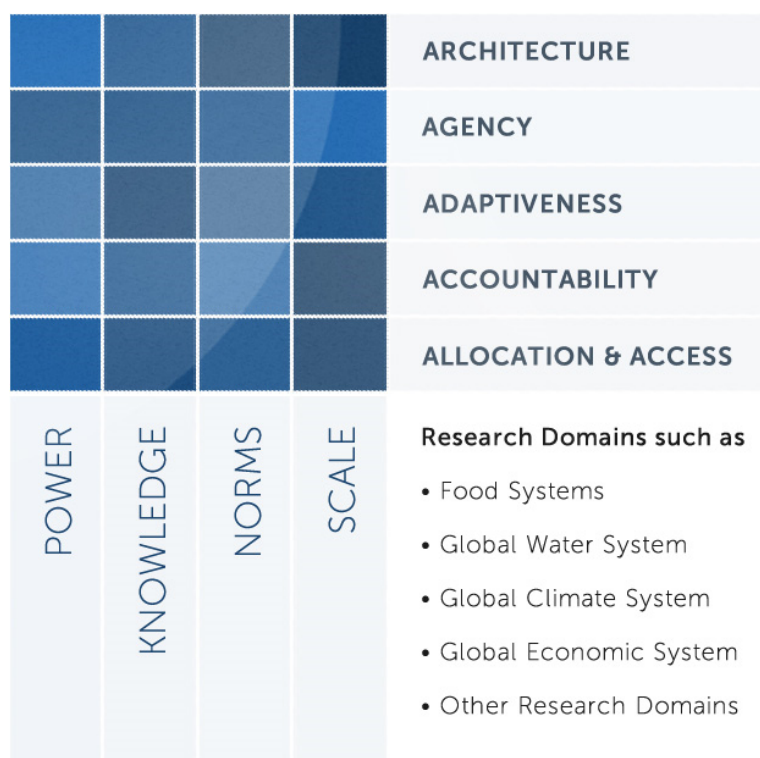


Figure 1: Earth System Governance Research Framework

Most problems of earth system transformation are unprecedented. The adequate policies, politics and, especially, modes of allocation and adaptation are uncertain and contested. Normative uncertainty requires the development of new norms and conceptual frameworks for global collective action in uncharted territory. Research therefore needs to be reflexive and pay attention to how particular worldviews shape scientific research or how scientists deal with problems of uncertainty and lack of quantifiable knowledge of human behaviour.

The governance of transboundary river basins is marked by persistent uncertainty regarding the causes of climate change, its impacts, the interlinkage of various causes and response options, and the effects of possible response options. These uncertainties can be classified in many ways, for example, with respect to magnitude, source and system and are multi-level and interdependent. The perception and subsequent role in governance of these uncertainties depends on interests but also cultural settings. In the Asian region, the entrenched relation between geo-politics and transboundary river basin governance adds another layer of governance and uncertainty and demands explicit consideration of normative uncertainty in addition to analytical uncertainty.

Rivers like the Mekong-Lancang, Brahmaputra, Red River, Salween-Nu, Ganges and Indus provide many services crucial for local livelihoods, national development, as well as regional stability and cooperation. They are also a source of regional tensions and natural disasters. Globalisation and environmental change, potentially leading to tipping points in natural systems, pose new and uncertain risks in these basins. These uncertain risks have become the normal context in which regional water governance takes place.

1.2. Objectives

The main objectives of the workshop were:

- Increasing understanding of early-career researchers of normative and analytical uncertainty as problem characteristic of global environmental change governance.
- Expanding understanding of early-career researchers of the governance challenges posed by the uncertainties created by rapid land-use and water-use changes in the context of a changing climate for the management of transboundary rivers in the Asia-Pacific region.
- Bringing together a community of researchers working on earth system governance in general and transboundary water governance in particular to jointly learn, stimulate dialogue and initiate new research endeavours.
- Enabling early career researchers from the Asia-Pacific region to participate in an international workshop and to receive feedback and support from established colleagues and their own peers as well as policy makers.
- Strengthening and broadening the network of early-career governance researchers in the Asia-Pacific region under the Earth System Governance Project's umbrella.
- Contributing to the Flagship Activity on Earth System Governance and the Water Systems, as outlined in the Earth System Governance Project Science and Implementation Plan

With these main objectives, the workshop thus directly addressed APN's goal to support regional cooperation in global change research on issues relevant to the region (APN Strategic Plan, goal 1, instruments a and b), and through developing capacity of individual early career researchers the workshop also contributed to improving the scientific capabilities of nations in the region (APN Strategic Plan, goal 3). Attention has been paid to strengthening interactions among scientists and policy makers (APN Strategic Plan, goal 2, instrument b), here in particular on local scale.

The Earth System Governance Project is designed as the central nodal point within the global change research programmes to guide, organize and evaluate various activities on governance (see www.earthsystemgovernance.org). The workshop was explicitly also intended as an important networking opportunity and platform to initiate and combine momentum for new research on governance under uncertainty, in particular related to governance of transboundary rivers in Asia-Pacific region. It thus was of direct relevance to cooperation with global change networks and organisations (APN Strategic Plan, goal 4).

In addition to this, the Unit for Social and Environmental Research at Chiang Mai University (the host) is a Research Centre in the project's network. Earth System Governance Research Centres are hubs that support the implementation of specific parts of the Earth System Governance Science Plan and act as focal points for earth system governance research in their geographical and thematic area.

2.0 Methodology

2.1. Scheduling of the workshop

Based on the availability of speakers we decided to organize the workshop 21-23 January 2013. This also offered participants and trainers the opportunity to combine the workshop with the 2013 Earth

System Governance Tokyo Conference. The Earth System Governance Tokyo Conference, held 28-31 January 2013 at the United Nations University Headquarters in Tokyo, Japan, was part of the global conference series organized by the Earth System Governance Project and jointly hosted by the United Nations University Institute of Advanced Studies (UNU-IAS), the International Environmental Governance Architecture Research Group and the Tokyo Institute of Technology on behalf of the Earth System Governance Project.

2.2. Application and Selection Process

We put out a call for applications in August 2012 (see Appendix 3). It was distributed widely and was posted in the Earth System Governance Newsletter, on the Earth System Governance Project website and throughout USER and Earth System Governance project's networks in the region as well as extensively via social media.

We received 43 formally correct and complete applications. The applications included an abstract (300-500 words) for a short paper to be presented at the workshop focusing on a specific case-study and river-basin; and curriculum vitae (with list of publications). These applications were evaluated by the project collaborators first against basic criteria (i.e. applicant is 'early career', abstract is on transboundary water governance, etc.). We then closely evaluated each application based on a further set of criteria including the relevance of case study to the question of uncertainty, as well as academic merit, need for capacity building, and 'fit' with workshop themes.

We did specifically aim for a broad distribution of scholars in terms of their country of residence and river basin studied. In line with the mandate of the Asia-Pacific Network for Global Change Research, we intended to give priority to applications from developing countries in the Asia-Pacific region. But also in this regard, the selection procedure as described above, already resulted in a group of candidates with a clear strong representation of early-career researchers from developing countries.

We accepted applications from 15 participants. Together with 5 trainers and 2 co-chairs, and 4 observers they formed a diverse group coming from Australia (3), Bangladesh (2), Bhutan (1), Canada (1), China (1), India (3), Nepal (1), Pakistan (2), Russia (2), Philippines (1), Sweden (1), Thailand (6) and USA (1). While all participants had academic backgrounds in a range of relevant disciplines including political science, meteorology, civil engineering, and law, a number of them currently have positions in NGOs, diplomacy or business (see also detailed participant and trainer profiles in appendix 2). This was important because uncertain risks have become the normal context in which regional water governance takes place already. This diverse composition of the group was very beneficial for an active and constructive discussion and learning not only through lectures by the trainers but also through peer-to-peer interactions.

The selected participants for support by APN were:

1. Jakerul Abedin, Macquarie University, Australia¹
2. Tasnia Alam, North South University, Bangladesh
3. Hasrat Arjjumend, Grassroots Institute, India
4. Luqman Atique, CIIT Islamabad, Pakistan

¹ Participant had to leave Chiang Mai already before start of the workshop due to personal circumstances.

5. Kshitij Bansal, Rajiv Gandhi National University of Law, India
6. Chanagun Chitmanat, Maejo University, Thailand
7. Arpita Das, Tata Institute of Social Sciences, India
8. Hari Bansha Dulal, George Mason University, USA²
9. Dulce Elazegui, University of the Philippines Los Baños College, The Philippines
10. Prakash Gaudel, Nepal Electricity Authority, Nepal
11. Khalid Hossain, RMIT University, Australia
12. Asif Iqbal, World Vision Pakistan, Pakistan
13. Om N. Katel, Royal University of Bhutan, Bhutan
14. Medha Khatiwada, Asian Institute of Technology, Thailand
15. Zahidur Rahman, Prodipan, Bangladesh

The workshop trainers were:

16. Chayanis Krittasudthacheewa, Stockholm Environment Institute (Bangkok), Thailand
17. Louis Lebel (*co-chair*), Chiang Mai University, Thailand
18. Tom Maesham, CSIRO, Australia
19. Carl Middleton, Chulalongkorn University, Thailand
20. Eduard Podgaisky, Russian State Hydrometeorological University, Russia
21. Jianchu Xu, Kunming Institute of Botany, China
22. Ruben Zondervan (*co-chair*), Earth System Governance Project; and Lund University, Sweden³

In addition following persons attended as observers:

23. Carrie Mitchell, IDRC, Canada
24. Elena Shestakova, Siberian Federal University, Russia
25. Orn-uma Polpanich Khun, Stockholm Environment Institute (Bangkok), Thailand
26. Phimpakan Lebel, Unit for Social and Environmental Research, Thailand

Following the selection procedure, the results were communicated to all applicants and Letters of Invitation were provided to all those requiring assistance with visa applications.

² Participant had to cancel participation last-minute due to travel complications.

³ Without financial support by APN

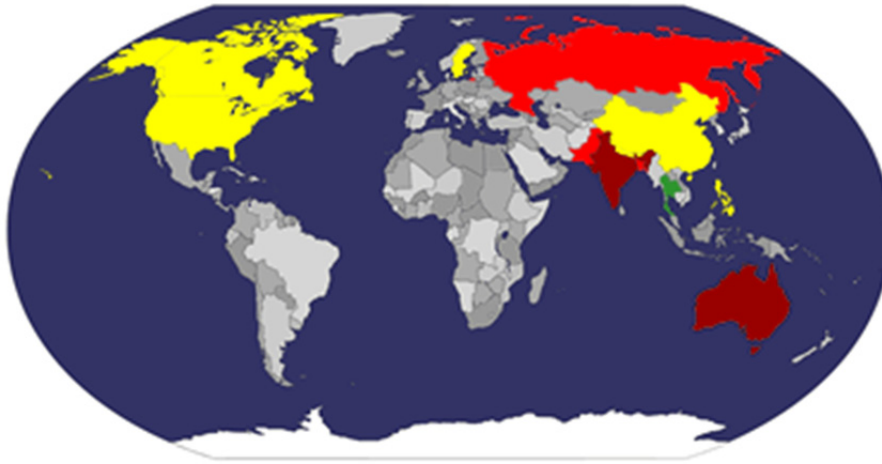


Figure 2: Graphic overview of the diversity in country of residence of participants (green: 6 participants; maroon: 3; red: 2; yellow: 1.)

Map created with: © worldmapmaker.com

2.3. Preparation Process

Project Activities 2012-2013

Project Activities	Year 1 (2012/2013)											
	(from 01 June 2012 – 31 May 2013)											
	1	2	3	4	5	6	7	8	9	10	11	12
Organisation (administration, accounting, communication)	█	█	█	█	█	█	█	█				
Invitation lead researchers and launching CfA early career researchers	█	█										
Application period early career researchers		█	█	█								
Application review and selection and initial communication with participants				█	█							
Organisation (content, programme design) and online discussions / information sharing					█	█	█	█				
Organisation (on-site logistics, venue							█	█				

etc)												
Capacity Building Workshop in Chiang Mai, Thailand												
Reporting (content) and preparation of workshop follow-up / publications												
Reporting (APN project report and financial reporting)												

Figure 4: Project time table

By the October 2012, trainers had been secured and a preliminary program prepared. Between October 2012 and December 2013 travel arrangements were made for participants and trainers through the travel agent of Lund University by the Earth System Governance International Project Office.

Full papers were due one month prior to the workshop. This allowed for all of the papers to be distributed to the participants, and trainers ahead of time. All of the papers are provided in the CD attached to this report.

All participants have been issued a certificate of participation.

2.4. Workshop Program

The workshop program (see appendix 1) was built around sessions with four different formats:

2.4.1. Short Presentations

We decided against the ‘traditional’ format of paper presentations of 20-30 minutes or longer followed by question and answers and discussion. Instead, we asked the participants to present their paper in a well prepared presentation (‘sales pitch’) of maximum 10 minutes. The rationale behind this has been threefold:

First, based on previous experiences with capacity building workshops and summer schools under the umbrella of the Earth System Governance Project, there was a desire to avoid longer detail-rich presentations on topics not familiar or relevant to all participants. The aim of the 10 minute format was to force speakers to present in such a manner that the key take-home messages were clearly communicated (or even ‘sold’), which opened up more opportunities for the participants to discuss how their interests intersected.

Second, due to budgetary and scheduling constraints, limited time (two full days) was available for presentations. The short format allowed sufficient time for discussion and tutoring (which were the main priority), while still enabling all of the participants to hear all of the presentations (i.e. no breakout groups for presentations).

Third, based on previous experiences with capacity building in the Asia-Pacific region, the co-chairs understood the need for capacity building beyond purely academic writing and networking. Presentation skills and the ability to communicate with a wide audience are particularly important for those operating in the field of environmental governance. In our view, the shorter a presentation, the better considered and prepared the presentation needs to be. The short format does not permit presentations with numerous data-heavy slides that lack reflection or context. The ability to give a short talk also translates well into science-policy communication (government officials often don't have the time to hear a 20-30 minute presentation) and work with the media.

During the preparation phase of the workshop, we have repeatedly stressed the importance of a good and above all short presentation. Participants came well prepared and without exception managed to present their papers within the given time limit without sacrificing content.

2.4.2. Breakout groups became plenary discussions

Initially it was planned to have breakout groups after each presentation session in which related papers could be discussed. All participants (except the authors) could decide which breakout session to attend based on their interest in a paper or by having been convinced by the short presentation. Due to two participants having to withdraw from the workshop last-moment and good time management, as well as the realization that nearly all presentations were relevant for all participants and included unique elements, it was decided on-site to not split the group into parallel session. Instead, sets of related case-studies were discussed in plenary sessions. These discussions had strong value in terms of peer-to-peer capacity building; intense exchange among participants from opposite sides of borders provided mutual learning opportunities for participants and trainers.

2.4.3. Keynote Lectures

We invited the 5 trainers to give lectures of 45 minutes each (*in order of programme*):

1. Ruben Zondervan (*co-chair*), Earth System Governance Project; and Lund University, Sweden. *"The Earth System Governance Research Framework"* (short introductory presentation)
2. Louis Lebel (*co-chair*), Chiang Mai University, Thailand. *"Governance and uncertainties in transboundary river basins"*
3. Eduard Podgaisky, Russian State Hydrometeorological University, Russia. *"Uncertainty, our daily business. Reflections from weather science"*
4. Carl Middleton, Chulalongkorn University, Thailand. *"The Politics of Normative Uncertainty in Transboundary Water Governance in the Mekong Basin: Divergent Values, Vested Interests and Savvy Strategies"*
5. Tom Maesham, CSIRO, Australia. *"Participatory and learning approaches to coping with uncertainty and water governance"* (workshop)
6. Jianchu Xu, Kunming Institute of Botany, China. *"Interactions between climate change, land-use and water use"*
7. Chayanis Krittasudthacheewa, Stockholm Environment Institute (Bangkok), Thailand. *"Analyzing and modeling uncertainties"*

We are grateful to the keynote speakers for giving highly relevant and very interesting presentations that were well received by all participants.

Please refer to Appendix 2 for more information about the speakers.

2.4.4. Social and Networking events

As one of the objectives of the workshop has been “bringing together a community of researchers working on earth system governance in general and transboundary water governance in particular”, we have placed emphasis on and provided opportunities for social interaction and network development. This included long, well catered coffee breaks and lunches in a convenient setting at the Kantary Hills Hotel venue. In addition we have been able to invite all participants to a welcome dinner with a music performance by local artists.

3.0 Results & Discussion

In total, 20 interesting and generally strong presentations were made in this two-day-workshop, out of which 13 by the early career researchers. The workshop brought together a balanced, interesting and collaborative group of early career researchers from across the region and various academic disciplines to enhance their interdisciplinary capacity, stimulate dialogue, and initiate disciplinary synergies. The process of engagement and interaction before the workshop and during the workshop, including over lunches and dinners, built the capacity of young researchers. It enabled them to present their research at an international workshop and to receive feedback and support from each other and from established colleagues, and bringing these young researchers in contact with the regional and global research communities and projects. The human network developed in this program has potentials to harness further with focused and thematic work on governance, uncertainty and transboundary river management in Asia-Pacific region.

In particular having case studies on transboundary river basins presented and discussed by early-career researchers coming from upstream and downstream countries sharing a river basin, provided a rich and balanced perspective to a situation in which a lot of the politics around river basins in the region have little to do with water but influence positions, cooperation and negotiations about water and river governance. Or as one participant stated, these rivers “historically share blood, border, and water since ages”. Conversely cooperation on water may assist reduce conflicts in other areas. Such cooperation can and should include scientific collaboration and joint capacity.

It that sense, the workshop contributed to reduce uncertainty already by creating trust, exchanging views and information, and establishing relationships and social learning between the participants. The workshop thus directly addressed APN’s goal to support regional cooperation in global change research on issues relevant to the region and through developing capacity of individual early career researchers and stakeholders the workshop also contributed to improving the scientific capabilities of nations in the region.

As the Earth System Governance Project is designed as the central nodal point within the global change research programmes to guide, organize and evaluate various activities on governance (see www.earthsystemgovernance.org) the event also was an important networking opportunity and

platform to initiate and combine momentum for new research on governance under uncertainty of transboundary rivers in Asia within the global research community.

Participants and trainers developed a set of prepositions on uncertainty in governance of transboundary river basins under climate change during the workshop and there is strong commitment and a process in place to synthesize these into a scientific article co-authored by all trainers and participants. This article will use the empirical case studies on many river basins in Asia prepared before and presented at the workshop by the participants.

The programme design with short presentations (see 2.4.1.) followed by sufficiently long and well moderated plenary discussions (see 2.4.2.) has been advantageous. For most presenters this format required from them to prepare their presentation differently than they would usually do. This led them to (re) consider routines in presentations and clearly provided them new knowledge and experience.

Inspired by the exchanges of knowledge and information, and enabled by the new collaborations and connections from the workshop, a number of publication ideas have emerged and will be followed up by the participants, if necessary with the support of the Earth System Governance Project in general and the co-chairs of the workshop in particular. They will also stay in contact with participants about publication plans for the papers presented at the workshop.

For this purpose, a shared dropbox folder has been created where all participants can access all presentations and papers as well as related academic literature related to the workshop theme. Also, a google-group has been set-up during the last day of the workshop that is used to communicate workshop follow-up information as well as other information and announcements related to uncertainty in transboundary river governance.

Participants and trainers developed a set of prepositions on uncertainty in governance of transboundary river basins under climate change during the workshop and there is strong commitment and a process in place to synthesize these into a scientific article co-authored by all trainers and participants. This article will use the empirical case studies on many river basins in Asia prepared before and presented at the workshop by the participants.

These propositions, that can be read as results and output of the workshop are following:

1. Uncertainties can be classified in many ways, for example, with respect to magnitude, source and system. For exploring issues in the governance of transboundary rivers under a changing climate it is also important to consider the interactions among different types of uncertainties.
2. How people understand and perceive uncertainties depends on individual characteristics, including interests or stakes, but also cultural settings.
3. How different people represent uncertainties is an important dimension of the politics around water infrastructure and management decisions.
4. Sharing of data can reduce informational and perhaps also normative uncertainties; conversely lack of information and transparency increases uncertainties.

5. Sharing of understanding through participatory and deliberative processes that creates new knowledge and trust help reduce severity of conflicts and normative uncertainties but do not necessarily produce consensus or reduce knowledge related uncertainties.
6. Uncertainties and relatively more certain trends may intersect to create crisis. For example, long-term trends of increasing water demand make a place increasingly less resilient to a dry year in a variable climate even in the absence of any climate change.
7. An important (and hopeful) insight from studies of how people understand weather forecasts is that many people prefer some level of uncertainty to be communicated rather than an exact figure, and that even when an exact figure is given, people assume some level of uncertainty around it.
8. Uncertainties in transboundary river basins may be easier to negotiate around if focus is on sharing the 'benefits' of water (food, energy, ecosystems) rather than just physical flows of water. Just and fair outcomes also depend on attention to who shares with whom.
9. At the same time a lot of politics between states is about issues that have little to do with water and this can influence positions, cooperation and negotiations about rivers and water. Conversely cooperation on water may assist reduce conflicts in other areas.
10. Participatory processes that are inclusive and deliberative – while not without shortcomings, costs and challenges – can make significant contribution to adaptation at different scales in complex situations like those represented by transboundary rivers under a changing climate and multiple uncertainties. At the international level they may help inform or otherwise shape more formal government-to-government negotiations.
11. Insights on governance of uncertainties in transboundary rivers do not only come from consideration of relations between states and contributions to national interests but also very much from impacts and responses at local levels, for example, with respect to livelihoods and gender.
12. The politics around scale – from regional through national to local impacts and interests – intersect with the politics of uncertainty. The influence of combination, for example, in form of discourses that shape agendas or negotiations, on governance of transboundary rivers need further investigation.
13. There seems to be a scale dilemma: actions within a country require regional cooperation to be successful, but regional cooperation requires coordination within a country to proceed.
14. Higher uncertainties may arise when considering multiple factors, for example, climate change and hydropower development. Moreover, "land-use decisions are also water-use decisions".
15. There are modeling, scenario-building and other decision-support tools which can help explore uncertainties and robustly inform decisions or negotiations in conditions of high uncertainties. "Uncertainty is unavoidable".

4.0 Conclusions

The Workshop on Governing Critical Uncertainties: Climate Change and Decision-Making in Transboundary River Basins brought together a community of researchers working on earth system governance in general and transboundary river basin governance in particular to jointly learn, discuss research, and initiate new research endeavors.

With the generous support of the Asia-Pacific Network for Global Change Research the workshop enabled early career researchers from the Asia-Pacific region to participate in an international workshop and to receive feedback and support from established colleagues and their own peers and the workshop contributed to improved awareness and skills in research and research presentation and communication.

As such, the workshop met the objectives. The workshop was well structured to allow for detailed discussions on a range of topics from a variety of disciplinary perspectives. In addition, the overall setting allowed for good network development between participants and between participants and senior scholars and organisers.

5.0 Future Directions

Some workshop participants have applied to become Research Fellows in the Earth System Governance Project or for related other events by the Earth System Governance Project or other organizations⁴ thereby becoming engaged in this field of research in a more structural way. This contributes to our conclusion that this workshop is evolving from a one-off successful event to the start of a long-term research collaboration in a global network with a strong (and growing) regional presence in the Asia Pacific.

The process to synthesize the propositions into a scientific article co-authored by all trainers and participants is advancing slowly but steadily and will result in a clearly visible product from the workshop but also serve as a point of reference for the future research, policy, and advocacy by the participants in the area of governance under uncertainty in transboundary river basins.

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⁴ Including the "Uncertainties in the context of Earth system governance, its goals, effects and costs" session at the Interdisciplinary Conference of Young Earth System Scientists (<http://www.earthsystemgovernance.org/events/2013-05-08-uncertainties-earth-system-governance>), the GWSP Conference "Water in the Anthropocene: Challenges for Science and Governance. Indicators, Thresholds and Uncertainties of the Global Water System" (<http://www.earthsystemgovernance.org/events/2012-09-10-water-anthropocene>) and the Summer School on Scale in Earth System Governance: Local Case Studies and Global Sustainability (APN CBA2013-11NSY-Pakharkova, <http://www.earthsystemgovernance.org/events/2013-05-03-scale-earth-system-governance>).

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Appendices

Appendix 1 – Workshop program

Appendix 2 – Participant & Trainers Profiles

Appendix 3 – Call for Application

Appendix 4 – Participant List

Appendix 5 – Funding Sources Outside the APN

Appendix 6 – Participant Feedback

Appendix 1: Workshop Programme



Workshop on Governing Critical Uncertainties: Climate Change and Decision-Making in Transboundary River Basins

21-23 January 2013, Chiang Mai, Thailand

Programme

Organized by the Unit for Social and Environmental Research, Faculty of Social Sciences, Chiang Mai University
(www.sea-user.org)
and the Earth System Governance Project (www.earthsystemgovernance.org)

Sponsored by the Asia-Pacific Network for Global Change Research (www.apn-gcr.org)
Endorsed by the Global Water System Project (www.gwsp.org)

Workshop aims to help early career researchers:

- Increase their understanding of the implications of analytical and normative uncertainties associated with climate change and other large-scale drivers for the governance of trans-boundary river basins;
- Strengthen and expand their network with other early career researchers as well as more established experts in the Asia-Pacific region and beyond.

Workshop themes:

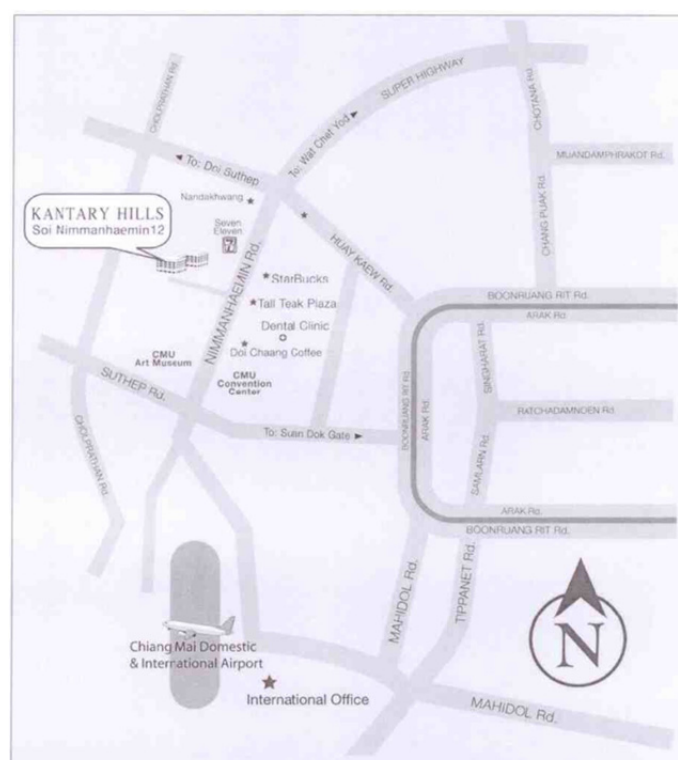
Earth system transformation is marked by persistent uncertainty regarding the causes of environmental change, its impacts, the interlinkage of various causes and response options, and the effects of possible response options. Uncertainty is not only analytical but also normative. Normative uncertainty refers to uncertainty with respect to goals and perceptions of acceptable risk. Most problems of earth system transformation are unprecedented. The adequate policies, politics and, especially, modes of allocation and adaptation are uncertain and contested. Normative uncertainty requires the development of new norms and conceptual frameworks for collective action at multiple scales in uncharted territory. Research therefore needs to be reflexive and pay attention to how particular worldviews shape scientific research or how scientists deal with problems of uncertainty and lack of quantifiable knowledge of human behaviour.

Rivers like the Mekong-Lancang, Brahmaputra, Red River, Salween-Nu, Ganges and Indus provide many services crucial for local livelihoods, national development, as well as regional stability and cooperation. They are also a source of regional tensions and natural disasters. Globalisation and environmental change, potentially leading to tipping points in natural systems, pose new and uncertain risks in these basins. These uncertain risks have become the normal context in which regional water governance takes place.

The workshop will address the governance challenges posed by uncertainties related to climate change, land-use and water-use changes focussing on the management of transboundary rivers in the Asia-Pacific region.

Location

Accommodation and meeting: *Kantary Hills Hotel*, 44 Nimmanhaemin Rd, Chiang Mai, Thailand



Agenda – Day 1, 21 January 2013

Morning & afternoon	Arrival at Chiang Mai	
18.00 – 19.00	Workshop opening and welcome Welcome on behalf of Chiang Mai University, Unit for Social and Environmental Research Welcome on behalf of ESG <i>and short presentation of ESG research framework</i> Short self-introductions by all participants	Louis Lebel Ruben Zondervan
19.00 –	Welcome Dinner	

Agenda – Day 2, 22 January 2013

08.30 – 09.00	Coffee/Tea	
09.00 – 10.30	Plenary Session Keynote 1 - <i>Governance and uncertainties in transboundary basins</i> Keynote 2 – <i>Uncertainty, our daily business. Reflections from weather science</i>	<i>Chair: Ruben Zondervan</i> Louis Lebel Eduard Podgaisky
10.30 – 11.00	Coffee / Tea	
11.00 – 13.00	Parallel Panel 1 1 <i>What is to blame for flood, drought and salinity in Bangladesh? The fuzzy line between climate change and transboundary river management</i> 2 - <i>Impact of climate change and transboundary water issues: Case study on Bangladesh-India bilateral relation</i> 3 - <i>Understanding the Nature of Risk in the Context of Climate and Implications on River Basin Governance</i> 4 - <i>Impact of Trans-Boundary River on Women’s Livelihood in the South Coast of Bangladesh</i>	<i>Chair: Chayanis Krittasudthacheewa</i> Khalid Hossain Tasnia Alam Dulce Elazegui Zahidur Rahman
	Parallel Panel 2 5 - <i>Governing Climate Adaption in Ganges Basin: Assessing Needs and Capacities</i> 6 - <i>The Need of Regional Co-operation in Transboundary Water Resources Management in the Context of Uncertain Environmental Change</i> 7 - <i>The Ganges-Brahmaputra-Meghna (GBM) Watershed Governance: Potential for A Multilateral Regulatory and Integrated Management under International Law</i> 8 - <i>Improving Governance for Regional Adaptation to Climate Change in the Brahmaputra</i>	<i>Chair: Xu Jianchu</i> Hari Bansha Dulal Om N. Katel Jakerul Abedin Arpita Das
13.00 – 14.00	Lunch	
14.00 – 15.30	Parallel Discussion Session 1 <i>Discussion on papers 1-4</i>	<i>Chair: Chayanis Krittasudthacheewa</i>
	Parallel Discussion Session 2 <i>Discussion on papers 5-8</i>	<i>Chair: Xu Jianchu</i>
15.30 – 16.00	Coffee / Tea	

16.00 – 16.45	Plenary Session Keynote 3 – The Politics of Normative Uncertainty in Transboundary Water Governance in the Mekong Basin: Divergent Values, Vested Interests and Savvy Strategies	<i>Chair: Eduard Podgaisky Carl Middleton</i>
16.45 – 18.00	Workshop (Participatory and learning approaches to coping with uncertainty and water governance)	<i>Facilitator: Tom Measham</i>
19.00 –	Informal Dinner	

Agenda – Day 3, 23 January 2013

08.30 – 09.00	Coffee/Tea	
09.00 – 10.30	Plenary Session Keynote 4 – <i>Interactions between climate change, land-use and water use</i> Keynote 5 – <i>Analyzing and modelling uncertainties</i>	<i>Chair: Eduard Podgaisky Xu Jianchu Chayanis Krittasudthacheewa</i>
10.30 – 11.00	Coffee / Tea	
11.00 – 13.00	Parallel Panel 3 9 - <i>How to harmonise this confused discourse towards conflict resolution?</i> 10 - <i>Examining Uncertain Justice in Benefits-Sharing Programs for Climate Change Mitigation Projects in the Mekong Region</i> 11 - <i>Governing Critical Uncertainties: Climate Change and Decision-Making in Transboundary River Basins</i>	<i>Chair: Carl Middleton Kshitij Bansal Kimberly Suiseeya Medha Khatiwada</i>
	Parallel Panel 4 12 - <i>New Challenges of Transboundary Water Conflicts and Climate Change for Governance of Indus River Basin</i> 13 - <i>Polity Involved in Transboundary River Kabul Basin</i> 14 - <i>Implications of Proposed Budhi Gandaki Storage Project on Nepal-India Water Relation in Changing Climatic Regime</i> 15 - <i>From the Indus to the Mississippi, Climate Change Touches Us All</i> 16 – <i>Lesson learnt from efforts to manage water following extreme events and its effects on Tilapia cage culture in northern Thailand</i>	<i>Chair: Tom Measham Hasrat Arjumend Luqman Atique Prakash Gaudel Asif Iqbal Chanagun Chitmanat</i>
13.00 – 14.00	Lunch	
14.00 – 15.30	Parallel Discussion 3 <i>Discussion on papers 9-11</i>	<i>Chair: Carl Middleton</i>
	Parallel Discussion 4 <i>Discussion on papers 12-16</i>	<i>Chair: Tom Meesham</i>
15.30 – 16.00	Coffee / Tea	
16.00 – 17.00	Workshop (Key messages and propositions)	<i>Facilitator: Louis Lebel</i>
17.00 – 17.30	Workshop Wrap-Up Follow-up activities Official closing	Ruben Zondervan

Appendix 2: Participant & Trainers Profiles

Trainers



Louis Lebel is the director of the Unit for Social and Environmental Research (USER) at the Faculty of Social Sciences, Chiang Mai University, Thailand. He has been at Chiang Mai University since 1999 and began working in Thailand in 1991. His interests include: global environmental change, livelihoods, public health, development studies, aquaculture, consumption and water governance. He has led several multi-centre comparative studies and contributed significantly to several research networks in the Southeast Asia region including M-POWER and SUMERNET. He is on the editorial board of six journals and is a member of the scientific steering committee of the Earth System Governance Project. For further details see: www.sea-user.org



Chayanis Krittasudthacheewa is the Deputy Director of Stockholm Environment Institute – Asia Centre (SEI-Asia), Thailand, with over ten years of professional experience in the developing countries. Prior to joining SEI, she served as an office in charge of the hydrology team of the Mekong River Commission Secretariat in Cambodia and Lao PDR. Chayanis has extensive experience in research management and coordination with multi-stakeholders and specializes in the fields of hydrology, integrated water resources management and water resources modeling. Chayanis is currently managing the Sustainable Mekong Research Network (SUMERNET, www.sumernet.org), a long-term research network delivering credible research to influence sustainable development policy. She holds a Ph.D. in Hydrology and Water Resources Engineering from the University of Tokyo, Japan.



Tom Measham leads a team of researchers at CSIRO Ecosystem Sciences (Australia) focused on regional and community sustainability. He is also an Adjunct Associate Professor in the Fenner School at the Australian National University. Tom has 15 years applied research experience, focusing on how regional communities respond to the social and environmental challenges which face them, drawing on deliberative theories and concepts of social learning. Amongst his publications are 2 books, 6 book chapters and 17 journal papers. He was part of the team which won the 2009 Eureka Award for Innovative Solutions to Climate Change and serves as a professional member of the Australian National Curriculum Reference Panel for Geography.



Carl Middleton is a lecturer on the International Development Studies Program in the Faculty of Political Science, Chulalongkorn University, Thailand. Before joining the program in 2009, he spent eight years working with international and local civil society organizations throughout the Mekong Region. His research interests are the politics and policy of the environment in Southeast Asia, with a particular focus on environmental justice and the political ecology of water and energy resources.



Edward Podgaisky is Director-General of Center for Transboundary Cooperation-St Petersburg, environmental NGO in Russia dealing with issues of climate change and energy efficiency awareness raising. He is also employed at the Russian State Hydrometeorological University where he is involved in a number of international projects in meteorological and environmental education and training. He is a member of the World Meteorological Organization's Task Team on Distance and Online Learning, head of EUMETCAL technical working group and academic secretary of Russian Association of universities in hydrology and meteorology. He has been involved as lecturer and facilitator in a number of international training events, including the WMO train-the-trainer event for Asia and South-Western Pacific in 2009. His academic interests are in computer-aided and social learning while business interests are in environment issues around the Baltic region.



Ruben Zondervan is Executive Director of the Earth System Governance Project. He is based at the International Project Office hosted by Lund University, Sweden. He is a political scientist and specialist in international social science research management. Prior to his current position, he worked in research management, research, diplomacy and industry consulting. He also serves as adviser and in management positions on a number of programmes and commissions related to global environmental change research.

Participants



Jakerul Abedin is a PhD candidate at the Macquarie Law School, Macquarie University, Sydney, Australia. He has submitted thesis as an international student under the international Macquarie University Research Excellence Scholarship (iMQRES). He is a casual academic staff in the Macquarie University Faculty of Business and University of Western Sydney Law School, Australia. He did his Bachelor of Laws (LL.B) and Master of Laws (LL.M) from the University of Rajshahi, Bangladesh in 1997 and 1998, respectively. He was a practicing lawyer in the Dhaka Bar Association in Bangladesh. In 2000 he joined to the government service as an Assistant Secretary in the Ministry of Law, Justice and Parliamentary Affairs of Bangladesh and promoted to Deputy Secretary (cc) in 2009. In 2002, he completed the fellowship course in International Law under UNITAR scholarship. In 2006, he completed Master of International Trade Law (MITL) at the University of Technology, Sydney (UTS) under the AusAID scholarship. He presented conference and

seminar papers in different forums in the area of international watercourses law. He also published couple of papers in the same area. He has more than 10 years of experience as, policy analyst, legislative drafter parliamentary counsel, legal researcher and law teacher.



Tasnia Alam has completed a BBA and MBA and is currently serving as Economic Specialist at the Embassy of Japan in Dhaka. Her hobbies include exploring countries, interacting with different multi-cultural people, playing badminton, singing and anchoring.



Hasrat Arjjumend attained an MSc in Environmental Sciences from G. B. Pant University of Agriculture & Technology, MRM (MPhil in Resource Management) from Indian Institute of Forest Management (Govt. of India), and MA in Public Administration. Currently, he is also writing PhD on International Governance of Biodiversity (ABS Regime) at Academy of International Studies, Jamia Millia Islamia Central University, New Delhi, and undertaking PGDEL (Environmental Law) from National Law School of India University, Bangalore. He has few Certificates from World Bank Institute and Human Rights Education Associates (USA), Grolink (Sweden), Green Net and Mahidol University (Thailand), CISED (Bangalore). Having 20 years experience of research, field action, training, teaching and organizational management, dealing with various thrust areas in broad (inter)disciplines of Environment, Natural Resources, Governance, Development, and Indigenous Rights, he founded People's Resource Centre, a consultancy and publication group, in 1999. Then he co-founded Grassroots India Trust and executed over 30 projects. He had been Commonwealth Professional Fellow 2007 in Wolverhampton/London, and Social Impact Fellow 2008-10 at Mumbai. On behalf of Grassroots India Trust he also received UNESCO-Wenhui Award for Educational Innovation 2010 (Honorable Commendation) for outstanding field action. He has over 90 publications of varied types, and over 50 popular articles on development and environmental issues published in newspapers & magazines.



Luqman Atique is a Lecturer at the Department of Meteorology, COMSATS Institute of Information Technology (CIIT), Islamabad since September 2009. He has studied at Umeå University / Luleå University of Technology, Sweden and University of the Punjab, Lahore, Pakistan at graduate and undergraduate level. He has taught and contributed in two graduate level courses viz. 'Principles of Remote Sensing', and 'Land Use Planning Management' at Master level at Department of Meteorology as part of his academic obligations. Understanding, sharing and disseminating Climate Change and its impacts is the mainstay of his motivation and passion. He keeps himself abreast with the latest developments in research on climate change trends and dynamics. In future he is resolved to achieve a Doctorate degree in the domain of earth system governance.



Aripta Das is a doctoral candidate at the School of Social Work, Tata Institute of Social Sciences, Mumbai. She is also a UGC Senior Research Fellow. Her Masters is in Social Work from Delhi University. Her research interests include environment and governance, water and society, transboundary cooperation in natural resources and community development. She is pursuing my doctoral research in the politics of flood in Dhemaji district of Assam and looks at the dialectics of communities experience of democracy and the State's mode of governance through a natural phenomena of floods in the Brahmaputra valley.



Hari Bansha Dulal received his doctorate in environmental science and public policy from George Mason University. He is currently a consultant for climate change and renewable energy at the World Bank in Washington, D.C. He has consulted to the Asian Development Bank, on climate change, in the past and has published more than dozen articles in international peer-reviewed journals. He recently edited a book "Poverty Reduction in a Changing Climate," which discusses the new innovations and funding mechanisms that have emerged in response to the rise of climate-related challenges in the twenty-first century. Dulal and the contributors explore the synergies and implications of those innovations with respect to poverty alleviation goals. The edited volume brings together a range of scholars from different backgrounds, ranging from political science, economics, public policy, and environmental science, all analyzing poverty reduction challenges and opportunities from different, forward-thinking perspectives.



Dulce Elazegui is currently a University Researcher III at the Center for Strategic Planning and Policy Studies, College of Public Affairs and Development, University of the Philippines Los Baños. She obtained a Master's degree in Technology Policy and Innovation Management from Maastricht Economic Research Institute on Innovation and Technology in the Netherlands. She also holds a Master's degree in Agricultural Development Economics from the Australian National University. She attended the Summer Certificate Course on Sustainable Environmental Management at the University of California-Berkeley under the Beahrs Environmental Leadership Program. Her research interests include policy and governance in agriculture, natural resources and environment, and science and technology. She has been involved in research and extension work particularly on climate change, water and watershed management, and agricultural biotechnology. She has joined collaborative research work with some prestigious international organizations such as the Asia-Pacific Network for Global Change Research, Sustainable Mekong Research Network and Climate and Development Knowledge Network, Economy and Environment Program for Southeast Asia, International Development Research Centre, Columbia University – International Research Institute for Climate and Society, and the Sustainable Agriculture and Natural Resource Management Program of the US Agency for International Development.



Prakash Gaudel, works as an Environment Specialist for Nepal Electricity Authority (NEA) which is an undertaking organization of Government of Nepal responsible for the generation, transmission and distribution of electricity in the country. Before joining NEA, he has worked for Jalsrot Vikas Sanstha (JVS)/Global Water Partnership (GWP) Nepal as a Trainee Manager. Prakash Gaudel is the recipient of Silver Jubilee Scholarship of India and holds Master degree in Environment Science from Kurukshetra University, India. He is also the recipient of South Asian Water Alliance (SAWA) Fellowship and holds another Master degree in Interdisciplinary Water Resources Management from Nepal Engineering College of Pokhara University, Nepal. His research interest and the areas of research focus has been transboundary water resources management, environmental change and community based natural resources management. Prakash Gaudel holds professional memberships of JVS/GWP Nepal; Environment Graduates in Himalaya (EGH) and International Network on Participatory Irrigation Management (INPIM)-Nepal.



Md Khalid Hossain is a PhD Researcher at the School of Management of RMIT University, Australia. He is currently an Australian Leadership Award (ALA) scholar. He earned his Master of Diplomacy and Trade degree from the Monash University, Australia as an Australian Development Scholarship (ADS) scholar in 2006. Prior to that, he received Bachelor of Science in Civil Engineering and Technology (BUET). He is Bangladeshi citizen and has around seven years of professional experience in Bangladesh as a Research Officer at Bangladesh Tariff Commission and as Policy Officer and Campaign Coordinator at Oxfam GB – Bangladesh Programme. His work experience in Bangladesh includes research, policy analysis, policy advocacy and grassroots development programming. He also has work experience as a research and teaching assistant in Australia. He has published numbers of papers in international journals and conference proceedings. His research interests include international business, governance, sustainability and climate change adaption for multinational corporations in Australia and Bangladesh, Khalid's PhD research topic is 'Climate Change Adaption, MNC Strategy and Environmental Pragmatism: A Cross-country Perspective'.



Asif Iqbal is a climate campaigner and development professional in Pakistan. He grew up in a remote, lush green mountainous region in the KPK province. Asif works at World Vision Pakistan as Programme Development Coordinator. He designs transformational development and advocacy projects at the national level which strive for child well-being, long-term development and environmental sustainability. In July 2009, after getting trained by Al Gore, Asif started a voluntary national-level campaign called Climate Project Connectors with youth and civil society organizations in Pakistan. He engages youth in the country to fight the climate crisis and take initiatives at the local level. Asif voluntarily delivers presentations, trains stakeholders on climate change, and uses print, electronic, and social media for climate advocacy. Asif was part of the 24 Hours of Reality- live webcast along with Al Gore, presenting live to 8.6 million viewers in 2011 on the reality of the climate crisis. In November 2012, he again joined Al Gore in a global discussion on 24 Hours of Reality- Dirty Weather Report, reaching another 17 million people around the globe. Asif writes his blog on <http://asifoghi.blogspot.com>



Om N. Katel is a faculty member in Royal University of Bhutan at College of Natural Resources, Lobesa. He has been teaching Environmental Science, Conservation Science and Geographical Information System (GIS) for the last two years. His area of specialization includes natural resources management particularly forest resources management. He conducted more than three years of research on conservation management in one of the national parks of Bhutan. Currently, he is leading two research projects on Farmer's vulnerability to climate change in Punakha–Wangdue valley, Bhutan, and Evaluating upstream land use changes for ecosystem services in Punakha, Bhutan. In addition Om Katel is also supervising several students' thesis research projects like Effectiveness of solar fencing on reducing Human – Elephant conflicts in southern Bhutan, Contribution of Integrated Conservation and Development Programs (ICDP) to farmers livelihoods, Ecology and habitat status of Red Panda in Jigme Singye Wangchuck National Park, Bhutan and Impact of climate change on ecosystem dynamics and farmers livelihood in Dangchu watershed, Bhutan. Om Katel's interest areas of research include Watershed Management and Conservation, Mountain Water Resources Management, local people's vulnerability and adaptation to climate change and Land use and land cover change.



Medha Khatiwada is a masters student in Water Engineering and Management at Asian Institute of Technology writing her thesis on 'Impact of climate change in Hydropower production potential of Hindu Kush Himalayan Region'. She holds a Bachelor in Engineering from the Kantipur Engineering College, Kathmandu, Nepal. From 2009 to 2011 Medha Khatiwada has been a Design Engineer at the Mailun Khola Hydropower Company and in 2012 a Research Intern at the UN Regional Integrated Multi-Hazard Early Warning System



Zahidur Rahman has completed an M.Sc degree in Environmental Science from Khulna University, Bangladesh. Before he has completed a four years B.Sc in Environmental Science of the same university. In addition, he has also completed successfully few professional degrees including GIS application for Disaster Risk Assessment, Community Risk Assessment (CRA) and Project Planning Development and Management (PPDM). Apart from that, Zahidur Rahman has few national and international journal publications on livelihood vulnerability, climate change, green house gas emission from fossil fuel, urban sustainable energy, forestry and agriculture. Except the educational statements, he has more than 5 years of pragmatic working experience on implementation, research and monitoring the project related to livelihood, agriculture, WATSAN, food security and rural development, climate change and disaster management at both a national and international organization.

Appendix 3: Call for Application



Workshop on Governing Critical Uncertainties: Climate Change and Decision-Making in Transboundary River Basins

21-23 January 2013, Chiang Mai, Thailand

Organized by the Unit for Social and Environmental Research, Faculty of Social Sciences, Chiang Mai University
(www.sea-user.org)
and the Earth System Governance Project (www.earthsystemgovernance.org)

Sponsored by the Asia-Pacific Network for Global Change Research (www.apn-gcr.org)
Endorsed by the Global Water System Project (www.gwsp.org)

Workshop aims to help early career researchers:

- Increase their understanding of the implications of analytical and normative uncertainties associated with climate change and other large-scale drivers for the governance of trans-boundary river basins;
- Strengthen and expand their network with other early career researchers as well as more established experts in the Asia-Pacific region and beyond.

Workshop themes:

Earth system transformation is marked by persistent uncertainty regarding the causes of environmental change, its impacts, the interlinkage of various causes and response options, and the effects of possible response options. Uncertainty is not only analytical but also normative. Normative uncertainty refers to uncertainty with respect to goals and perceptions of acceptable risk. Most problems of earth system transformation are unprecedented. The adequate policies, politics and, especially, modes of allocation and adaptation are uncertain and contested. Normative uncertainty requires the development of new norms and conceptual frameworks for global collective action in uncharted territory. Research therefore needs to be reflexive and pay attention to how particular worldviews shape scientific research or how scientists deal with problems of uncertainty and lack of quantifiable knowledge of human behaviour.

Rivers like the Mekong-Lancang, Brahmaputra, Red River, Salween-Nu, Ganges and Indus provide many services crucial for local livelihoods, national development, as well as regional stability and cooperation. They are also a source of regional tensions and natural disasters. Globalisation and environmental change, potentially leading to tipping points in natural systems, pose new and uncertain risks in these basins. These uncertain risks have become the normal context in which regional water governance takes place.

The workshop will address the governance challenges posed by uncertainties related to climate change, land-use and water-use changes focussing on the management of transboundary rivers in the Asia-Pacific region.

Invited speakers and trainers will make key note presentations and facilitate discussions on state of knowledge, theory and methods. The workshop will cover the following topics:

Presentations by resource persons:

- Key governance concepts with illustrations from transboundary river cooperation, conflict and management;
- Sources of analytical uncertainty, including, in particular, climate change, land-use and water-use changes;
- Sources of normative uncertainty, including, differences in values, interests, goals and perceptions of acceptable risk;
- State of knowledge of ways and approaches to governing uncertainties based on theoretical expectations as well as empirical evidence from practice;

Working group analyses:

- Methods, study designs and analytical frameworks for exploring consequences of uncertainty on decision-making processes and politics;
- Critical review of merits and limitations of a small set of case study papers and a set of papers by participants;
- Extract key messages and propositions for development of joint paper out of workshop;

Presentations by participants

- Panels of presentations by participants on governance issues in a transboundary river basin of their choice;

Resource persons will also help participants produce a jointly-co-authored synthesis paper from the event. Trainers will include:

- Louis Lebel, *Unit for Social and Environmental Research, Chiang Mai University, Thailand*
- Xu Jianchu, *ICRAF and Kunming Institute of Botany, Kunming, Yunnan, China*
- Chayanis Krittasudthacheewa, *Stockholm Environment Institute, Bangkok, Thailand*
- Tom Measham, *CSIRO, Australia*
- Eduard Podgaisky, *Russian State Hydrometeorological University, Russia*
- Carl Middleton, *Faculty of Political Sciences, Chulalongkorn University, Thailand*
- Ruben Zondervan, *Earth System Governance Project, Lund University, Sweden*

Who should apply?

The workshop is designed for early career researchers in the Asia-Pacific Region working in the field of environmental governance and with interests in transboundary river basins.

Application Process

Participants will be selected through a competitive call process based on a submitted abstract and CV.

To apply, please submit the following (in *word-format*):

- An abstract (300-500 words) for a short paper to be presented at the workshop;
- A curriculum vitae (with list of publications).

Applications should be send electronically to the International Project Office of the Earth System Governance Project (ipo@earthsystemgovernance.org).

The organizers expect to be able to provide funding for up to 20 participants, covering travel expenses, accommodation and full catering. Logistical support will be provided for travel arrangements and visa

applications.

Selected participants will need to write a short paper (2000-3000 words) about a transboundary water governance issue in their region, preferably making links to the issue of uncertainty in decision-making, prior to attending the workshop and to make a brief presentation on their papers at the workshop. Participants are encouraged to base their papers on their own research as far as possible but also to review relevant work as needed.

Deadline for applications is 15 October 2012.

Appendix 4: Participant List

Last name	First name	Role	Country of Residence	Affiliation	Email
Abedin	Jakerul	Participant	Australia	Macquarie University	jakerul.abedin@mq.edu.au
Alam	Tasnia	Participant	Bangladesh	North South University	shonajihorria@yahoo.com; tasnia.alam@dc.mofa.go.jp
Arjument	Hasrat	Participant	India	Grassroots Institute	harjument@yahoo.co.in; harjument@gmail.com
Atique	Luqman	Participant	Pakistan	CIIT, Islamabad	lagondal@yahoo.com
Bansal	Kshiti	Participant	India	Rajiv Gandhi National University of Law	kshitiibansal23@gmail.com
Chitmanat	Chanagun	Participant	Thailand	Chiang Mai University	chanagun.1@hotmail.com
Das	Arpita	Participant	India	Tata Institute of Social Sciences	arpita.das@tiss.edu
Dulal	Hari Bansha	Participant	USA	George Mason University	hbdulal@gmail.com
Elazegui	Dulce	Participant	The Philippines	University of the Philippines Los Baños College	dulceelazegui@yahoo.com
Gaudel	Prakash	Participant	Nepal	Nepal Electricity Authority	peezeep@gmail.com
Hossain	Khalid	Participant	Australia	RMIT University	mdkhalid.hossain@mit.edu.au
Iqbal	Asif	Participant	Pakistan	World Vision Pakistan	asifoghi@yahoo.com
Katel	Om N.	Participant	Bhutan	Royal University of Bhutan	katekombhutan@yahoo.com
Khatiwada	Medha	Participant	Thailand	Asian Institute of Technology	medha.khatiwada@ait.ac.th
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Appendix 4: Funding Sources Outside the APN

Activity	Organisation	In-Kind (US\$)
Planning, communication, travel arrangements and administration and service fees travel agency.	ESG International Project Office – Ruben Zondervan	13,100
Design of workshop program, oversee local organization, synthesis of key findings	Unit for Social and Environmental Research – Dr. Louis Lebel	5,000
Total		18,100

Appendix 6: Participant Feedback

The Workshop in Chiang Mai was unique for the fact that it had scholars coming from diverse backgrounds and nationalities with policy makers, scientists, lawyers, academicians, and social activists coming together and discussing issues which matter to all of us. The short number of participants kept this event very focused and productive. I personally being a young researcher got to learn a lot. From how to go about an issue which impacts countries at large to the way we should reach out to people, it was an immensely learning experience for me. Interactions with reputed professionals were an enriching experience; they have now become life time friends. Many thanks to Earth System Governance and APN for their generous funding support which made it possible for me to attend. (Kshitij Bansal, Rajiv Gandhi National University of Law, India)

I have been working on the Brahmaputra for three years now. Yet, all along, it was with an Indian focus. This workshop made me realise the transboundary nature of the river in its fullest sense. The information and the volume of work done on the Mekong was particularly useful. It gives concrete examples of how one can envisage actual hands on cooperation of various stakeholders in a shared basin. The concept of uncertainty also gives non technical people in the field to bring to the table lived experiences of communities in these basins. Overall, I had gone to the workshop unsure of how would I could contribute. It was a very pleasant experience to interact with the resource persons and trainers who were extremely approachable. Personally, it was good to meet Chinese and South Asians, since that is something which is extremely difficult to organise in my own country. (Arpita Das, Tata Institute of Social Sciences, India)

Being a participant from a country which constantly deals with critical uncertainties related to water governance, I was keen to learn from my fellow participants and trainers how other countries in the Asia-Pacific region are addressing the transboundary river management issue in conjunction with climate change impacts. The Workshop has definitely created that learning opportunity for me. I have taken different ideas around water management and climate change adaptation during my time at the Workshop. (Md Khalid Hossain, School of Management of RMIT University, Australia)

I have been advocating on the issue of climate change in Pakistan, however my understanding remained limited on impact of climate change in relation with critical uncertainties in transboundary river basin. I have been thinking differently on this issue in the sub-continent region (Indus Basin) until I participated in the APN capacity building workshop and understood the discussion taking place among experts and early age researchers from the Asia-Pacific region. To be honest, I have particularly added talking points in my climate change campaign about climate change and regional geo-political uncertainties which needs deeper attention of regional' politics and political will to tackle this issue with mutual understanding. The workshop broaden my understanding to realize the importance of regional cooperation and mutual work between India and Pakistan to collectively work on climate change, rather than keeping Indus Basin as a political debate and keep people of Pakistan and India more vulnerable to climate variability. The very next month when I came back to Pakistan after attending the APN workshop, I raised the same point to the Chairman of National Disaster Management Authority (NDMA) of Pakistan while he was giving a speech on climate change and its impact on Indus Basin to the members of civil society organizations in Islamabad! I am

again thankful to you and Earth System Governance Project for giving me this opportunity for learning and networking! (Asif Iqbal, World Vision Pakistan, Pakistan)

The ESG Project should be congratulated on organizing such a successful and well-facilitated workshop. As a speaker and participant, I especially appreciated the constructive and creative atmosphere of the workshop and the free and open exchange amongst participants. The proactive sharing of knowledge amongst the participants certainly shed new light on the concept of uncertainty in the context of transnational rivers, and I look forward to co-authoring a paper with many of the participants reflecting these insights. (Carl Middleton (Trainer), Chulalongkorn University, Thailand)