

CPWF Project Report

Enhancing Multi-Scale Mekong Water Governance

Project Number 50

Louis Lebel, Ram C Bastakoti and Rajesh Daniel
Unit for Social and Environmental Research
Faculty of Social Sciences, Chiang Mai University, Thailand

for submission to the



April 30, 2010

Acknowledgements

The following individuals contributed to the preparation of this report as M-POWER theme leaders: Richard Friend (Fisheries), Lu Xing (Watersheds), Tira Foran (Hydropower), Edsel Sajor (Waterworks), Bach Tan Sinh (Floods), Chu Thai Hoanh (Irrigation), Babette Resurreccion (Social Justice), Francois Molle (Policy), John Dore and Kate Lazarus (Dialogue), Antonio Contreras (Knowledge), and Xu Jianchu (Integration). Many other individuals and organizations contributed to this project. For details please see the section on "Project Participants". The work upon which this report is based was funded by the Challenge Program on Water and Food with financial inputs from the International Fund for Agricultural Development (IFAD) and Echel Eau. Their financial support is gratefully acknowledged. The views expressed herein can in no way be taken to reflect the official opinion of IFAD or Echel Eau.

Program Preface:

The Challenge Program on Water and Food (CPWF) contributes to efforts of the international community to ensure global diversions of water to agriculture are maintained at the level of the year 2000. It is a multi-institutional research initiative that aims to increase the resilience of social and ecological systems through better water management for food production. Through its broad partnerships, it conducts research that leads to impact on the poor and to policy change.

The CPWF conducts action-oriented research in nine river basins in Africa, Asia and Latin America, focusing on crop water productivity, fisheries and aquatic ecosystems, community arrangements for sharing water, integrated river basin management, and institutions and policies for successful implementation of developments in the water-food-environment nexus.

Project Preface:

The CPWF Project PN50 "Enhancing multi-scale water governance" was a flagship activity of the Mekong Program on Water, Environment Resilience (M-POWER). The goal of helping improve livelihood security, human and ecosystem health in the Mekong Region through democratizing water governance was pursued through critical research and direct engagement with stakeholders involved in managing floods, irrigation, hydropower, watersheds, fisheries and urban water works at various scales. We identified commons governance problems and suggested ways that some can be addressed. Often, for example, there are needs to: strengthen local representation, improve the quality of deliberative processes, enhance the interplay between institutions at different levels, and build capacities to handle uncertainties and adapt to changes in flow regimes.

CPWF Project Report series:

Each report in the CPWF Project Report series is reviewed by an independent research supervisor and the CPWF Secretariat, under the oversight of the Associate Director. The views expressed in these reports are those of the author(s) and do not necessarily reflect the official views of the CGIAR Challenge Program on Water and Food. Reports may be copied freely and cited with due acknowledgment. Before taking any action based on the information in this publication, readers are advised to seek expert professional, scientific and technical advice.

Please cite this report as follows:

Lebel, L., Bastakoti, R.C., Daniel, R. (eds). 2010. CPWF Project Report. *Enhancing Multi-Scale Mekong Water Governance*. Project Number 50. CGIAR Challenge Program on Water and Food.

CONTENTS

RESEARCH HIGHLIGHTS	8
EXECUTIVE SUMMARY	10
Rationale and objectives.....	10
Approaches	10
Findings and actions	11
Significance, impacts and outcomes	14
Conclusions.....	16
INTRODUCTION	17
OBJECTIVES	19
FINDINGS	21
1 Case study 1: Fisheries	21
1.1 Deconstructing narratives of doom – and generating a fisheries counter-narrative	22
1.2 Understanding impacts without policy change.....	22
1.3 Participation in management	22
1.4 Negotiating access and control over flood pulses, floodplains and wetlands	23
1.5 Fish aquaculture in rivers.....	24
1.6 Implications for policy, practice and future research	25
1.7 Literature cited	25
2 Case study 2: Floods	27
2.1 Politics of floods and disasters	27
2.2 Risk redistribution	28
2.3 Promises of protection.....	28
2.4 Changing flood regimes	29
2.5 Living with floods	31
2.6 Implications for policy, practice and future research	33
2.7 Literature cited	33
3 Case study 3: Irrigation	35
3.1 Irrigation in the Lower Mekong Basin Countries	36
3.2 Irrigation development in Laos: re-considering irrigation management transfer.....	36
3.3 Irrigation development in Thailand: Small vs large systems	37
3.4 Irrigation development in Cambodia: Public policy issue.....	38
3.5 Irrigation development in Vietnam: Water pricing policy and RBO.....	40
3.6 Implications for policy, practice and future research	41
3.7 Literature cited	43
4 Case study 4: Hydropower	44
4.1 Hydropower players in the Mekong region: Agendas and strategies.....	45
4.2 China’s energy reform and hydropower expansion in Yunnan province.....	45
4.3 Hydropower development in Nu-Salween River.....	46
4.4 Hydropower development in Lao PDR.....	47
4.5 Hydropower and Fisheries.....	48
4.6 Electricity planning: insights from Thailand	48
4.7 Hydropower Sustainability Assessment Protocol.....	51
4.8 Implications for policy, practice and future research	52
4.9 Literature cited	53
5 Case study 5: Watersheds	55
5.1 Upland Watersheds in the Mekong: Discourses, Livelihoods and Ecosystems.....	55
5.2 Politics of Knowledge	59
5.3 Institutions, Representation and Accountability.....	60
5.4 Dialogue, grassroots research and integrated watershed management	62
5.5 Insights and implications for policy, practice and future research.....	65
5.6 Literature cited	66
6 Case study 6: Waterworks	68
6.1 Land Use and Equity in Water Governance in Peri-Urban Bangkok.....	68
6.2 Political rescaling: Eastern Seaboard Development Program, Thailand	68
6.3 Urbanization and pollution in Vietnam	69
6.4 Urbanization and policy transitions	69

6.5	Implications for future research	70
6.6	Literature cited	71
7	Governance summary	72
7.1	Dialogue	72
7.2	Social justice	73
7.3	Knowledge	74
7.4	Policy	74
7.5	Prospects	75
7.6	Impact, significance and future	77
7.7	Literature cited	79
	OUTCOMES AND IMPACTS	80
8	Impact Pathways.....	80
8.1	Regional	80
8.2	National and local.....	80
9	International Public Goods.....	87
9.1	Tools and Methodology.....	87
9.2	Project Insights.....	87
10	Partnership Achievements	89
11	Recommendations	90
11.1	Research.....	90
11.2	Policy	91
12	PUBLICATIONS.....	92
12.1	Journal articles	92
12.2	Book chapters.....	93
12.3	Books.....	97
12.4	Public reports	97
12.5	Working papers.....	98
12.6	Films.....	101
	BIBLIOGRAPHY.....	102
	PROJECT PARTICIPANTS	104
	APPENDICES.....	113
	Appendix A. Abstracts of key publications	113
	Cross-cutting.....	113
	Watersheds	115
	Fisheries	118
	Floods.....	119
	Hydropower	121
	Irrigation	122
	Waterworks.....	123

LIST OF TABLES

Table 1 Summary of selected mechanisms through which risks are redistributed. Key components of vulnerability involved are indicated in bold. 28

Table 2 Five institutional traps 30

*Table 3 Advantages and limitations of different dyke forms.....*32

Table 4 Total avoidable hydropower & coal-fired electricity imports (2008–2018) 50

Table 5 Meanings of watersheds in the Mekong region 57

Table 6 Discourses on the watershed management 58

Table 7. Selected features of three water policy transitions. 70

Table 8 Summary of the Project’s Main Impact Pathways..... 82

LIST OF FIGURES

Figure 1: Map of Mekong region showing major river basins..... 17

Figure 2: Analytical and organizational framework for M-POWER’s program and the CPWF PN50 project..... 19

Figure 3: Covers of the first two volumes in the M-POWER book series titled “Democratizing water governance in the Mekong region”..... 21

Figure 4: Excerpt from flyer for the round-table on fish farming in the Upper Ping River held in Chiang Mai, 6 December 2007. 24

Figure 5: Floods may be beneficial, harmless or disastrous 27

Figure 6: The promise of flood protection: an initial conceptual model 29

Figure 7: How the presence of informal groups contributes to community resilience 31

Figure 8: Existing (left) and planned (right) irrigation projects in the Lower Mekong countries . 35

Figure 9: Poster for the Mekong Region Waters Dialogue. 72

RESEARCH HIGHLIGHTS

The CPWF Project PN50 “Enhancing multi-scale water governance” was a flagship activity of the Mekong Program on Water, Environment Resilience (M-POWER). Its main goal was to help improve livelihood security, human and ecosystem health in the Mekong Region through democratizing water governance. This was pursued through critical research and direct engagement with stakeholders involved in managing fisheries, floods, irrigation, hydropower, watersheds, urban water works and integrated water management at various scales. In each policy domain we identified common, shared, problems with current patterns of governance and made suggestions on how they could be addressed.

Many problems are supported by under-scrutinized and over-simplified policy narratives. In fisheries, for example, there is an established narrative of doom and crisis for the region’s fisheries that underpins much policy, research and debate. Evidence about the potential adverse impacts of infrastructure on valued fisheries is increasingly acknowledged but has not changed development priorities.

In flood and disaster management political dimensions have usually been neglected. Promises of protection are often made in earth or concrete: dams built far upstream will regulate river flows; diversions will take the water around and past the city; dykes higher and longer will hold back the flood waters; drains, pumps and tunnels will move water out faster. Flood management policies, measures and practices in the greater Mekong region, intended to reduce risks, however, frequently shift risks onto already vulnerable and disadvantaged groups. Promises of protection and how they are pursued can be explained in terms of beliefs, interests, and power.

Irrigation has expanded and intensified. Irrigation systems, however, have often not performed as well as expected. Differences between stated policies and actual practices are frequently large. Common institutional reforms do not capture the complexity of basin-wide water management, the multiple functions of irrigation systems, and relationships between different levels of management and as a consequence fail. There is also significant underinvestment in operation and maintenance.

Hydropower governance in the Mekong region is problematic. The problems often start with how long-term electricity generation planning is done. Important assumptions and beliefs that underpin electricity planning practices lack transparency. National planning processes need to become more accessible to the public, both in terms of improved participatory processes, and in terms of improved accountability of authorities. Regulatory and planning functions may need to be separated more explicitly. Regional policy initiatives have sent mixed signals about sustainable hydropower and energy development and this has confounded attempts to improve the sustainability of hydropower.

Upper tributary watersheds in the Mekong Region are contested terrains. Research has underlined the importance of both discourse and agency practices. Decentralization in Mekong region, for instance has put more responsibility for natural resources in the hands of local communities, but at the same time stronger state regulations over forests and commitments to conservation has often given more powers to forest and other land agencies in certain areas. Increased awareness of ecosystem services provided by upland watersheds has been a tool for both asserting importance of management by upland farmers and forest users as well as a basis for exclusion.

Water politics in the peri-urban or *desakota* landscapes in the Mekong Region must deal with water quality issues as well as challenges of water allocation and flood management. Current institutional arrangements and rescaling of development to larger

geographical regions tend to shift environmental and resource scarcity burdens to small farmers. The problem is mediated by administrative separatism, ambiguity and multiplicity in the functional jurisdiction of water-related government bodies, and the general lack of a participatory culture in the bureaucracy.

Across sectors and domains of water policy research in M-POWER studies gave insights into several other key tensions in governance scholarship that also have high practical relevance.

First, public participation programs are not a panacea. Governments and other actors in the Mekong Region often take an instrumental approach to participation and as a consequence being included can be a cost not a benefit. Participation can also legitimize otherwise flawed processes and decisions while sidelining issues of gender and equality. The terms and conditions of participation need to be examined critically.

Second, many water projects continue to be evaluated and promoted in terms of their benefits with insufficient attention given to their costs, burdens or risks. The way assessment and consultation processes are designed and implemented has implications for their credibility, legitimacy and saliency, and ultimately public acceptance. In many cases these processes have been poorly designed and implemented.

Third, discourse and policy narratives play an important role in shaping and justifying decisions. Unpacking these lines of reasoning to reveal faulty assumptions, vested interests and hidden adverse impacts has become a key role for engaged researchers in the Mekong Region in general and in the M-POWER network in particular. How problems and solutions are framed, it turns out, have a very large bearing on which policies and projects are pursued.

Fourth, how policies are made and practices changed are important areas for future research. It is increasingly apparent that in the Mekong Region the pathways to influence are diverse and certainly do not just depend on expert advice or rationale comparison of policy options. Water bureaucracies have adopted modern discourses of participation and integration, but practice rarely matches management discourses or policies on paper.

EXECUTIVE SUMMARY

Rationale and objectives

Finding the appropriate way to deal with the water-resource challenges is the critical question of the 21st century in the Mekong region. The growth in demand, prospects of climate change, technological and institutional innovations all imply large uncertainties for access to, and management of water resources. Cross-scale biophysical implications of dams, irrigation infrastructure and land-use changes associated with urbanisation on water flows, sediment delivery and ecosystems upon which people depend on directly or indirectly for food are likely to grow in importance. Negotiating workable institutional arrangements that can cope with and adapt to this complexity and dynamic changes in resource levels and quality over time and across spatial scales is a major challenge for water governance.

The overall goal of PN50 was to improve livelihood security, human and ecosystem health in the Mekong Region through democratizing water governance. The project approached this ambitious goal through a set of strategic objectives, specific research questions for water-related sectors and crossing-cutting governance themes.

The strategic objectives included: (1) convening, facilitating and supporting inclusive forums; (2) supporting and establishing mechanisms to better represent politically marginalized groups; (3) analyzing, proposing and promoting institutional changes; (4) synthesizing understanding about how to democratize water governance; and (5) supporting regional networks of researchers committed to critical analyses and actions to support democratizing water governance.

The democratization agenda was viewed broadly encompassing issues of public participation and deliberation, separation of powers, accountability of public institutions, social and gender justice, protection of rights, representation, decentralization, and the dissemination of information. No assumption was made that a single model fits all social and resource contexts; rather we asserted that action research can help societies explore, understand and adaptively reform water governance to advance their particular needs.

The PN50 project became a core, flagship, activity of the Mekong Program on Water Environment and Resilience (M-POWER) and supported the further development of the network.

Approaches

The action research program under PN50 was organized around empirical comparative studies and cross-cutting governance themes. The empirical comparative studies included: fisheries, floods, irrigation, hydropower, watersheds, urban waterworks and integrated management. The cross-cutting governance themes included: dialogue, social justice, knowledge and policies.

Synthesis activities were guided by 11 research leaders that build up multi-country and multi-organization teams. M-POWER Partner Organizations were the main source of effort to implement the research activities, especially in early years of the project, but later more and more individuals from other organizations became involved and in some cases their organizations also formally joined M-POWER. Thirty-two fellowship research grants were provided to 37 researchers including 5 Cambodians, 5 Chinese, 10 Thai, 10 Vietnamese, and one each from Myanmar and Lao PDR and the remainder from outside the Mekong region but for work hosted by partners.

The PN50 project involved a lot of comparative analysis at different scales from international through to national policies and strategies to the implementation of specific

local projects. This experience in developing shared conceptual and analytical frameworks, data collection protocols for qualitative data has been of tremendous benefit to M-POWER partners and have also been shared with others working in other parts of the world.

Findings and actions

In this section, we summarize some of the main findings and actions in each of the case study and thematic areas noting relevance as appropriate to main goal and strategic objectives.

Activities undertaken by the **fisheries** working group of M-POWER have helped raise the profile of fisheries and fisher livelihoods in national and transboundary debates. They reiterated the importance of ecosystem processes such as flood pulses and ecosystems like floodplains and wetlands to rural livelihoods and exposed flaws and gaps in fishery and aquaculture policies and programs. The fisheries group helped to create a new forum for critical debate – moving away from the established approach in the region, of taking fisheries ecology as the starting point—and replacing it with an approach starting from the discourse and narratives surrounding fisheries (and related livelihoods) in policy debates and expert writing. This was then substantiated with field research on management practices in critical parts of the Mekong Basin. By deconstructing the directions of current policy and practice we hoped to be able to open debate for how fisheries can contribute to an alternative, but viable development pathway. There is, for example, an established narrative of doom and crisis for the region's fisheries that underpins much policy, research and debate. This narrative has a long history. After several years of collaboration in the Mekong Region there is now a well-established network of committed fisheries scientists and governance scholars with strong links to local fishers groups, government agencies and regional actors. The challenge for the future will lie in providing direction for how fisheries can contribute to positive development, and in continuing the critique of current development pathways, and in changing some of the most destructive policies and projects.

Floods as a physical event vary greatly with respect to their velocities, onset, and high flow duration and recession dynamics, in their impacts on debris flows and water quality, and in their unusualness with respect to the historical flood regime. Activities undertaken by the flood working group in M-POWER have helped establish flood and disaster management in the Mekong Region as valid subjects for social, institutional and political analysis. They also demonstrated the value of engagement by researchers with practitioners whether the latter are non-state actors in flood-affected communities or government officials with responsibilities for flood and disaster management. Promises of protection from floods are a subset of the different ways society can respond to risks from flood waters. The protection approach usually implies prevention through regulation of flows. Promises of protection are often made in earth or concrete: dams built far upstream will regulate river flows; diversions will take the water around and past the city; dykes higher and longer will hold back the flood waters; drains, pumps and tunnels will move water out faster. Flood management policies, measures and practices in the greater Mekong region, intended to reduce risks, however, frequently shift risks onto already vulnerable and disadvantaged groups. Promises of protection and how they are pursued can be explained in terms of beliefs, interests, and power.

The Mekong Region has a long tradition of run-of-river farmer-managed **irrigation** schemes, and even longer tradition of rain-fed agriculture. Large-scale schemes have been developed since the 19th century, and during the last 20 years many more are being promoted and planned by State agencies. On the whole much of this planning and construction takes place without public consultation and limited public access to information. The studies show that irrigation has expanded and intensified across the Mekong countries; but irrigation systems have not lived up to their expectations and

have faced a number of problems. The differences between stated policies and actual practices are generally large, while policy changes have little impact; institutional reforms do not capture the complexity of basin-wide water management, the multiple functions of irrigation systems, and relationships between different levels of management. PIM/IMT initiatives, furthermore, have made very modest progress; while there is significant underinvestment in operation and maintenance, poor management and weak preparation of water user groups remains pervasive. The coming years will tell us whether the current opportunities to address the real challenges of poverty and food security of the LMR have been used wisely. The risk remains that the large sectoral and private interests that benefit from massive capital investments will prevail over more carefully targeted investments in irrigation or agriculture, more decisive reform and a necessary focus on improving the performance of existing assets.

The Mekong region has entered a phase of large-scale **hydropower** resource exploitation. The region's recent embrace of large hydropower is driven by both push and pull factors. The 'pull' firstly consists of strong demand for electricity in the economies of Thailand, China, and Vietnam, as forecast using a particular set of energy forecasting methods. Another set of factors supporting hydropower development include state policy. For instance, the Government of Laos has declared its aim to expand its GDP growth so as to achieve middle income country status by 2020, and hydropower revenue is expected to play an important role in that strategy. The rapid hydropower expansion in Yunnan in China has major impacts on both the national and provincial economy as well as the finance sector, the rivers and the people of the province. Large dams and associated infrastructure projects can have profound impacts on people's livelihood and ecosystems. Hydropower governance in the region is considered problematic by many actors, often for reasons that relate to weak governance regimes. Likewise how long-term electricity generation planning is governed matters for sustainability. To improve water governance, the important assumptions and beliefs that underpin electricity planning practices must be made clear. National planning processes need to become more accessible to public stakeholders, both in terms of improved participatory processes, and in terms of improved accountability about the many choices modelers make as part of long-term electricity generation planning. Regional policy initiatives in the past have sent mixed signals about sustainable hydropower and energy development. A need exists to identify and support initiatives with credible claims to sustainability.

Upper tributary **watersheds** in the Mekong Region have become a contested zone over land, forest and water policies and management practices. Pressure on groups living in the uplands of the Mekong has increased over the past decades, especially with respect to rights to access resources – land, water and forests. The most typical configuration sets State agencies with strong lowland perspectives against upland farmers with different land-use practices and cultures. NGOs, mass-media and academics align at opposite poles making contradictory claims about impacts on forest conservation, flood risks, poverty reduction, usage and availability of water. One critical issue reiterated by M-POWER researchers was that “watershed” and watershed management” are contested terms. Who defines these terms and how, is crucial to what happens (or not) in terms of management practices in the uplands. A lot of watershed politics and policy revolves around misunderstanding and misrepresentation of the hydrological consequences of changes in land-use in upper tributary watersheds. There is a lot of conventional wisdom, both in technical bureaucracies and in local rural communities, which may in fact be wrong. Governance approaches to upland areas have been affected by wider reforms. Decentralization in Mekong region, for instance has put more responsibility for natural resources in the hands of local communities, but at the same time stronger state regulations over forests and commitments to conservation has often given more powers to forest and other land agencies in certain areas. Increased awareness of ecosystem services provided by upland watersheds has been a tool for both asserting importance of management by upland farmers and forest users as well as a basis for exclusion.

Payments for ecosystem services are being talked about as possible alternative approach to reducing poverty in the uplands while improving forest conservation. However, not all environmental uses generate financial returns commensurate with their true economic value. Action-research interventions such as multi-level dialogues and debate appear to be useful and necessary to address issues of access and equity and to resolve conflicts. This appears especially true in situations where the issues at stake are multi-level (and even sometimes transboundary) and no single actor or agency is either able or willing to handle them.

The objective of the MPOWER **waterworks** group was to develop effective regulatory regime for promoting ecologically healthy rivers, lakes, wetlands and groundwater in the urban and peri-urban areas that particularly address the pollution and degradation actions of municipal and industrial users of water bodies, and ensure security of water supply to poorest households. Characteristics of existing land- and water-sector-related management institutions in peri-urban or *desakota* landscapes encourage a disproportionate shift of the environmental burdens to small farmers. The problem is mediated by administrative separatism, ambiguity and multiplicity in the functional jurisdiction of water-related government bodies, and the general lack of a participatory culture in the bureaucracy. Political rescaling of development to larger geographical regions in official discourses and mandates of public sector agencies tends to favor industries and urban interest groups at the expense of agriculture.

The initial M-POWER program envisaged four cross-cutting themes that would intersect with more conventional water sectors just summarized: dialogue, social justice, knowledge and policy.

A strategic objective of M-POWER has been to establish, as normal practice for exploring and deciding upon important national and transnational water-related management and development options, public processes for taking into consideration the rights, risks and responsibilities of different groups and perspectives. Multi-stakeholder **dialogues** were seen as a key type of event in facilitating such interactions and social learning processes. This goal was approached in the CPWF PN50 project by a combination of leading by example, making constructive contributions to public processes convened by others, and critical reflection on dialogues. At the regional level, for example, M-POWER co-convened the "*Mekong Region Waters Dialogue: exploring water futures together*" in Vientiane, Lao PDR, in July 2006. At local levels there were many experiments with dialogue type processes to help expand and explore alternative development and management options and decisions. Multi-stakeholder dialogues are also important at local levels with various watershed and river basin organizations increasingly finding themselves functioning as platforms, especially among government agencies, but also with civil society representatives.

Another strategic objective of M-POWER was to increase awareness of **social justice** norms, including notions of fairness, equality of treatment and opportunity, and on this basis redress and transform gender, class, ethnic and other inequities through both research and action on water governance. Analysis of policies and practices in M-POWER often identified and highlighted the impacts, risks and opportunities of water infrastructure development projects on disadvantaged social groups. One important lesson from several M-POWER studies is that public participation programs are not a panacea. Governments and other actors in the Mekong Region often take an instrumental approach to participation and as a consequence being included can be a cost not a benefit. Participation can also legitimize otherwise flawed processes and decisions. The terms and conditions of participation need to be examined critically. Another insight from several studies is that many water projects continue to be evaluated and promoted in terms of their benefits with insufficient attention given to their costs, burdens or risks. Reducing these differences in opportunities, rights, risks

and benefits is an outstanding political challenge requiring more intense engagement by researchers and those at a disadvantage. Protests and advocacy directly by and on behalf of small-scale fishers and farmers already or potentially affected by infrastructure projects and policy changes has often been important for change and should not be discounted as an important impact pathway.

Decision-making and action-taking are informed by different types of knowledge and learning processes. M-POWER has strategically sought ways to build links between formal, science-based knowledge and the experienced-based knowledge of local communities and other practitioners in the management of water. The idea has been that sustainable management of water resources will often require different forms of knowledge and privileging one form or holder of knowledge automatically is likely to lead to unfair and poor decisions. In the Mekong Region this position sits somewhat uneasily between the views of states and some development actors that experts can resolve water management problems with technological solutions with better infrastructure and institutions and others which see much a larger role for local expertise and knowledge. The way assessment and consultation processes are designed and implemented has implications for their credibility, legitimacy and saliency, and ultimately public acceptance. Moreover many water projects are assessed individually: the cumulative and aggregate environmental impacts of water resources development projects are neglected.

Policy analysis in practice is part of politics. An understanding of how policies are made and implemented, therefore, can also be constructively used to influence processes and products. That has been an underlying rationale of much of M-POWER's work in this area. Several different dimensions of the policy cycle in the Mekong Region countries deserve attention. First is the importance of problem framing. The pathways to influence are diverse and certainly do not just depend on expert advice or rational comparison of policy options. Second is the way policies are institutionalized. Here are there are major differences with levels. Third is the influence policies have on practices. Water bureaucracies, for instance, have widely adopted modern discourses of participation and integration, but have rarely changed their day-to-day practices. Gaps between management discourses, policies on paper and actions on the ground are often large. Fourth is the issue of agency in the policy process. Although it is tempting to attribute laws, regulations and mandates to governments other external actors often have substantial influence.

Significance, impacts and outcomes

The PN50 project was the largest individual project taken on by the M-POWER network. Many of the activities supported involved coordination and collaboration among individuals working in different organizations and countries. Moreover, the network grew substantially as a result of activities funded under PN50. The fellowship program was a particularly significant capacity building initiative and has left a legacy of well-linked cohort of engaged governance scholars and future policy makers within the Mekong Region. This cohort should continue to have a constructive influence on water policy and decision-making in the regions for decades to come.

A key strength of M-POWER as a network has been its rapid response capacity. As important events are announced or opportunities arise to influence policy, members of the network have been quick to let each other know what is happening and where appropriate organize a constructive and coordinated response. The mixture and coverage of the network allows for very flexible mix of individuals and actions. As a consequence some people have begun referring to M-POWER as a knowledge network. The main niche appears to have been at the regional level or more locally when dealing with regional or widely shared issues.

This project was explicitly designed to engage with a diverse range of stakeholders to improve decision-making around water resources development and management. The strategies and tactics adopted by project participants were also diverse reflecting the capacities and missions of individuals and organizations along a spectrum from groups most comfortable in conventional research and scholarship through others with experience in action-research to yet others most familiar with communication or advocacy. This provided a broad range of experiences from which different actors could learn about ways to influence and become a part of water governance processes in the Mekong Region.

From the outset the PN50 project declared that *"the target of our research is the systems of governance themselves rather than particular subset of actors"* (M-POWER 2005). Evidence for such changes is less direct than behavior of individual actors but might be recognized as shifts in norms. One area which M-POWER has emphasized strongly in many of its activities has been the importance of including the rural poor, ethnic minorities and other disadvantaged groups and those which represent them in formal water governance processes. Another area has been encouraging and demanding more independent scrutiny of proposals and plans. In these two areas at least the international regional level there has been something of a norm shift underway in which it is now becoming more standard practice to engage the public, in particular, potentially affected people, earlier and more openly when considering new water infrastructure projects and management approaches.

The PN50 project had a very significant impact on water governance scholarship in the Mekong Region. Through sharing of resources with partners, especially through fellowship program and support for coordination work of research leaders the project contributed to the publication of 29 journal articles, 35 book chapters, 13 public reports and 2 books. Another 64 other working papers were drafted most of which were being prepared for publication as articles or chapters at the time of writing of this report, including two more edited books.

Most of the significant intellectual public goods are documented in the form of publications. The PN50 project explored with respect to water governance issues a wide range of social science methods strengthening in particular practical approaches to comparative analysis and sharing of experiences across locations and cultures.

Several insights of wider significance to water and natural resources management beyond the Mekong Region can be claimed. First is the relative neglect of divergent interests and social justice issues in many flood and disaster management initiatives. Second is the emphasis on project benefits and frequent neglect of costs and adverse impacts of flood, irrigation and hydropower infrastructure projects. Third, and related to above, is the failure to consider in key policy the ecosystem services most important to livelihoods of disadvantaged groups, typically lowland fishers and upland farmers. Fourth is the erroneous assumption that science and politics can be neatly separated. In the real world knowledge claims are contestable and contested; decisions are value-laden and frequently interest-driven.

The relevance of the M-POWER program and network remains high in the Mekong Region. M-POWER will continue after the CPWF PN50 project ends. Several on-going multi-partner projects have already been secured and commitment by many partners to continue to work together is high. In the future different projects will likely be coordinated by a more diverse set of members. Some re-organization of priorities and themes as laid out in the series of M-POWER guides will be needed to fit changing political dynamics and water governance challenges in the region, but we would also anticipate that the collaboration secured and expanded by the CPWF PN50 project to continue to be active in water governance in the Mekong Region for many years to come.

Conclusions

Given these common problems in governance practices in the Mekong region the ultimate goal of pursuing improved livelihood security, human and ecosystem health still depends on further democratization of water governance. Several broad conclusions about common needs can be made.

First is strengthening local representation. Here there clearly has been some progress with at least acknowledgement of the value of local inputs into planning and implementation increasingly recognized by central government agencies.

Second is improving the quality of deliberative processes. Here the growing body of event convening and facilitation experience and skills within the wider M-POWER network of collaboration is an important resource to draw on.

Third is enhancing the constructive interplay between institutions both horizontally and vertically. There are important roles for engaged scholarship to help link non-state and state actors at various levels. Water governance in the Mekong region is and needs to be multi-level.

Fourth is building capacities to handle uncertainties and adapt to changes in flow regimes. Changes in water- and land-use are already impacting on seasonality of flows in many basins and prospects are that climate change will further compound these changes. Institutions and strategies for dealing with uncertainty are under-developed in the Mekong Region even under current conditions. Knowledge and policy networks like M-POWER, with rapid and flexible response capacity, are crucial for dealing with growing uncertainties.

These broad conclusions can also be interpreted as general recommendations. But in practice much more specific recommendations can be derived for different types of actors working in different political and water resource contexts in the region.

At the same time there are some very important constraints in the Mekong Region. Dominant political structures in the region vary from authoritarian states and single-party states to semi-democracies with frequently powerful military or other weakly accountable institutions. Democratization itself is often seen by those in power as a threatening term and process. Nobody in the Mekong Region believes there is a single institution, practice or model for democracy that will immediately and once and for all improve governance overall and more so of water. Despite many constraints improvements in practices are possible and being pursued by broad coalitions of state and non-state actors. This is the reality of democratizing water governance in the Mekong Region.

INTRODUCTION

The Mekong Region is a social and political construct which covers an area of 2.3 million km² and is home to about 240 million people (ADB and UNEP, 2004). The region has many significant, often related, social challenges. These include: continuing water and food scarcity for many, managing pressures from new forms of globalisation and regionalisation, still tense and largely self-interest dominated relationships between Mekong States, handling interference/interventions by external powers, government policies affecting ethnic minorities, labor migration, HIV-AIDS and drugs use, biotechnology impacts on rural production systems, and various subtle or blatant injustices (Mingsarn Kaosa-ard and Dore, 2003). There is a range of competing development discourses suggesting the best ways forward.

Water is a key resource in the region. The major river basins of the region – West to East– are the Irrawaddy, Salween, Chao Phraya, Mekong and Red (Figure 1). Across the region, there are also countless subbasins– that is, catchments or watersheds – natural lakes, aquifers, and human-built dams and reservoirs. In addition, there are many coastal river basins, some of which are quite large. Collectively, they comprise the visible and accessible freshwater 'life source' or 'resource'. Key challenges involve conflicts over water, which are increasing both within and between countries. Conflict is rife or looming over growth in water and energy demand, interference with natural river flows from dams, water diversions, altered sediment and nutrient loads, and reef blasting for transportation. Livelihoods are already impacted by a number of changes: changes to hydrology from erosion, to ecology by fisheries and aquaculture. Food production systems, cultural traditions and economies have all seen dramatic changes in recent years, and even greater changes likely lie ahead. Water governance throughout the Mekong Region requires transformation to deal with these challenges.



Figure 1: Map of Mekong region showing major river basins¹

¹ Need a better quality map

Introduction **CPWF Project Report**

By “water governance” we mean the ways in which society shares power with respect to decisions about how water resources are to be developed and used, and the distribution of benefits and involuntary risks from doing so. Water governance involves the range of political, social, economic and administrative systems that are in place to develop and manage water resources and the delivery of water services (Rogers and Hall, 2003). This includes the full spectrum of influences from shaping agendas and deliberating options through the design of institutions and laws through the way these are implemented in the practices of day-to-day management of water.

The democratization agenda was viewed broadly encompassing issues of public participation and deliberation, separation of powers, accountability of public institutions, social and gender justice, protection of rights, representation, decentralization, and the dissemination of information. No assumption was made that a single model fits all social and resource contexts; rather we asserted that action research can help societies explore and adaptively reform water governance.

Water governance throughout the Mekong Region requires transformation to deal with the challenges mentioned above. To the end of contributing to governance transformation we proposed important action-research, which scrutinised the equity and effectiveness of existing rules and options, the power relationships and interplay between actors, and the dynamic context within and between each country. A multi-perspective, regional approach was adopted. As water governance is inherently interdisciplinary, aspects such as agricultural science, international relations, political economy, law, ecology, economics, engineering, geography and sociology were covered in the analysis.

OBJECTIVES

The overall goal of PN50 is improved livelihood security, human and ecosystem health in the Mekong Region through democratizing water governance.

The project’s strategic objectives were to:

1. Convene, facilitate and support inclusive forums for learning about issues critical to the future of water resources, people and ecosystems.
2. Support and establish mechanisms whereby the view, needs and rights of politically marginalized groups – including women, urban and rural poor and ethnic minorities – are better represented in deliberations and negotiations over the use and development of water resources.
3. Analyze, propose and encourage institutional changes that would improve the accountability of water management authorities to the people they are supposed to serve and others whom their activities impact.
4. Synthesize understanding about efforts by state, non-state and international organizations to democratize water governance in the Mekong region.
5. Foster, and contribute to, the growth of regional networks of researchers committed to critical analyses and actions to support democratizing water governance.

The research activities under PN50 were organized around comparative and regional empirical case studies carried out by multi-country teams and synthetic cross-cutting themes (Figure 2). The case studies followed conventional divisions in the water sector that, when together, were also a basis for addressing issues in integrated water resources management. The case studies frequently included action research elements in addition to more conventional research scholarship and policy analysis. The four cross-cutting themes provided a second dimensions for analysis of public policy processes and their consequences for allocation of water resources and risks.

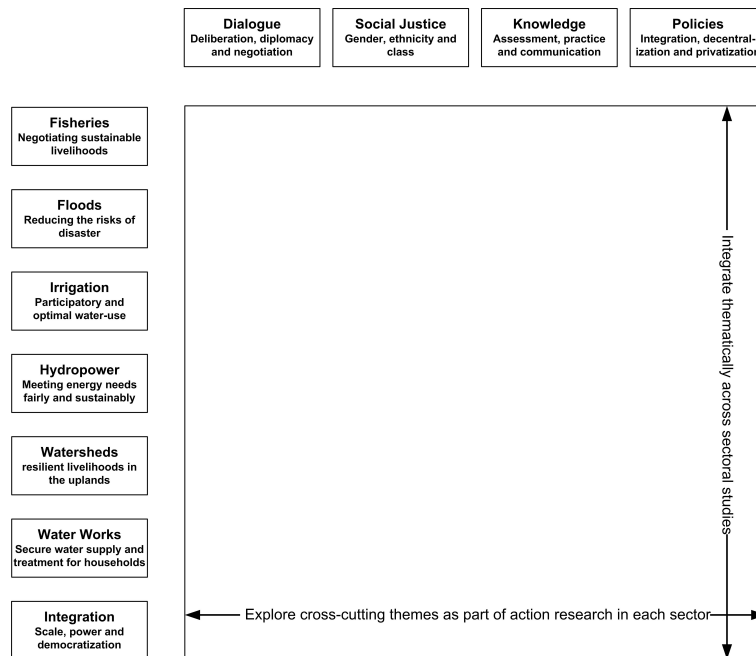


Figure 2: Analytical and organizational framework for M-POWER’s program and the CPWF PN50 project.

Source: (M-POWER, 2008)

Objectives **CPWF Project Report**

Synthesis activities were guided by 11 research leaders that build up multi-country and multi-organization teams. M-POWER Partner organizations were the main source of effort to implement the research activities, especially in early years of the project, but later more and more individuals from other organizations became involved and in some cases their organizations also formally joined M-POWER. Thirty-two fellowship research grants were provided to 37 researchers; including 5 Cambodians, 5 Chinese, 10 Thai, 10 Vietnamese, and one each from Myanmar and Lao PDR and the remainder from outside the Mekong region but for work hosted by partners.

FINDINGS

This section forms the main body of the report. It presents the main findings of the project as well as acting as an index to the set of published material including books (Figure 3), papers and other manuscripts, under review or being finalized for publication. The section is presented in two ways. First, and at greater length, organized around the six case studies. Second, and more synthetically, according to the cross-cutting themes of our framework (Figure 2).

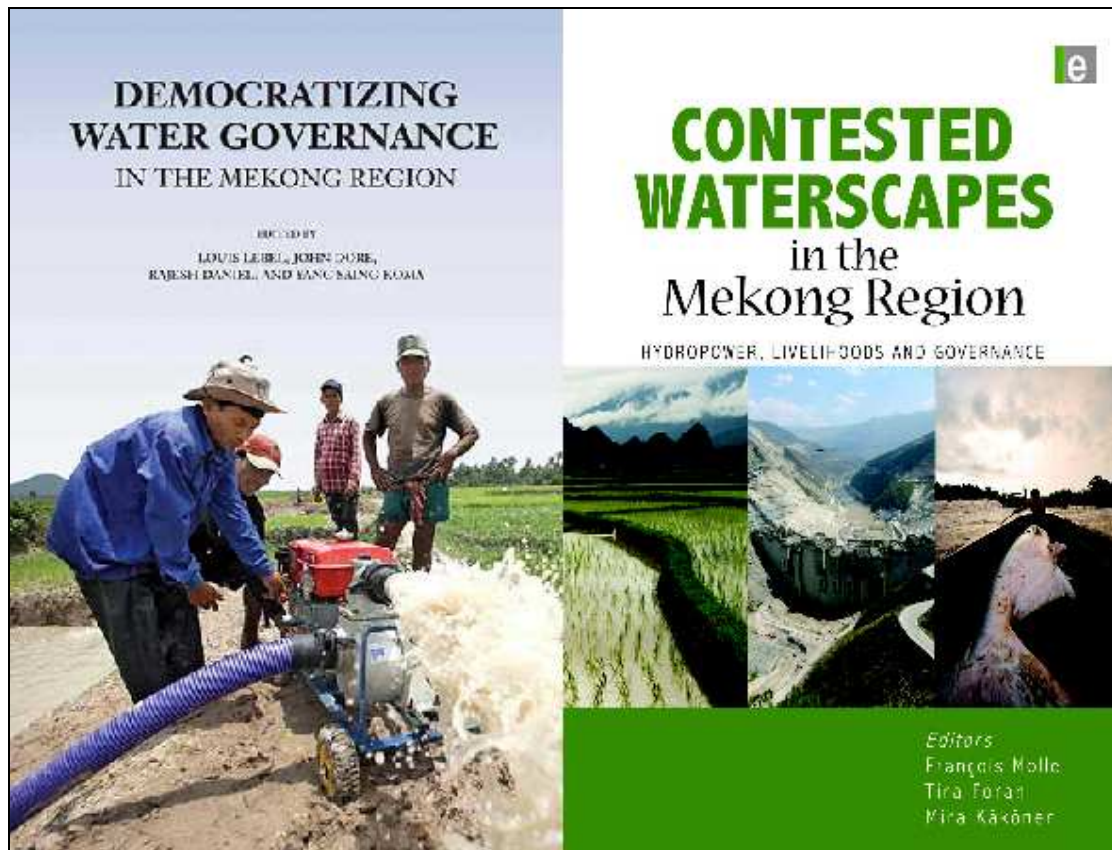


Figure 3: Covers of the first two volumes in the M-POWER book series titled "Democratizing water governance in the Mekong region"

1 Case study 1: Fisheries

Activities undertaken by the fisheries working group² in M-POWER have helped raise the profile of fisheries and fisher livelihoods in regional debates. The activities have helped to reiterate the importance of flood pulses, floodplains and wetlands to rural livelihoods. The research has also exposed flaws and gaps in fishery and aquaculture policies and programs. The Fisheries & Livelihoods Theme has helped to create a new forum for critical debate – moving away from the established approach in the region, of taking fisheries ecology as the starting point. The research interest has been in scrutinizing the discourse and narratives surrounding the way fisheries (and related livelihoods) appear in policy debates and academic writing, while critiquing the practice of fisheries policy

² This subsection was written with contributions from Dr Richard Friend

and management so as to provide input to future direction. This has been substantiated with field research in critical parts of the Mekong Basin. As well as deconstructing the directions of current policy and practice the working group hopes to be able to open debate for how fisheries can contribute to an alternative, but viable development pathway. In this short review, the working group first summarizes the main lessons from these activities then highlights a few key implications for policy, practice and future research.

1.1 Deconstructing narratives of doom – and generating a fisheries counter-narrative

There is an established narrative of doom and crisis for the region's fisheries that underpins policy, research and debate. This narrative has a long history and is well reflected in the policy and institutional structures of the fisheries departments of the region. Capture fisheries appear largely as impacts and costs of development, to be 'traded-off', mitigated or substituted, with the future development of the fisheries sector lying largely in aquaculture. We (members in the working group) have also begun to scrutinise the future potential for aquaculture and reservoir stocking in the region. The linkages between poverty and fisheries have also been placed under critical review, drawing on experience in Africa and the Mekong. While deconstructing these narratives, we have also attempted to provide a counter-narrative in which fisheries are drivers of development (Béné & Friend, in press). In doing so, we have been active in regional public fora concerning water resources management, and in particular, the development of hydropower, as well as presenting their research findings in international academic conferences.

1.2 Understanding impacts without policy change

A better understanding of the ecology and value of fisheries in the Lower Mekong Basin (Lebel et al 2007a; Lebel et al 2007b) has not deflected state and private interests in water resources development, in particular, mainstream hydropower (Deeburee, 2009b).

Building on the deconstruction of discourse and narratives, the leading member of the group, Richard Friend, attributes this in part, to a flawed model of how to engage and influence policy. The rights and interest of fishers and need for their articulation in decision-making continue to be downplayed, even within the research process. A major assumption underpinning research-based attempts to influence policy has been that policy is rational, and influenced by science. Our analysis suggests that fisheries are ignored in policy, not because of a lack of scientific information, but by the enduring resonance of doom narratives, and because fishers themselves are excluded from decision-making arenas. By "expertising" the 'problem' of fisheries, fishers themselves are further excluded. In particular, Richard Friend, Robert Arthur, Mark Dubois and Marko Keskinen argue for an engaged research agenda that builds on fishers' knowledge and capabilities to be better able to assess and monitor their resources base, better able to articulate their interests and needs, and thereby engage in policy debates.

1.3 Participation in management

Sok Serey and Oung Ty Sana made a detailed study of participation in fisheries management in three Cambodian provinces bordering Tonle Sap Lake (Serey and Sana 2009). They compared three floating fishing communes in which formal community

fisheries were absent, in the process of being established and already established. Community fisheries were formally established by reforms in 2000 and 2003 representing a shift from a historical emphasis of public policy on regulating large and medium-scale fisheries. Interviews with 900 fishermen from three communes suggest that levels of participation were high in initial stages of establishment of community fisheries when strong support of government agencies, NGOs and other partners was present but later declined once formed. This was obviously contrary to initial expectations and hopes of self-management. Most participation was in attending community meetings or in planning at the establishment stage. Fishermen were much less involved in other activities like assessment or campaigns.

Seak Sophat also working on Tonle Sap Lake argues that community-based monitoring of biodiversity is promising because locals have a clear stake in resource use and conservation (Sophat, 2009). State and NGO-managed programs have both their strengths and weaknesses.

The terms and benefits of participation in natural resource or fisheries management require careful scrutiny. Babette Resurreccion cautions that inclusion of women in community fisheries in the Tonle Sap region may simply reproduce existing unequal gender relations (Resurreccion, 2006). Her research emphasizes the importance of paying attention to pre-existing power relations and institutions (Resurreccion, 2006). She found, for example, that women legitimize their presence in community fisheries programmes through ties with men in positions of power and by opting for roles like marketing and financial stewardship favored by development programmes (Resurreccion, 2006).

1.4 Negotiating access and control over flood pulses, floodplains and wetlands

Floods are a normal part of the seasonal cycle in many areas and “flood pulse” ecosystems are often critical to productivity of agriculture, wetlands and fisheries. In the Songkhram River Basin wetlands, for example, the majority of residents still view flood events as positive. More extreme floods can damage paddy rice crops and effect drinking water supplies and even houses or livestock shelters. But overall especially when exploring climate change possibilities droughts are expected to have more adverse impacts than floods. Access to wetland and floodplain resources is hugely important to rural livelihoods. But such access is keenly contested, within communities and between resource users and the state.

Kanokporn Deeburee studied changing access to floodplain wetlands in the Songkhram River basin (Deeburee, 2009a; 2009b). She argues that these resources are viewed as common property by local communities whereas state macro-economic policies are driving privatization of flood plain areas and providing other incentives that are undermining the resources and management institutions. Rather than engaging in direct conflict with state, however, local communities compromise and look for ways negotiate and align practices within state frameworks, for example, with respect to fisheries conservation. Locally-defined property rights, ultimately, persist but remain vulnerable and again are contested and diverse. Significantly she also points to the tensions, power and gender relations, and associated diversity of interests, access and control within such ‘communities’, and how these become manifest in access rights.

1.5 Fish aquaculture in rivers

Aquaculture in rivers and other public water bodies raises important questions of access. In particular: Who gets to farm fish when and where? With support from M-POWER grant to USER as a partner organization, Phimphakan Lebel completed a Master's Thesis at Faculty of Aquatic Resources and Fisheries Technology at Mae Joh University in Chiang Mai on the topic of fish cage culture in the Upper Ping River basin (Lebel, 2008). Two short articles for Thai fisheries journals were subsequently prepared. One described the main fish farming practices (Lebel et al 2007a) and a second on the role of women (Lebel et al 2008). Women, it turns out are often the main labor contributor and, compared to many other agricultural activities in northern Thailand, also frequently have a major role in decisions (Lebel et al 2010). Leadership in farming fish, however, does not necessarily empower women in other river management or other aspects of community life (Lebel et al 2010).

Access to river surface water is largely restricted to land-holders with bank-side properties even though the water surface itself is public (Lebel et al 2007b). Policies for aquaculture in rivers and otherwise regulating such practices are only now being introduced (Lebel, 2008) such as most recently some standards and certification schemes. At the time of the research a roundtable M-POWER members convened and contributed to was one of the first multi-stakeholder activities on this industry in the area and was well received by all participants (Figure 4). The event was attended by about 120 participants, many directly involved in the fish farming industry or with responsibilities and interest in the management of the Ping River. A short documentary film on the industry (USER FM-2007-04) and some of the main management issues was prepared.³ How various new policies and schemes are affecting aquaculture practices and interactions with other river users deserves further study.



Figure 4: Excerpt from flyer for the round-table on fish farming in the Upper Ping River held in Chiang Mai, 6 December 2007.

The interest in aquaculture goes much further. With Richard Friend, Robert Arthur and Mark Dubois' extensive experience in small-scale aquaculture as part of broader aquatic resource management systems, the theme is continuing to review experience of

³ View on-line at: <http://www.sea-user.org/uweb.php?pg=196>

aquaculture and stocking in the region, and to explore the future potential to contribute to livelihoods security and improvements (Arthur et al 2010).

1.6 Implications for policy, practice and future research

After several years of collaboration in the Mekong Region there is now a well-established network of committed fisheries scientists and governance scholars with strong links to local fishers groups, government agencies and regional actors.

The challenge for the future will lie in providing direction for how fisheries can contribute to positive development, and in continuing the critique of current development pathways, and in changing some of the most destructive policies and projects. Fisheries is clearly a hugely important issue in the Mekong Region and the work done by M-POWER partners constitutes a unique approach that should be supported and expanded.

1.7 Literature cited

- Arthur, R.I., Lorenzen, K., Homekingkeo, P., Sidavong, K., Sengvilaikham, B. and Garaway, C.J (2010) 'Impacts of introduced aquaculture species on native fish communities: Nile tilapia and major carps in SE Asian freshwaters.' *Aquaculture* 299: 81-88
- Deeburee, K (2009b) Local Management Practices under Pressure from Regional/National Water and Fish-Based Resource Management Practices: Experiences from the Songkhram River Basin. This article was presented at the International Seminar on Cultural Diversity of the Mekong River: Sharing Experiences from Japan and the Mekong Countries, Ubon Ratchathani, Thailand. This short article was also published in the proceeding of the seminar during 19-20 November 2009.
- Deeburee, K. (2009a). *The responses to resource territorializations: an experience of fish-based property right processes in floodplain of Songkhram River Basin*. M-POWER Working Paper MP-2009-10. Unit for Social and Environmental Research (USER), Chiang Mai University: Chiang Mai.
- Friend, R.M. (2007). *Securing sustainable livelihoods through wise use of wetland resources: reflections on the experience of the Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme (MWBSP)*. Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme: Vientiane, Lao PDR.
- Friend, R.M. (2009). *Fishing for influence: fisheries science and evidence in water resources development in the Mekong basin*. *Water Alternatives* 2(2): 167-182.
- Friend, R.M. , R. Arthur, and M. Keskinen (2009). *Songs of the Doomed: The continuing neglect of capture fisheries in hydropower development in the Mekong*. In *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, F. Molle, T. Foran, and M. Käkönen, Editors. Earthscan: London.
- Friend, R.M. and D.J.H. Blake (2009). *Negotiating trade-offs in water resources development in the Mekong Basin: implications for fisheries and fishery-based livelihoods*. *Water Policy* 11(Supplement): 13-30.
- Lebel, P. (2008). *Managing for sustainability: the livelihood opportunities, social implications and ecological risks associated with fish cage aquaculture in the Ping River, Northern Thailand*. Maejo University: Chiang Mai.
- Lebel, P., L. Lebel, and P. Chaibu (2007a). *Aquaculture in rivers: management and policy options for fish cage aquaculture in the Upper Ping River, northern Thailand*. *USER Working Paper WP-2007-08*. . Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Lebel, P., P. Chaibu, and L. Lebel (2007b). *Rules of entry and access to river waters: fish cage aquaculture in the Upper Ping River, northern Thailand*. *USER Working*

Objectives CPWF Project Report

- Paper WP-2007-06* Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Lebel, P., P. Chaibu, and L. Lebel (2009). *Women farm fish: gender and commercial fish cage culture on the Upper Ping River, northern Thailand*. *Gender, Technology and Development* 13(2): 199-224.
- Lebel, P., P. Chaibu, B. Jaichaichom, and L. Lebel (2008). *Gender and the culture of Tilapia in the Upper Ping River in Chiang Mai and Lamphun Provinces [in Thai]*. *Journal of Fisheries Technology* 2(1): 168-178.
- Lebel, P., S. Leudpasuk, L. Lebel, and P. Chaibu (2007b). *Fish cage culture in upper part of Ping river. [in Thai]*. *Journal of Fisheries Technology* 1(2): 160-170.
- R.I. Arthur, R.M. Friend & M. Dubois (in press) *Fisheries, nutrition and regional development pathways: the potential for food-led regional development*
- Resurreccion, B. (2006). *Rules, roles and rights: gender, participation and community fisheries management in Cambodia's Tonle Sap region*. *Water Resources Development* 22(3): 433-447.
- Resurreccion, B. (2008). *Gender, legitimacy and patronage-driven participation: Fisheries management in the Tonle Sap Great Lake, Cambodia*. In *Gender and natural resource management: Livelihoods, mobility and interventions*, B. Resurreccion and R. Elmhirst, Editors. Earthscan: London. Pages 151-173.
- Sarkkula, J., M. Keskinen, J. Koponen, M. Kumm, J. Richey, and O. Varis (2009). *Hydropower in the Mekong region: What are the impacts on fisheries? Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, ed. F. Molle, et al. London: Earthscan. Pages pp.
- Scurrah, N. (2009). *'Countering hegemony' and 'institutional integration': Two approaches to using Tai Baan (villagers') research for local knowledge advocacy*. *M-POWER Working Paper MP-2009-11*. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Serey, S (2010) "Participatory Managing Small-scale Fishing in the Tonle Sap Lake: A Case Study in Kompong Leang District of Kompong Chhang Province, Cambodia" *Sephis Magazine (M-POWER Book Volume 4)*
- Serey, S. and O.T. Sana (2009). *Public participation in fisheries governance in the Greater Mekong Sub-Region (GMS): A case study of provinces along the Tonle Sap Lake in Cambodia*. *M-POWER Working Paper MP-2009-13*. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Sophat, S. (2009). *Biodiversity monitoring: status, challenge and opportunity. A case study of Tonle Sap Biosphere Reserve, Cambodia*. *M-POWER Working Paper MP-2009-19*. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.

2 Case study 2: Floods

Activities undertaken by flood working group⁴ in M-POWER have helped establish flood and disaster management in the Mekong Region as valid subjects for social, institutional and political analysis. They also demonstrated the value of engagement by researchers with practitioners whether the latter are non-state actors in flood-affected communities or government officials with responsibilities for flood and disaster management. This sub-section summarizes the main findings from these activities and highlights key implications for policy, practice and future research.

2.1 Politics of floods and disasters

Floods as a physical event vary greatly with respect to their velocities, onset, and high flow duration and recession dynamics, in their impacts on debris flows and water quality, and in their unusualness with respect to the historical flood regime (Lebel and Sinh, 2007). Some floods are treated by society as potentially harmful; some turn into disasters (Figure 5)

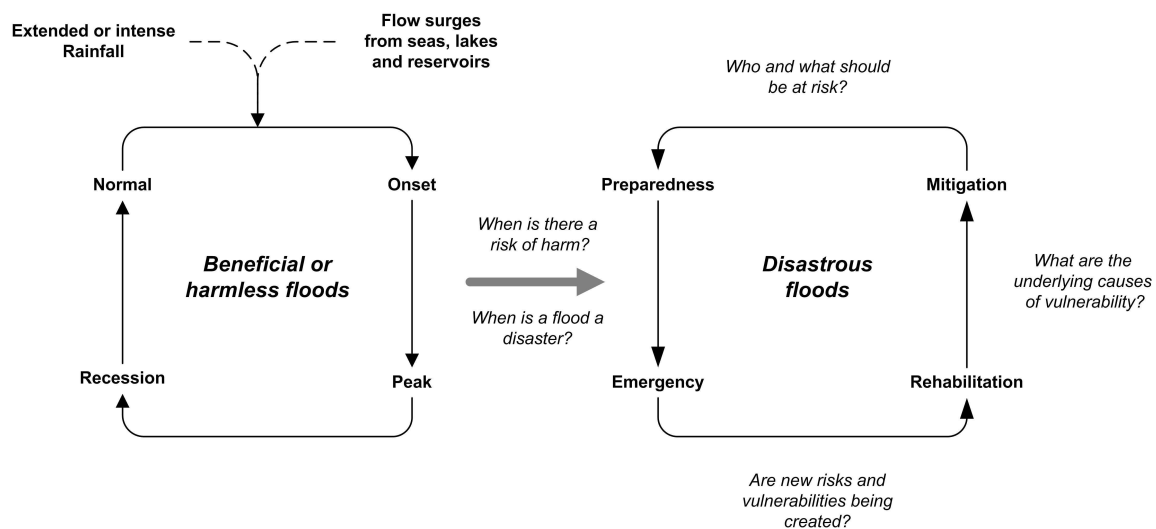


Figure 5: Floods may be beneficial, harmless or disastrous
Source: (Lebel and Sinh, 2007).

The initial review of the flood working group established the importance of analysis of power and discourses for explaining floods and disaster management (Lebel and Sinh, 2007). For instance we explored how people talk about floods and ask: when is a flood a disaster? Three important discourses are: living with, control and adjust.

The living with floods discourse treats floods as natural events that arise from high rainfall. Living things are adapted to flood regimes and it is difficult to do much to deter floods. Therefore, we should learn to live with floods.

The control discourse treats floods as natural events that can and should be controlled with properly constructed and operated dams, embankments and spillways.

The adjust discourse says floods are caused by people, from how they use watersheds and floodplains, and how they regulate and modify river channels. We need to adjust land- and river-use in ways that don't cause floods.

⁴ This subsection was written with contribution from Dr Bach Tan Sinh.

Apart from discourses we also looked at decision-making around risks and vulnerabilities and the responses to floods. We concluded that research and policy have largely accepted a technocratic paradigm of disaster management and argued for much greater attention to the political dimensions of flood governance in the Mekong region (Lebel and Sinh, 2007). The implication is that public consultation, participation and deliberation of flood management policies, institutional innovations, and infrastructure measures needs to be expanded.

2.2 Risk redistribution

The theme of risk redistribution was first articulated in M-POWER book 1 as one of the important elements of the politics of flood disaster management (Lebel and Sinh, 2007). Over the next few years we collected examples from different countries and were then able to make an expanded and more systematic treatment of the different ways risk redistribution can occur (Lebel and Sinh, 2009). We reviewed instances and conditions under which flood management policies, measures and practices in the greater Mekong region, intended to reduce risks, appear to have shifted risks onto already vulnerable and disadvantaged groups. It classifies these observations into six mechanisms through which risks may be redistributed (Table 1). The analysis highlights the importance of public participation and negotiation in handling various risks associated with flood management, and, conversely, why purely technical, expert-driven, approaches to flood disaster management are unlikely to succeed in reducing the risks of flood disasters.

*Table 1 Summary of selected mechanisms through which risks are redistributed. Key components of vulnerability involved are indicated in **bold**.*

	Description
A	Introduction of flood protection infrastructure exposes non-target (of protection) populations to flood waters and thus higher risks of adverse impacts
B	Discrimination, lack of opportunities and other social processes lead certain social groups to live or work in unsafe places or high exposure whereas other groups, correspondingly, enjoy much lower exposure
C	Emergency relief and disaster recovery programs in response to events, or development programs more broadly, preferentially serve those who need it less, reducing capacity of others to cope , recover (resilience) or transform
D	Distorted, or poor access to, information about risk reduction benefits used to justify flood control and protection projects that take away resources which otherwise could be used to improve resilience or capacity to transform vulnerable groups
E	Development policies that reduce livelihood options or encourage activities to be under-taken at higher risk times than they would otherwise can undermine capacities to cope and transform .
F	Flood control or protection measures that disrupt wetland or agricultural ecosystems upon which other groups depend undermining their social-ecological resilience to floods and other stresses and disturbances

Source: (Lebel and Sinh, 2009)

2.3 Promises of protection

Governments frequently make promises to their citizens; few promises are as powerful as that of safety and security (Lebel et al 2009b). Promises of protection from floods are a subset of the different ways society can respond to risks from flood waters. The protection approach usually implies prevention through regulation of flows. Promises of protection are often made in earth or concrete: dams built far upstream will regulate river flows; diversions will take the water around and past the city; dykes higher and

longer will hold back the flood waters; drains, pumps and tunnels will move water out faster (Lebel et al 2009b).

After documenting typical flood protection responses we analyzed the origins of protection promises. To do so we developed a simple, initial, conceptual model in which promises are seen as arising from perceptions about risks, but often influenced by triggering events. Using the model we suggested five mechanisms that are considered key to understanding origins and consequences of flood protection promises (Figure 6).

Promises of protection and how they are pursued can be explained in terms of beliefs, interests, and power. Promises pursued in concrete—as dykes and dams, drains and diversions—regularly exaggerate benefits and ignore the often unanticipated side-effects on people living elsewhere and on the environment. Efficacy in reducing-risks of flood-related disasters is often reduced to a side-effect of projects pursued for other reasons. This does not imply that infrastructure has no role in flood management; but it does underline how frequently the promise of flood protection rings false (Lebel et al 2009b).

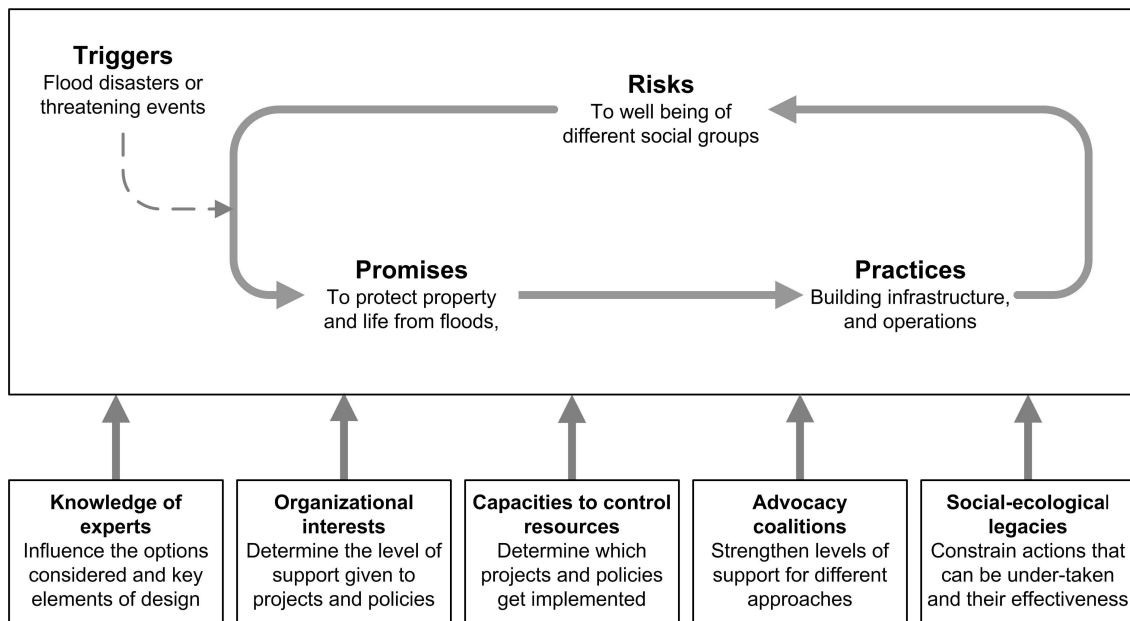


Figure 6: *The promise of flood protection: an initial conceptual model*
 Source: (Lebel et al 2009b)

2.4 Changing flood regimes

One of the most important insights that emerged through the course of this research was that changing flood regimes represented a major challenge for communities and bureaucracies. Changes in water infrastructure, modifications of floodplains and river banks, and patterns of land- and water-use are already influencing flood regimes in important ways. Climate change could further confound flood regimes.

As a contribution to a book about climate change adaptation in the water sector we analyzed issues of social justice in how floods and disasters were being managed in Thailand (Lebel et al 2009d). Based on a critique of historical policies and practices we identified several key challenges posed by altered flood regimes resulting from climate change and adaptation policies themselves. The analysis underlined the importance of politics in the pursuit of adaptation. Contests emerge because of divergent interests, perceptions and experiences of risks. Our main conclusion was that persistent social

injustices could be made worse by both inaction and misguided climate change adaptation policies (Lebel et al 2009d).

We also argued for a risk management approach to incorporating climate change considerations in development. Reducing the risk of disasters should be central to climate adaptation. Incorporating climate change adaptations into flood and disaster management should be seen as an opportunity to address inequities, insecurities and unfairness that have created large disparities in well-being, vulnerability and opportunity (Lebel et al 2009d). At the same time we note that we should not wait for more catastrophic confirmation of climate change: there are many actions that would benefit disadvantaged and vulnerable groups now which don't need climate change or any other justification (Lebel et al 2009d).

In subsequent articles (in preparation or in press), we explore the practicalities of linking adaptation to climate change and disaster risk reduction policies and programs generally (Lebel et al 2009a) and more specifically in the case of Thailand (Lebel et al 2010a; Lebel et al 2010b).

Vulnerabilities to floods in Thailand, for instance is changing as a result of many factors. Formal and informal institutions help shape exposure, sensitivity and capacities to respond of individuals, social groups and social-ecological systems. Our analysis identifies several institutional traps which need to be overcome if vulnerability is to be reduced (Table 2). Possible responses are to: expand public participation in managing risks; build adaptive capacities at multiple levels and link them; integrate flood disaster management and climate change adaptation into development planning; prioritize risk reduction for socially vulnerable groups; and, strengthen links between knowledge and practice. Responses like these could help reduce vulnerabilities under current climate and flood regimes, while also improving capacities to handle the future which every way that unfolds.

Table 2 Five institutional traps

Trap	General description
Fragmentation	Bureaucratic separatism and competition leading to poor coordination, institutionalized incapacities, and gaps in service provision
Rigidity	Over-emphasis on control, stability and elimination of uncertainties in management functions maintained by, and reinforcing, highly inter-connected and inflexible institutions
Scale	Overly narrow concentration of resources, capacities to a single level, ignoring benefits and management challenges of cross-scale interactions
Elite capture	Elites deploy experts and technical tools in ways that serve their interests not those of marginalized and vulnerable groups
Crisis	A focus on reacting to emergencies and crises because of political pressures and opportunities; made possible by absence of effective, strategic, longer-term planning

Source: (Lebel et al 2010a).

2.5 Practice and knowledge

A feature of activities in the flood working group has been on-going interaction with practitioners at different levels, both state and non-state. One example was the facilitation of exchange visits of flood managers in Thailand and Vietnam (Sinh, 2007). Some of these individuals also subsequently contributed to a larger scale workshop

(Lebel et al 2008) and a reflective article on managing floods in urbanizing regions (Lebel et al 2009c).

Khin Thein Htwe documented efforts to reduce vulnerabilities to major floods in Pyapon Township in the Ayeyarwaddy delta in Myanmar (Htwe, 2009). This case study was carried out in areas severely impacted by Cyclone Nargis. In one of the study villages, for example, 99 individuals died and 314 homes were destroyed. The case study documents the high reliance of affected households on external emergency aid. She concludes that several factors are important to disaster risk reduction in this setting including: awareness, capacity building, warning system, safe places, effective response, coordination of Government agencies and NGOs, investment on structural measures, and investments in human resources development.

Bui Viet Hien and colleagues in Vietnam made a detailed study of informal organizations in several communities in Phu Cat District, Binh Dinh province, Vietnam (Hien et al 2009). One of the most important contributions of this work was methodological: a systematic framework for assessing the attributes of informal organizations and relating these to community resilience was developed and illustrated. The informal groups studied included: rice processing and trading, construction, migration, savings, canal clearance, labor exchange, boating and dyke protection. Different groups were important in different phases of flood disaster management. The services provided by informal groups varied across villages in ways that could, in part, explain levels of community resilience (Figure 7).

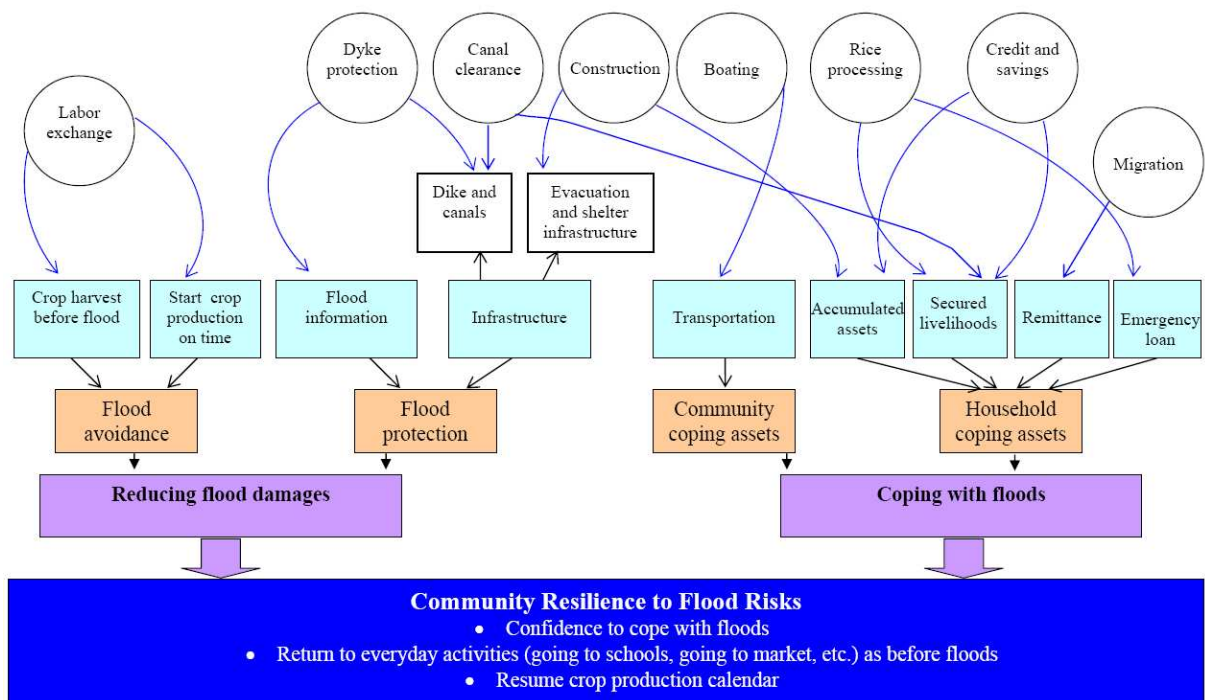


Figure 7: How the presence of informal groups contributes to community resilience Source : (Hien et al 2009).

2.5 Living with floods

In An Giang province in the Mekong Delta the People’s Committee has encouraged residents to explore and adapt to conditions created by floods. This has led to some successful livelihood projects and made the “living with floods” policies much closer to a

reality than has frequently been the case (Sinh et al 2009). The way the An Giang People’s Committee responded to national guidelines is instructive. They looked closely at the local institutional context and capacities as well as the existing knowledge and wisdom about ways of living with floods. Apart from the traditional production of rice, the local authority recognized and explored the benefits from flood such as diversifying agricultural activities during flood seasons, off-farming incomes.

The successful experience of An Giang Province in coping and adapting to the conditions generated by seasonal flood has been fed back to the central government and used to revise the National Strategy on the Disaster Prevention, Control and Mitigation in Vietnam to the year 2020 (Sinh et al 2009). In this National Strategy the Approach towards “living with floods” has been highlighted as a principle for disaster prevention, control and mitigation in the Mekong Delta. The local approach to “living with floods” has been shared with interested groups from neighboring provinces as they attempt to find appropriate local response to seasonal floods. The benefits from floods, not just risks, should be explored and be part of flood management.

Le Anh Tuan and colleagues at Can Tho University carried out a series of studies on temporary or “semi-dykes” – an alternative local technology – which provide adequate protection for completing a rice crop but also allow peak seasonal flood waters to spread as usual so that flood benefits can also be secured (Tuan et al 2008). This alternative, compromise, approach to “living with floods” appears to give more benefits than either no or full dyke protection (Table 3).

Table 3 Advantages and limitations of different dyke forms.

	No-dyke	Semi-dyke	Full-dyke
Advantages	<ul style="list-style-type: none"> • full sediment deposits • easy to catch fish • remove insects, rats, soil toxics • no affects to downstream areas 	<ul style="list-style-type: none"> • full sediment deposits • rather easy to catch fish • remove insects, rats, soil toxics • ensure the second rice crop • more harvest jobs for hired labour • no affects to downstream areas 	<ul style="list-style-type: none"> • have intensive crop • develop fruit/vegetable gardens • safe for children, women • easy to transport, trade • safe houses and assets • more jobs for hired labour
Disadvantages	<ul style="list-style-type: none"> • harmful for children, sick-persons • no second rice crop • destroy infrastructures • interrupted education • hardy trading • less jobs for hired labour • poor living conditions 	<ul style="list-style-type: none"> • high maintenance • hard transportation • living condition is not easy during the flood 	<ul style="list-style-type: none"> • high cost for dyke construction and crop production • loss sediment • no fishing • more insects, rats, soil toxics... • serious water pollution • upstream water logging • affects to downstream areas (high erosion, flood prolonging)

Suon Seng and colleagues in Cambodia made a study of flood affected communities in Prey Vong province (Seng et al 2009). They documented evidence that changing patterns of floods created hardships for farmers. Capacities to innovate and adapt livelihood systems varied among communities and households. Adaptive capacities in woman-headed and the poorest households were especially low. Local authorities and

technical agencies also play a role but to be effective need to have a better understanding of dynamic rural livelihood systems (Seng et al 2009).

2.6 Implications for policy, practice and future research

After several years of collaboration in the Mekong Region there is now a well established network of governance scholars committed to improving flood and disaster management policy and practices. The opportunities to critique and provide and advice on institutional issues are significant and likely to be an important area of work within M-POWER beyond the PN50 project.

At the same time more engaged or reflexive scholarship is still needed at many levels. Reviews and analyses have identified social processes and capacities but their relative importance often remains unclear. The effectiveness of different kinds of social or institutional interventions and how they are based combined with infrastructure are also far from clear.

2.7 Literature cited

- Hien, B.V., N.P. Vinh, and N.T. Loan (2009). *Role of informal groups in building and maintaining community resilience to floods in Binh Dinh Province, Vietnam*. NISTPASS: Hanoi.
- Htwe, K.T. (2009). *Case study on flood risk reduction in Pyapon township of the Ayeyarwady delta in Myanmar. M-POWER fellowship progress report*. Water, Research and Training Centre: Yangon.
- Lebel, L. and B. Sinh (2009). *Risk reduction or redistribution? Flood management in the Mekong region*. *Asian Journal of Environment and Disaster Management* 1(1): 23-39.
- Lebel, L. and B.T. Sinh (2007). *Politics of floods and disasters*. In *Democratizing water governance in the Mekong region*, L. Lebel, et al., Editors. Mekong Press: Chiang Mai. p. 37-54.
- Lebel, L., B.J. Manuta, and P. Garden (2010a). *Institutional traps and vulnerability to changes in climate and flood regimes in Thailand*. *Regional Environmental Change* in press.
- Lebel, L., B.T. Sinh, and E. Nikitina (2009a). *Adaptive governance of risks: climate, water and disasters. USER Working Paper WP-2009-13*. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Lebel, L., B.T. Sinh, P. Garden, S. Seng, L.A. Tuan, and D.V. Truc (2009b). *The promise of flood protection: Dykes and dams, drains and diversions*. In *Contested Waterscapes in the Mekong Region*, F. Molle, T. Foran, and J. Kakonen, Editors. Earthscan: London. p. 283-306.
- Lebel, L., E. Nikitina, and B.T. Sinh, eds. (2008). *Climate change and the science and practice of managing floods in urbanizing regions of Monsoon Asia. MAIRS Working Paper Series #4*. Monsoon Asia Integrated Regional Study International Project Office and the Institute for Atmospheric Physics, Chinese Academy of Science: Beijingpp.
- Lebel, L., P. Lebel, and R. Daniel (2010b). *Water insecurities and climate change adaptation in Thailand*. In *Climate Change Adaptation and Disaster Risk Reduction*, R. Shaw, Editor. Emerald Publishers.
- Lebel, L., R.T. Perez, T. Sukhapunphan, B.V. Hien, N. Vinh, and P. Garden (2009c). *Reducing vulnerability of urban communities to flooding*. In *Critical states: Environmental challenges to development in Monsoon Asia*, L. Lebel, et al., Editors. Strategic Information and Research Development Centre: Selangor, Malaysia. p. 381-399.
- Lebel, L., T. Foran, P. Garden, and B.J. Manuta (2009d). *Adaptation to climate change and social justice: challenges for flood and disaster management in Thailand* In

Objectives **CPWF Project Report**

- Climate change adaptation in the water sector*, F. Ludwig, et al., Editors. Earthscan: London. p. 125-141.
- Seng, S., L. Soviet, N. Sokha, C. Keartha, and L. Sokundaro (2009). *Local adaptation to climate change: What do floods take from and bring to community people living in flood affected areas? M-POWER Final Report*. Center for Development Oriented Research in Agriculture and Livelihood Systems (CENTDOR) Phnom Peny.
- Sinh, B.T. (2007). *Joint informal meetings of Thai-Vietnam practitioners and researchers on management of flood risks and prevention of flood-related fatalities. M-POWER Small Grant Report*. Mekong Program on Water Environment and Resilience: Chiang Mai.
- Sinh, B.T., L. Lebel, and N.T. Tung (2009). *Indigenous knowledge and decision-making in Vietnam: the case of living with floods in An Giang Province, Mekong Delta. USER Working Paper WP-2009-21*. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Tuan, L.A., N.H. Trung, and T.T. Trieu (2008). *Semi-dyke alternative: local policies and practices to manage floods in the Mekong Delta. Working Paper*. Can Tho University: Can Tho.

3 Case study 3: Irrigation

The Mekong Region has a long tradition of run-of-river farmer-managed irrigation schemes, and even longer tradition of rain-fed agriculture. Large-scale schemes have been developed since 19th century, and during last 20 years many more are being promoted and planned by State agencies (Figure 8). On the whole much of this planning and construction takes place without attention to public information and consultation. The specific strategic objective of MPOWER, by 2010, for irrigation sector is: 'Open up for public deliberation plans for large-scale water infrastructure for irrigation and suggest alternative approaches for securing adequate water supplies for agriculture'.

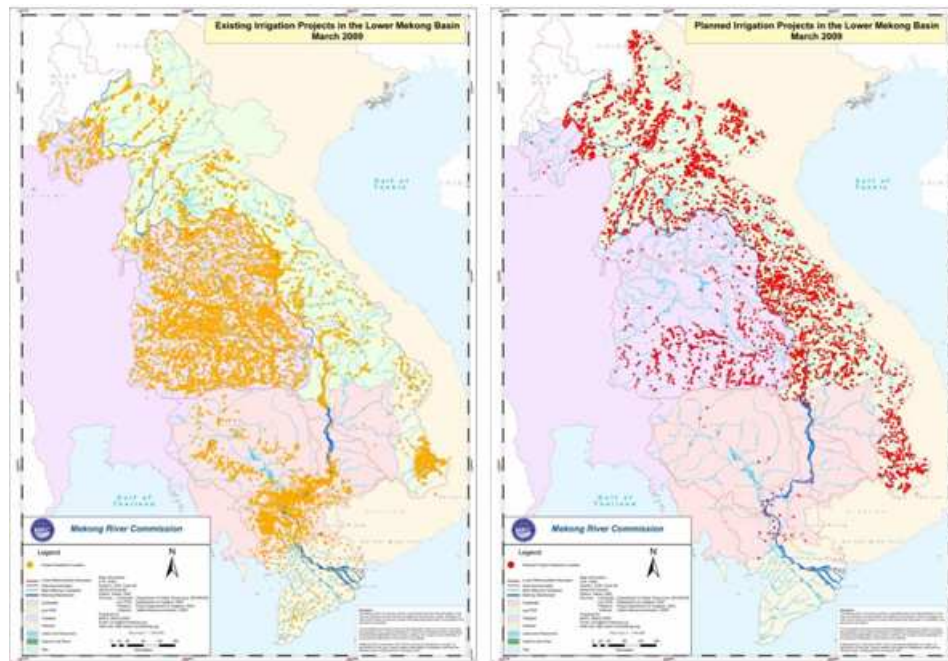


Figure 8: Existing (left) and planned (right) irrigation projects in the Lower Mekong countries
(Source: MRC, 2009).

A comparative study⁵ across Mekong countries focused on the rationales and processes for decisions about large-scale irrigation developments. These developments may, for example, include inter-basin diversions and the construction of storage dams, or be more about shifting responsibilities for water allocation or operations. The case studies focused on the national pump installation project in Laos, the 're-packaged' different elements of the Thailand water grid and the irrigation works planned in Cambodia, the water pricing and river basin organization in the Red river in Vietnam, recognizing that there may be local, national and cross border impacts.

Main research questions examined were:

- Whether the trend of irrigated area expansion in Mekong countries of slowing down during the last few years heralds the end of large-scale public irrigation or, in fact, a new irrigation era is expected? (Hoanh et al., 2009).
- What are the lessons learned from the experience with Irrigation Management Transfer (IMT) in Lao PDR? (Phengphaengsy, 2010)

⁵ This subsection was written with contribution from Dr Chu Thai Hoanh

- How does the governance of small-scale and decentralized decision-making play out vis à vis large-scale developments in the larger Chi-Mun Basin and Northeast Thailand? (Floch and Molle, 2007)
- What are the ways of irrigation planning actually implemented in the Northeast Thailand within a particular social, economic, cultural and political context? (Floch et al., 2009)
- What are the conflict in water uses and alternative for rice intensification in an irrigation system in Central Thailand? (Purotaganon, 2010)
- Why the Vietnamese Government pays many efforts in water-pricing policy but results obtained in practice do not meet desired objectives? (Thu, 2009)
- What are impacts on irrigation water use of the exemption on irrigation fee in Vietnam recently decided by the Government? (Xuan, 2009)
- What are the management, environment and social impacts of the current irrigation system and its investment pattern both from government and external development agencies? (Thuon, 2010)

The case studies in irrigation were led by theme leaders focusing on irrigation comparative studies and the policy aspects of irrigation development and management. In addition M-POWER partner organizations and research fellows contributed/conducted empirical research. The eight fellowship research granted by M-POWER conducted empirical case studies on various aspects of irrigation management in those countries.

3.1 Irrigation in the Lower Mekong Basin Countries

Irrigation comprises approximately 90% of all water abstractions in the Lower Mekong Basin (LMB). Irrigation water is considered a key factor for shifting from single crop, mainly rainfed rice, to multiple cropping systems and increasing crop yields. In the Mekong region, the development of reservoirs and irrigation schemes has been prominent (Molle, 2007). Large investment in irrigation systems have been made in all LMB countries at varying level. However, the expansions of irrigated areas in these countries have been slowed down during the last few years. The question raised has been whether a new irrigation era is beginning? Hoanh et al (2009) revisited irrigation in the Mekong part of LMB countries in the past and analyzed the trends for irrigation in future under several drivers, in particular the recent increase of food price in the global market.

There are six types of systems in the LMB countries that extract water from the reservoirs, rivers, storages or ground water for irrigation. The evolution of these types was dependent on the economic and agriculture situation, and the strategy and policy in the development stage in each country. The irrigation systems had not lived up to expectations due to several constraints like improper adoption of modernization, differences between policies and actual practices, complexity of the hydrological cycle and the multiple functions of irrigation systems, underinvestment in operation and maintenance, and poor management and very modest progress in participatory irrigation management. The recent trend of soaring food prices in the global market calls for a new irrigation era. The new investment should shift from the supply-driven irrigation to demand-driven irrigation, with priorities considered by type of systems to fit with the evolution scenarios and possible changes in water use technologies by users. For attaining success in the new irrigation era, the most important criteria is the institutional reform with a change in conventional management philosophy.

3.2 Irrigation development in Laos: re-considering irrigation management transfer

Asia's monetary crisis in 1997 hit the Laotian economy, forcing the Government of Lao PDR (GoL) to adopt a reduction policy. Cost of irrigation development was funded via printing of bank notes by central bank that then caused hyper inflation which exceeded

100% annually. Therefore the Ministry of Agriculture and Forestry (MAF) was forced to reduce its expenditure for irrigation. Irrigation Management Transfer (IMT) was considered as a suitable solution. IMT was officially introduced in 1998 by the Office of Prime Minister to "order on FULL the transfer of irrigation projects to committees for organization". One main question is: Are the irrigation systems and capacity of farmers ready for IMT? The study by Phengphaengsy (2010) indicated that the problems are:

- Lack of consultation and participation in implementing /transferring process leading to unclear ownership (e.g. Pak Ka Ngung, Phon Kham schemes)
- IMT framework is also unclear and not well understood by government officials due to duplication/contradiction of plural legal documents
- Low cropping intensity in dry season and degradation of irrigation facilities
- Weakness of Water User Groups (WUGs) and farmers' capacities
- Lack of success in collecting and use of irrigation fees and cost recovery to sustain O& M of irrigation system

3.3 Irrigation development in Thailand: Small vs large systems

3.3.1 Water Grid and Irrigation development in NE Thailand

The northeast region of Thailand shows a high incidence of rural poverty and environmental degradation, and has, for the last 50 years, continuously been a target area for intense water resources development of the state. During 1961-1977 the irrigation planning was done as part of the Mekong Development project. That period observed almost complete development of available storage possibilities. At the same time the large scale projects were challenged increasingly due to their social and environmental consequences. After 1978, a range of small scale and decentralized projects were introduced (Floch *et al*, 2007; and Molle and Floch, 2007). Similarly there was a surge in pump irrigation development (Floch and Molle, 2009). More recently in 2003, the idea of a "Water Grid" was initiated by the Thai government.

The 'Water Grid' was launched at a workshop on "Sustainable Water Resource Management" in July 2003 (Molle and Floch, 2008; and Molle *et al*, 2008). The project aimed to expand the existing irrigated of 30 million rai by an additional 103 million rai within 5 years. But the project could not go ahead due to various reasons related to water storage, labor shortage, environmental change/salinity, agricultural production and markets. The emerging major (unanswered) question is why, after all, governance shifts are so hard to come about. Why would it be not possible to do "good projects", with adequate safeguards, compensations, detailed assessments of future impacts and strict screening of projects? Governance shifts are slow and result from the complex interplay of local, national and global dynamics, with democratization more likely to result from hard-fought battles than from the mere desirability of social and environmental sustainability. The conclusion is that investments in hardware should be paralleled by "investment in institutions", with capacity building, participation and good-will supposed to make a difference.

As the Asian Development Bank suggested: "Thailand has established itself as a leader in pioneering a participatory approach to water resources management in river basins" (ADB, 2004). However, there is a gap between the rhetoric adopted both in national and international mainstream publications advocating better planning practices and the real-politics of water resources planning. At the same time that collaborative modes of planning are discursively mainstreamed, the initial hypothesis are increasingly washed out, as actual implementation often reminds of business-as-usual practices.

3.3.2 Politics of Water Governance and Multi-stakeholder negotiation in Thailand

The fellowship research by Man Purotaganon explored policy formulation, existing water management, implementations, and impact of the policy. Taking the case of Prachinburi sub-watershed, central Thailand this research reveals insight on policy process, negotiation process of different stakeholders and its outcome. The study indicates that irrigation development only addresses the physical dimension and effective technologies in irrigation and water distribution but does not take into account enough social factors and contexts such as - crop diversification, local livelihoods, market orientation, etc.

3.3.3 Local institutions in irrigation management

Diversification and input-led transformation in agriculture due to economic development and market pressure have created new dimensions in water resource management in Thailand. Bastakoti et al (2008) analyzed how community organizations are mediating with local people in managing competing water use among agricultural and non-agricultural sectors across rural-urban areas in changing context. Empirical evidences from sampled irrigation systems have shown the rapid increase in peri-urban vegetable productions in dry season resulting in increased competition for agricultural water use. The situation is further compounded by increased water demand from non-agricultural sectors. Increased competition for water among competitive users has caused various forms of conflicts. The extents of conflict in water use are higher in peri-urban areas compared to rural areas, having more competition with non-agricultural users. Moreover, presence of strong community organizations, the water users' association (WUAs), in rural areas seemed to be more instrumental in successful management of conflicts and devising various coping strategies to deal with water scarcity situation. In peri-urban areas also, systems having relatively more autonomous WUAs appeared to have better capacity to negotiate for limiting resource in changed context. The observation implies that lack of community organizations or relatively weaker WUAs were less successful in managing the situation.

Bastakoti et al (2010) further assessed the role of local institutions in managing irrigation water use amid changes in policy and market pressures. Market pressures and other economic factors have had significant influence on institutional arrangements. In Thailand market development supported diversification in farming practices resulting in the increased areas under high water demanding commercial crops mostly in dry season. Rising water demand has influenced collective action for irrigation systems management. The local institutions play an important role in maintaining the performance of irrigation systems as contexts change. Local institutions have provided alternative options for irrigation water use by mediating external pressures.

3.4 Irrigation development in Cambodia: Public policy issue

3.4.1 Inventory of irrigation systems in Cambodia

M-POWER partner organization CEDAC has been involved in the preparation of inventory of irrigation systems in the selected 13 provinces around Tonle Sap Lake. The inventory was prepared to assess the situation of irrigation in Cambodia. They identified a total of 2535 schemes in those provinces out of which only 588 were operating in the dry season. More than 50% of the schemes were not functioning well. In the second phase CEDAC continued in-depth study in the selected irrigation systems from those provinces. The case study covered best irrigation schemes, poorest irrigation schemes, and collapsed irrigation schemes. The study recommended that:

- Focusing more on rehabilitating and improving the existing schemes, especially small and medium schemes, including planning and redesign the systems that were not done properly in the past to fit with the current management capacity at local levels.
- Investing in building capacity of human resources of DOWRAM to support the FWUC and the capacity of FWUC to operate and maintain the system before implementing the Participatory Irrigation Management & Development (PIMD) and Irrigation Management Transfer (IMT).
- Establishing a National Irrigation Fund accessible by the FWUC and local communities and local authorities to rebuild and build irrigation schemes.
- Encouraging public private partnership in irrigation development and management by implementing Agro-Irrigation-Business and modernization taking into account competitive advantage of products in market, and institutional modernization.
- When new schemes are built, the following conditions are needed: participation of local people and local authorities, proper management transfer and sufficient resources for follow-up support and complete system construction.
- Poverty alleviation should be considered in irrigation development by considering benefit sharing between winners and losers.

CEDAC is also involved actively in capacity building of water user community.

- Capacity building and management assistance
- Farmer and water learning network: to connect the FWUC to each other

3.4.2 *Participation, Fit and Integration: Early lessons from SCIP, Cambodia*

Irrigation has been an important public policy issue and development discourse in Cambodia for a long time in the country's history. It is widely believed that some of the key policy makers in Cambodia view that without large-scale irrigation schemes, farmers will remain trapped in a life of poverty and hunger and in a state of subsistence agriculture forever. Therefore, the push for irrigation expansion in the country has received wide support from many corners of the society including donor agencies. The study of Stung Chinit Irrigation Scheme and Rural Infrastructure Project (SCIP), Cambodia provided some early lesson learnt from one of most modern scheme ever apply in the country as replica model for other areas around Tonle Sap Lake and its associated tributaries (Try *et al*, 2009). The key issues regarding the fit of project has been analysed over the process of cost overruns and shortfall of benefits, the project impact on social, economic and environmental issues, the crisis of the scheme modernisation to local adaptation.

Stung Chinit irrigation scheme was built in 1977, during Khmer Rouge regime, with the target to cover the command area of 12,000 ha. But the scheme was not appropriately designed and incomplete. Later during 2000, the rehabilitation of the scheme was proposed with the support from ADB and AFD. It aimed to increase the agricultural productivity covering 7000 ha in wet season and 2000 ha in dry season. The rehabilitation project also aimed to organize farmers for operation and maintenance. Originally planned to start in 2001 and to be completed by 2007, the rehabilitation work began only in 2006. The delay in construction resulted into increased costs and they revised the command area to be covered to less than 2000 ha. The delay also affected mobilization of the farmers, at the same time it was not beneficial as expected.

The experiences from Stung Chinit suggested irrigation proponent need to consider the real need and interest of the local farmers and types of their livelihood whether these farmers are depending on rice cultivation or off-farm activities. They need to think about the alternative scale rather than large-scale depending on geographical and hydrological. At local level, there need to think the reality and nature of local farmers livelihood,

potential cropping systems and chance of promoting collective action among key beneficiaries.

3.5 Irrigation development in Vietnam: Water pricing policy and RBO

3.5.1 Water-pricing policy over the last five decades

Red River Delta (RRD) in Vietnam has a long story of regulations to define contributions of water users to cover water management costs. But official national policy of payment in cash and/or in products (water fee) is known since 1962 when the Prime Minister promulgated the Decree 66-CP on water fee. Kim Thu (2009) reviewed the experiences of water-pricing policy implementation in the RRD since 1962. She addressed the central question: "why the Government pays more attention to efforts in water-pricing policy promulgation but results obtained in practice do not meet desired objectives?" This study examined the efforts from four angles namely, (i) historical perspectives, (ii) technical feasibility, (iii) economical viability and, (iv) social acceptance. The study shows that although all physical factors such as topography, soil type, hydrological conditions, etc. were considered in the design of irrigation systems, they are still not enough for the operators to cope with the diversification and discrepancies. Cost recovery and O&M sustainability are still the main issues in irrigation. Certain endogenous and exogenous factors observed in the process of policy setting and implementation still exist that constraint the effectiveness of irrigation system management. There is a need for more informed policy making; dialogue could be seen as one of necessary countermeasures to shift from hydro-bureaucracy to hydro-democracy.

3.5.2 Exemption of irrigation fee and its impact: Estimating deadweight losses

Vietnamese government enforced the policy to exempt irrigation fees nation wide from 1st January 2008. There is much debate over the advantages and disadvantages of this decision. Taking the case of selected irrigation schemes in Red River of Vietnam Xuan *et al* (2009) analyzed the changes in behaviors of main stakeholders after the exemption of irrigation fee. They estimated the "deadweight loss" caused by these changing behaviors. The objective of exempting irrigation fees in particular and exempting water fees in general has been to help farmers to reduce heavy burden of expenditures in crops productions. However, this policy caused many impacts on economic incentives of various participants of irrigation activities ranging from farmers to water user associations and irrigation management companies. Irrigation systems in Red River Delta are operated ineffectively and inefficiently since influenced incentives do not propose to conserve water resources,

3.5.3 Integrated River Basin Management: Role of RBOs

In the last decade many southeast-Asian countries have remodeled part or all of their water policies. Development banks, notably the Asian Development Bank (ADB), and multilateral cooperation agencies have been quite influential in supporting the adoption of policies and reforms that embody principles held as modern and internationally sanctioned. This includes the drafting of national policy and laws, the creation of "apex bodies", the establishment of river basin organizations (RBOs), the privatization of public companies, and increased financial contribution from users (e.g. through water pricing and the formation of water user groups). Vietnam has recently adopted several of these policies recommendations. A Law on Water Resource (LWR) released in 1998 was followed by the creation of an apex body (2000) and three RBOs (2001), before the Ministry of Natural Resources and Environment (MoNRE) was set up in 2002. The study

focused on the establishment of the Red River Basin Organization but expands its analysis to the wider transformations of the water sector that impinge on the formation and effectiveness of this organization. The study shows that the promotion by donors of IWRM icons such as RBOs has been quite disconnected from the existing institutional framework. In contradiction with IWRM principles, RBOs were established under the Ministry of Agriculture and Rural Development, with little means and power, while the Office of the National Water Resources Council remained dormant. The Red River Basin Organization was set up on the premise that a RBO was needed but it was soon found that basin wide participation was both difficult and unnecessary, with the focus being shifted to lower sub-basin levels.

It is shown that if policy reforms promoted by donors and development banks have triggered some changes, these changes may have come as a result not of the reforms themselves but, rather, of the institutional confusion they have created when confronted with the emergence of the MoNRE, itself largely destined – at first – to solving land rather than water issues. For MoNRE the river basin scale became crucial for grounding its legitimacy and finding its roles among pre-existing layers of the administration, while for MARD, RBOs became a site where power over financial resources and political power might potentially be relocated at its expense. Thus the confluence of donor driven projects on establishing RBOs and of the conflict between MARD and MoNRE (which put the river basin scale as a contested issue) helped strengthen changes in the direction of a better separation of duties and of integrated planning. It is too early to assess whether this transition towards a separation of the operation and regulation roles will be sustained and whether RBOs will be endowed with substantial power but institutional change is shown to result from the interaction between endogenous processes and external pressures, in ways that are hardly predictable.

3.6 Implications for policy, practice and future research

The studies show that irrigation has expanded and intensified across the four Mekong countries; but irrigation systems have not lived up to their expectations and have faced a number of problems. The differences between stated policies and actual practices are generally large, while policy changes have little impact; institutional reforms do not capture the complexity of basin-wide water management, the multiple functions of irrigation systems, and relationships between different levels of management. PIM/IMT initiatives, furthermore, have made very modest progress, while there is significant underinvestment in operation and maintenance, poor management and weak preparation of water user groups remains pervasive.

The variable prices of food in the global market has alarmed regional governments and fuelled calls for further re-investments in irrigation. In a broader sense, these include public investment in new schemes, scheme modernization, institutional reforms, improved governance and the creation of farmer organizations. Changes in governance, however, only emerge slowly and will remain dependent upon the democratization of society and the evolution of the relationships between the state and the various forms of civil society. In Cambodia, for example, the financial capacity to shoulder operation and maintenance costs, the access to markets, the managerial capacity of farmers, and the problematic relationship between the state and villagers preclude the enthusiasm conveyed by big numbers labeled in dollars or area to be equipped. In Thailand, notably its north-eastern region, the high investment costs per hectare and environmental constraints such as soil salinity, not to mention the actual low interest in dry-season cropping, suggest that massive investments will face severe setbacks. In the Red River Delta, large increases in the abstraction of freshwater in the dry season combined with severe drought are likely to worsen the irrigation capacity of the main river and canal system.

The coming years will tell us whether the current opportunities to address the real challenges of poverty and food security of the LMR have been used wisely. The risk remains that the large sectoral and private interests that benefit from massive capital investments will prevail over more carefully targeted investments in irrigation or agriculture, more decisive reform and a necessary focus on improving the performance of existing assets. The large-scale transformation of waterscapes through irrigation comes with risks and costs that are often downplayed, but which must be constantly reassessed and remembered by those with responsibility for decision-making, as well as those directly benefited or affected by these transformations. New systems may still be developed in predominantly agrarian economies, in ecosystems with comparative advantages; but their planning and appraisal process should be reformed in order to include improved water governance and to prepare for the transfer of from top-down to bottom-up governance.

Although the many studies on irrigation were implemented under M-POWER, there is still a long list of issues to be analyzed for the future development in each country. Development of irrigation is a central issue in Laos and Cambodia. What are the underlying rationales for such development? How is it conditioned by the economic environment, notably output prices and availability of markets? Can it be financially sustainable? Should large-scale or small-scale options be pursued? Thailand provides a case where large-scale irrigation is still politically attractive although its justification is unconvincing. Most irrigation systems were planned and designed only for irrigation purpose. New methodologies for planning and design of multipurpose water control systems are needed. How can we develop and apply the methods for multiple use of water in the Mekong Region?

Besides, when irrigation – participatory and optimal water-use is opened up for public deliberation plans for large-scale water infrastructure for irrigation and suggestion of alternative approaches for securing adequate water supplies for agriculture, the remaining questions are: What are the constraints and solutions for promoting Participatory Irrigation Management and Development (PIMD) at different management levels? How can water use in irrigation systems be optimized across administrative and national boundaries? How to adjust the structure and operation of existing irrigation systems for multiple water use, in particular for aquaculture and environmental services in the Mekong region? And if climate change and variability are considered, which adjustments are needed in planning, design, implementing and operation of irrigation systems?

3.7 Literature cited

- Bastakoti R. C., G. P. Shivakoti and L. Lebel. 2008. Community organizations in water resource governance: Rural-Urban interface of irrigation management in Thailand. USER Working Paper WP-2008-02. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Bastakoti, R. C., G. P. Shivakoti, and L. Lebel. 2010. Local irrigation management institutions mediate changes driven by external policy and market pressures in Nepal and Thailand. (In review with *Environmental Management*)
- Floch, P., and F. Molle. 2009. Pump Irrigation Development and Rural Change in Northeast Thailand. M-POWER Working Paper MP-2009-01. BOKU/M-POWER/IWMI/IRD.
- Floch, P., F. Molle and Loiskandl. 2007. Marshalling Water Resources: A Chronology of Irrigation Development in the Chi-Mun River Basin, Northeast Thailand. M-POWER Working Paper MP-2007-02. Unit of Social and Environmental Research: Chiang Mai University.
- Hoanh, C. T., T. Facon, T. Try, R. C. Bastakoti, F. Molle, and F. Phengphaengsy. 2009. Irrigation in the Lower Mekong Basin countries: The beginning of a new era? In Molle et al. (eds) *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*. Earthscan.
- Kim Thu, D. T. 2009. Water-Pricing Policies in the Red River Delta over the Last Five Decades. M-POWER Working Paper MP-2009-16. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.
- Molle F., and C. T. Hoanh. 2008. Implementing Integrated River Basin Management: Lessons from the Red River Basin, Vietnam. M-POWER Working Paper MP-2008-02. IRD/M-POWER/IWMI.
- Molle F., and P. Floch. 2008. The "Desert Bloom" Syndrome: Politics, Ideology, and Irrigation Development in the Northeast of Thailand. M-POWER Working Paper MP-2008-03. IRD/M-POWER/IWMI.
- Molle, F. and P. Floch (2008). "Megaprojects and Social and Environmental Changes: The Case of the Thai "Water Grid"." *Ambio* 37(3): 199-204
- Molle, F., and P. Floch. 2007. Water, Poverty and the Governance of Megaprojects: The Thai "Water Grid" . M-POWER Working Paper MP-2007-01. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Molle, F., P. Floch, B. Promphakping, D. J. H Blake. 2008. The 'Greening of Isaan': Politics, ideology, and irrigation development in the Northeast of Thailand. M-POWER Working Paper MP-2008-13. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Molle. F. 2007. Irrigation and water policies: Trends and challenges. In Lebel et al. (eds) *Democratizing Water Governance in the Mekong Region*. Mekong Press.
- MRC (2009). Supplement Note for 5th RTWG meeting on scenario formulation and assessment of hydrological changes. Internal Technical Note, Basin Development Plan Programme Phase 2. Mekong River Commission Secretariat, Vientiane, Lao PDR.
- Try, T., L. Lebel, and R. C. Bastakoti. 2009 Making projects fit: early lessons from Stung Chinit Irrigation Scheme and Rural Infrastructure Project, Cambodia. M-POWER Working Paper MP-2009-07. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.
- Xuan, Q. T., D. V. Khiem, and B. T. T. Hoa. 2009. Estimation of deadweight losses caused by the policy of exempting the irrigation fee: Case study of selected irrigation schemes in the Red River Delta, Vietnam. M-POWER Working Paper MP-2009-15. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.

4 Case study 4: Hydropower

The Mekong region has entered a phase of large-scale hydropower resource exploitation. The region's recent embrace of large hydropower is driven by both push and pull factors. The 'pull' firstly consists of strong demand for electricity in the economies of Thailand, PRC, and Vietnam, as forecast using a particular set of energy forecasting methods. Indeed, Southeast Asian electricity demand growth rates have been among the highest in the world. Rates of electricity demand are linked to but higher than rates of GDP growth.

Another set of factors supporting hydropower development include state policy. For instance, Government of Laos has declared it's aim to expand its GDP growth so as to achieve middle income country status by 2020, and hydropower revenue plays an important role in that strategy. Hydropower projects become attractive to buyers based on additional, project-specific drivers, such as energy output, power output, ability to offer a competitive price for power and energy, and satisfaction of environmental and social criteria imposed by project host governments and developers. It often takes years to produce this knowledge.

Large dams and associated infrastructure projects however, can have profound impacts on people's livelihood and ecosystems for decades. Hydropower governance in the region is considered problematic by many actors, often for reasons that relate to weak governance regimes (Foran and Manorum 2009; Lawrence 2009; Magee and Kelley 2009; Middleton, Garcia, and Foran 2009). Comprehensive options assessment, feasibility studies, and on-going sustainability evaluation processes are critical.

Despite their profound impacts on people, rivers and ecosystems, electricity planning practices are difficult to understand (Foran 2006a). To improve water governance, the important assumptions and beliefs that underpin electricity planning practices must be made clear.

The specific strategic objective of M-POWER, by 2010, for hydropower and energy sector is: 'Help create better national and international institutional frameworks for assessing, deliberating and negotiating the development of regional water resources for hydropower'. This comparative study focused on the quality of electricity services planning, politics of assessment, investments and knowledge surrounding hydropower expansion in the Mekong region. Case studies in hydropower and energy were initiated, designed and implemented by M-POWER partner organizations and research fellows. A research theme leader⁶ provided mentorship and advisory support, and proposed the following research agenda:

- System planning / 'upstream' options assessment: How do planners and others actors define the benefits and problems associated with hydropower, and alternatives such as coal, energy conservation & renewable energy? Who are the main actors driving decision making processes? Which stakeholder groups are excluded? How credible are the arguments put forward by different actors?
- Can less powerful stakeholders avoid unnecessary hydropower development by participating in dialogue at the system planning level?
- Specific projects/ 'downstream' assessment: What social and environmental outcomes or impacts have occurred and are likely to occur from combinations of selected hydropower projects?
- How can vulnerable stakeholders benefit more from crucial hydropower development, in terms of equitable sharing of benefit and risk?
- What practical contributions can M-POWER make to improve social justice outcomes of hydropower projects already underway?

⁶ This subsection was written with contribution from Dr Tira Foran.

4.1 Hydropower players in the Mekong region: Agendas and strategies

Due to recent political stability and rapid economic growth, the countries of mainland Southeast Asia and Yunnan province, China, demand increasing quantities of electricity, especially in China, Thailand, and Vietnam.

Hydropower is framed as one attractive option in comparison to other demand and supply side options. Large hydropower is regarded as cost competitive, flexible, low on greenhouse gas emissions, and is often treated as renewable energy.

For both hydropower and nuclear technology, construction risks are highly important, but also thought to be highly controllable. Again like nuclear, the risk a hydropower project may encounter more stringent environmental legislation is moderate, but (at least in an OECD context) considered beyond the control of developers. Because of its use of mature technology, hydropower has lower risk of technological problems than either natural gas or nuclear. On the other hand, hydropower is thought to have much higher (and non-controllable) risks of operational / dispatch problems than either nuclear or natural gas (because of variability in run-off).

The World Bank, the Asian Development Bank (ADB), international agencies such as the United Nations (UN), bilateral donors, and mostly the Western hydropower companies and consultants, have long played a role in pushing forward hydropower development (Middleton et al 2009). Now private-sector hydropower developers mainly from Thailand, Vietnam, China, Malaysia, and Russia have picked up hydropower plans in the region.

Middleton et al (2009) explored how the ADB and the World Bank have influenced the development of dams and electricity infrastructure in the Mekong Region, and attempted to orientate national policies towards private-sector led development. The technical studies, advice, and financing of the ADB, World Bank, Mekong Committee, and bilateral donors fundamentally shaped the Mekong region's electricity development path at its early stages. The authors evaluated the extent to which banks have applied their environmental and social standards in the region, and discussed the implications of the banks' evolving role and declining influence.

Middleton et al (2009) also identified new actors that are now developing, building, and funding hydropower projects in each of the Mekong countries. The absence of environmental and social safeguard policies among these new actors, combined with the weak implementation of the host countries' national law, is identified as a threat to the ecological health of the Mekong basin. Finally they argue that these new actors and the region's governments should adopt international frameworks of best practices that would significantly reduce the risk of developing poorly conceived projects.

4.2 China's energy reform and hydropower expansion in Yunnan province

In the year 1996 China passed the 'Electric Power Law' that followed other several reforms in the Chinese energy sector (Dore et al, 2007). State Power Corporation (SPC) was established in the year 1997 to represent the state as owner of government-owned asset. State Reform and Development Commission (SRDC) was announced early 2002, and by the end of 2002, the monopoly of SPC ended with the transfer of SPC assets to power generation, distribution, and consultant companies. Similarly, in the year 2003, the State Electricity Regulatory Commission (SERC) announced the intention to create six competitive regional power markets across China.

Such reforms in Chinese energy sector have unleashed an explosion in power industry development proposals across the country. Nationwide there was an intention to almost double hydropower capacity by the year 2010. Those reforms have led to a national surge in competition between corporate generators to secure actual and potential power-producing assets. The dam builders' aspirations are greater in the south-west region

especially in the Yunnan province. In terms of Mekong region such developments in Yunnan have greater impact downstream.

Dore et al (2007) discussed the recent updates on the hydropower expansion in Nu (Salween), Lancang (Mekong), and Jinsha rivers. The key drivers for the hydropower expansion in Yunnan were: globalization and economic growth; international economic integration and investors looking into China; energy demand, trade and security; and the western region of the country seen as key to increased energy production.

The rapid hydropower expansion in Yunnan has major impacts on national and provincial economy, the finance sector, the rivers and the people of the province. Dore et al (2007) called for a detailed review and debate on hydropower expansion in Yunnan, because of the rationale, processes, options and the implications for the entire Mekong region.

By 2010 some debate had taken place – but this was largely in the mass media and media distributed by civil society, as opposed to the detailed debate envisioned by Dore et al. (2007). China's central government began to participate more visibly and vigorously in public and special-session consultations organized by MRC. But by that time, it had already built or initiated major dams on the Lancang, thereby changing the terms of any debate that might take place in future.

4.3 Hydropower development in Nu-Salween River

Nu-Salween River is one of Asia's principal rivers and is the source of livelihood for around six million people in China, Myanmar/Burma, and Thailand. Over its 2800km course the river drops some 5000m, much of that in steep gorges, which makes it extremely attractive from a hydropower development perspective.

China's plans to construct hydropower installations on the Yunnan portion of the Nu originally emerged in the early 1990s. The initial calls for a hydropower cascade on the Nu came as early as 1995 but serious planning and surveying did not begin until 2001 (Magee and Kelley, 2009). So far, the joint venture model has not been openly discussed as an option for the Nu dams within China. Central authorities delegated survey and design work for the Nu cascade to Beijing Institute of Hydropower Survey and Design and the East China Institute of Hydropower Survey and Design. Plans were submitted in July 2003 as the 'Middle and Lower Nu River Hydropower Planning Report'. Supporters cited practical advantages of developing large-scale hydropower on the Nu, including river's steepness and relatively small number of people who would have to be resettled. Environmentalists and cultural preservationists have criticized the dam plans as threatening to the cultural and biological diversity of the area. Due to their controversial nature, there is limited publicly-available information regarding the Nu dams.

In the downstream, Electricity Generating Authority of Thailand (EGAT) had studied the potential hydropower development on the Salween as early as 1981. Preliminary studies commissioned by Thailand and Myanmar and conducted by Japan's Electric Power Development Company in the early 1990s identified about ten potential dam sites on the Salween. But the economic crisis in 1997 sidetracked those plans, by bankrupting Thai developers and raising new questions about the viability of investing massive amounts of public and private funds in foreign megaprojects.

In the part of Myanmar, financing large dams proved problematic. Earlier Thai firms could not manage the funds, whereas Myanmar is not eligible for assistance from other donors specially the World Bank and ADB. Similar is the case for getting any financial assistance from US government, European Union or any international financial institutions. In such situations, the recent entry of Thai and Chinese developers and

financiers has given Myanmar's hydropower regime a needed boost. Thai energy planners recently identified the Salween as the 'most favorable' location for transboundary hydropower development despite of security and political concerns. Similarly, in August 2003, China approved a US\$200 million loan for the 790 MW Yeywa dam project, currently Myanmar's largest hydropower facility. Yeywa is being built by a consortium of Chinese companies that includes China's Gezhouba, which also reportedly is contracted for part of the construction work at Tasang.

Kelley (2010) discussed political conflict in Myanmar and the rationality of infrastructure development in such context; and the weak regulatory frameworks, both in Myanmar and for Thai projects in neighboring countries. Owing to their political sensitivity, the dams planned for the Salween have proceeded under a high degree of secrecy. The lack of a clear regulatory framework for hydropower development on the river, allegations of human rights violations conducted in preparation for the dams, and the potential environmental destruction that may result from their construction all raise further questions about the viability of the Salween projects.

4.4 Hydropower development in Lao PDR

As noted above, the Government of Laos has a formal policy to become a middle income country by 2020. The Lao economy would need to grow at 7% per annum between now and then in order to achieve this status (which is defined in terms of per capita GDP). However, most of the population lives in rural area. Despite a labor force growing at 3% per annum, adults have relatively low literacy. Hydropower and mining thus assume importance as strategies to meet this goal.

Lao PDR has an estimated 18,000 MW of hydropower potential. Lao PDR began exporting power from the Nam Ngum 1 dam to Thailand in 1971, but it was not until the late 1980s that extensive hydropower exploitation appeared politically realistic. Since the late 1980s, representatives from the ADB, World Bank, UNDP, and bilateral Western donors have consistently advised the Government of Lao PDR (GOL) that developing the country's hydropower potential was one of its few plausible development options (Middleton et al, 2009). Larger hydropower projects were advised to be developed by the private sector under Build-Operate-Transfer (BOT) contractual arrangements, with the government taking an equity share in the project.

The economic revival of the Mekong region and the approval of Nam Theun 2 (NT2) approval bought to Lao PDR a new wave of hydropower developers. NT2 became the largest ever foreign investment in Laos and the largest hydroelectric project with private sector financing (Lawrence, 2009), despite controversy over its costs and benefits, and associated social and environmental risks such as land and livelihood compensation.

In the recent period investors from China, Thailand, Vietnam, Malaysia, and Russia now lead the hydropower push in the country replacing Western hydropower developers who were major players in the early 1990s. Chinese companies are presently involved in the development of hydropower projects in Lao PDR. Some of them are already in construction and many are in the phase of feasibility studies. Sinohydro Corporation, a Chinese state owned enterprise (SOE) and China's largest hydropower construction company, is the lead player. However, the Chinese companies still seek collaboration with international agencies, for example, Yu Yin and Lazarus (2010) discuss Sinohydro's decision to seek approval for political risk insurance from the Multilateral Investment Guarantee Agency (MIGA) of the World Bank Group.

Thai investors are also the major players in hydropower development in Lao PDR. They have joined Western corporations in two major projects during 1990s: the Theun-Hinboun and Houay Ho hydropower schemes, and two Thai companies are also major

shareholders in Nam Theun 2. It was the construction of the 615 MW Nam Ngum 2 hydropower project that broke ground in 2006 which was developed and financed largely by Thai actors. Similarly, the Viet Nam-Laos Joint Stock Company (VLPC) began construction of the 250 MW Xekaman 3 project in Southern Laos in 2006. Financing for the project was largely provided by Vietnamese financial institutions, including the Vietcom Bank and the Bank for Investment and Development of Vietnam.

4.5 Hydropower and Fisheries

Hydropower development has been often considered as having negative impacts on the hydrology and fisheries. Sarkkula et al (2009) discussed the Mekong River and Tonle Sap's distinctive hydrology. They present the estimates that a High Development scenario would lead to 30% decline in primary production (e.g., plant biomass) in the Tonle Sap, leading to severe impacts on fisheries and food security. The authors reported that the most damaging hydropower projects will be on the lower Mekong, between Khone Falls and Tonle Sap. Friend et al (2009) commented that food security (usually conceived as rice security) is not the same as nutritional security (e.g., from fish), and that decision-makers should consider the latter as well.

4.6 Electricity planning: insights from Thailand

How long-term electricity generation planning is governed matters for sustainability. Greacen and Palettu (Greacen and Palettu 2007) surveyed regional planning practices. They noted that projected need for new electricity demand in Thailand, while an expert-led process, is open to criticism on technical grounds as well as on grounds of poor participation in options assessment.

Second, they argued that hydropower is assigned a privileged role in the Thai 'least-cost' planning processes. Unlike coal, natural gas, or (most recently) nuclear alternatives, hydropower cost-performance data are not input into the cost optimization model by Electricity Generating Authority of Thailand (EGAT), the output of which is a schedule for power system expansion.

4.6.1 Securing energy efficiency as a high priority: scenarios for common appliance electricity consumption in Thailand

During the 1990s, when Thailand's EGAT built the controversial Pak Mun dam (Foran and Manorom, 2009) and when it began expanding its hydropower imports from Lao the utility also began a successful energy efficiency program. EGAT estimates that its "demand-side management" (DSM) programs have saved an estimated total of 8,369 GWh/year energy savings and 1,471MW avoided peak power as of 30 September 2008. Despite these impressive saving figures, relatively little future scenario analysis are available to policy makers. Before the 2008 global financial crisis, electricity planners forecasted 5–6% long-term increases in demand.

Foran et al (2010) explored options for efficiency improvements in Thailand's residential sector, which consumes more than 20% of Thailand's total electricity consumption of 150 TWh/year. The authors constructed baseline and efficient scenarios for the period 2006–2026, for air conditioners, refrigerators, fans, rice cookers, and compact fluorescent light bulbs. They drew on an appliance database maintained by Electricity Generating Authority of Thailand's voluntary labeling program. For the five appliances modeled the efficiency scenario results in total savings of 12% of baseline consumption after 10 years and 29% of baseline after 20 years. Approximately 80% of savings come from more stringent standards for air conditioners, including phasing out unregulated air

conditioner sales within 6 years. Shifting appliance efficiency standards to current best-in-market levels within 6 years produces additional savings. They discussed the institutional aspects of energy planning in Thailand that thus far have limited the consideration of energy efficiency as a high-priority resource.

4.6.2 *Thailand's electricity planning process and demonstration of integrated electricity planning*

During the next decade and a half (2007–2021), EGAT and Ministry of Energy planners declare that Thailand needs more large central power stations, including thermal stations fired by imported coal and nuclear fuel, as well as increasing quantities of imported electricity.

Foran (2008) provides an extended introduction to integrated electricity resource planning (IRP), demonstrates how it might work in Thailand, and reviews governance challenges. IRP is a form of comprehensive options assessment. In this assessment, demand-side and supply-side options are given balanced treatment, with the objective of investing in the least-economic cost first. IRP can be done for energy and for water resources. IRP can be designed as an integrated, participatory assessment, and in recent years a number of independent analysts have called for Thailand to initiate such a process.

As an input to such a process, the author asked '*How much electricity (kWh, MW) from large stations could be avoided if Thailand were to attain its 'practically achievable potentials' in (1) energy efficiency (2) renewable energy and (3) combined heat and power (CHP)*'. The timeframe for the analysis was 2008–2018 (plus 2008–2027 for renewable energy). 'Practically achievable potential' is a subset of commercially viable potential. It is an estimate, which suggests the need for dialogue between different informed actors. Indeed, the analysis was intended to start useful conversations rather than state definitive answers.

The author took the Thailand power development plan (PDP) (EGAT 2008) as a reference scenario. According to this reference case, electricity demand grows at 5.5% per annum from 2007–2021, and Thailand needs a total net new supply of 30,413 MW. For each of the options: energy efficiency, renewable energy, and CHP, the author conducted literature review, and in the case of renewable energy, used a spreadsheet model to explore the effect of different financial parameters on rates of RE investment.

Based on applications submitted to the Ministry of Energy as of April 2008, but not yet included in the PDP, a near-term potential of 3023 MW exists for renewable energy and natural-gas CHP. Based on literature review (Foran et al, 2010), the author estimated medium-term (that is, by 2018) achievable *energy efficiency* at 1366 MW savings.

For *CHP* over the medium term, the estimate is 1382 MW. For *renewable energy*, under a policy with base tariff set to 3.34 THB/kWh, plus a feed-in tariff equal to the current rate offered to Thailand's three Southern provinces, a total of 2142 MW renewable energy could be developed within 20 years. The estimates of achievable potential by 2018 add up to 4890 MW. Adding the near-term potential with the medium-term potential, a preliminary, conservative estimate of the 'clean, domestic, distributed' options achievable by 2018, but not yet in the PDP (as of 2008), sums to approximately 8000 MW (~33,000 GWh). If Thailand decided to attain this full 'clean, domestic, distributed' potential, it could, if it so chose, avoid having to import power from a number of large hydropower projects including:

Table 4 Total avoidable hydropower & coal-fired electricity imports (2008–2018)

Date	Project	Capacity (MW)
2011	Nam Ngum 2	597
2012	Theun Hinboun Expansion	220
2013	Nam Ngum 3	440
	Hongsa 1 lignite	490
2014	Nam Theun 1	523
	Nam Ngiap	261
	Nam Ou 1	200
2015	Nam Ou 2	843
2017	Unspecified	510
Total avoidable hydropower (2008–2018)		4084

Source: Based on analysis in (Foran 2010a). Note: EGAT (2008) also includes 980 MW of imports from Hongsa 2 & 3 in 2014. Alternatively, these lignite stations could be avoided, but not in addition to the scheduled hydropower imports in that year.

M-POWER partners are currently updating this analysis in light of the 2010 PDP from EGAT (not finalized as of March 2010). The figures that Thailand will actually achieve depend on successful implementation of energy efficiency measures in commercial and industrial buildings, as well as on enhanced tariffs for renewable energy. Results depend on participation by the private sector, thoughtful incentives, and political commitment to more transparent and open planning.

4.6.3 Interaction with policy actors (action research)

Capacity building for pro-sustainability energy regulation

Since the mid-1990s, the Thai electricity sector has implemented a number of important planning and regulatory initiatives. Labeling of electric appliances by EGAT (under its DSM program) rapidly transformed the space lighting market. A popular "feed-in tariff" subsidy program for power producers under 10 MW yielded, by December 2008, almost 3800 MW of bids from renewable producers. However, moving towards greater sustainability requires not only a diversity of policy instruments, but the capacity to re-examine longstanding planning and regulatory practices (Foran 2008b). M-POWER partners sought to improve this capacity by engaging with a new actor, Thailand's Energy Regulatory Commission (ERC).

In February 2008, Thailand established the ERC with responsibility for issuing licenses to operate power stations, reviewing and adjusting tariffs, and commenting on long-term natural gas and electric power development plans. Unlike many U.S. counterparts, the Thai ERC does not have authority to order a utility, in its planning, to treat energy efficiency programs as a "resource" symmetrically with new supply options. ERC has not yet emerged as a strong independent regulator. However, it does have a mandate to promote energy efficiency, and individual commissioners are motivated to do so. ERC also has authority to organize public hearings on the controversial electric Power Development Plan (PDP) prepared by EGAT and Ministry of Energy.

In 2008, M-POWER partners (Palang Thai and CMU-USER) helped organize a U.S. study exchange for ERC commissioners, EGAT and other senior Thai energy planners, NGOs, and journalists, to visit counterpart organizations in Oregon and Washington (see Palang Thai & A W.I.S.H. 2009). The study exchange exposed participants to key planning and regulatory practices routinely used in OR and WA:

- Detailed scrutiny of utility expansion plans during hearings on tariff adjustments

- IRP - integrated electricity resource planning (discussed above)

In addition to these important practices, participants were exposed to the U.S. Pacific Northwest's contested history of power system expansion, which has produced, among a majority of voters, an opposition to new nuclear, large hydropower, or new coal-fired power stations.

The exchange was followed by a January 2009 visit to Thailand by a senior planner and sustainability advocate from the U.S. Pacific Northwest. These activities improved rapport between NGO advocates, the Thai energy regulatory commission (ERC), and utility executives. It contributed to building capacity around integrated planning and regulating energy in Thailand. In 2008 ERC has signed a memorandum of understanding with the Oregon Public Utilities Commission to enable future cooperation.

Discussion and argument with energy knowledge brokers

In 2007 ADB hired energy modeling experts IRM-AG to study the economic impacts of several medium-term energy development scenarios. The experts produced a very large model incorporating electric power as well as transportation fuels. The modeling project is rich and complex, running into several hundred pages. It models almost 200 different kinds of energy, including fuelwood and decentralized renewable energy.

The purpose of this initiative (Asian Development Bank 2009) was to test the economic benefit of further integrating energy in the GMS by building electricity and natural gas transmission networks, as well as trading liquid fuels (including from coal). A key figure in this report shows electricity power flows within the GMS between GMS and China under a so-called Integrated Scenario (ADB 2009: Fig. 16). Power flows from Myanmar to Thailand go from zero in 2005 to 139,000 GWh in 2025 (which translates to more than 25 dams like Nam Theun 2). According to the model, the total discounted cost of Integrated Scenario is \$200 billion less than the Base Scenario. One reason is that the modelers assumed it is cheaper to build coal and hydropower plants and transmit the power, rather than import fuel such as liquefied natural gas into the region.

M-POWER partners engaged in discussion (technical and policy argument) with the study manager, communicating critical and constructive feedback aimed at improving the credibility of the analysis, as well as its salience (i.e. usefulness) to stakeholders. For example (Foran 2008a) questioned if it is really "least-cost" for the region to exhaust many of its large hydropower sites by 2025 (with irreversible and highly uncertain political consequences) as opposed to more make aggressive investments in energy efficiency. Exploring those energy efficiency options requires more end-use modeling (Foran et al 2010). We also noted that ADB's arguments relied on economic aggregate cost analysis, but argued that strategic analysis should not be confined to economics, but also need to make a clear statement about political risks of regional integration.

4.7 Hydropower Sustainability Assessment Protocol

Hydropower Sustainability Assessment Forum, a multi-stakeholder collaboration that began in 2007, developed a draft Hydropower Sustainability Assessment Protocol [HSAP]. Motivated in part by the work of the World Commission on Dams, the 2009 Draft HSAP is designed to be a practical sustainability measurement tool that will be endorsed by many stakeholders, including civil society. Foran (2010b) compares the draft HSAP with the World Commission on Dams decision making framework and discusses potentials and limitations of the draft Protocol. In late 2009–early 2010, M-POWER partners organized a series of public consultation in the Lower Mekong countries seeking feedbacks on the draft HSAP [<http://www.mpower.net.org/mweb.php?pg=219>]. In early 2010, the same partners also initiated "rapid sustainability assessments" of Mekong electricity planning, using Section 1 of the draft Protocol.

In an ideal project development context, strategic planning (e.g. electricity options assessment, various national and regional development plans) takes place in a transparent, objective, and participatory manner. Strategic planning occurs regularly, and precedes various project-level studies. The structure of the WCD guidelines and the draft HSAP reflect this planning ideal.

Actual practice in the Mekong region, however, is far from this ideal. Planners at electricity utilities, for instance, do not include energy efficiency projects as candidate investment options in their long-term power development plans (Foran 2006b). In hydropower supplying countries, screening studies exist, but seldom guide prioritization of hydropower sites in a transparent, participatory manner. Hydropower projects instead are developed according to an entrepreneurial and highly exclusive process. Customers negotiate power purchases from projects that have emerged from a multi-year bottom-up process.

The process typically begins with developers bidding with government for exclusive rights to investigate sites. Developers then proceed to invest increasing amounts of capital to generate increasingly refined knowledge of impacts, costs, and returns. This knowledge supports a number of agreements negotiated with governments and buyers. The agreements become increasingly complex. Later, the public begins to learn about a project's details and participate in consultations. By this time, the sponsors' flexibility to revise environmental and social performance in response to public input has unfortunately decreased (Foran 2010b).

4.8 Implications for policy, practice and future research

4.8.1 For policy & practice

An urgent and important need exists for processes (i.e. institutions and technical planning practices) which are more responsive to sustainability concerns.

National level – National planning processes need to become more accessible to public stakeholders, both in terms of improved participatory processes, and in terms of improved accountability about the many choices modelers make as part of long-term electricity generation planning. Estimates of the cost of alternative energy sources for electricity production are usually treated as point estimates with simple linear assumptions of increase over time. Estimates of demand growth are given as base, low, and high cases. In Thailand, few public justifications have traditionally been given about these choices. As independent analysts began to challenge the credibility of EGAT's plans in the late 1990s they offered "alternative power development plans" (see Foran 2006). Often however, the alternative plans promoted by advocates were often simple sketches which ironically presented credibility problems of their own. The need for better transparency in electricity planning assumptions thus deserves to be underscored.

Since the mid-2000s, some changes have taken place in Thailand's PDP process, at least at the level of making discursive concessions: the PDP 2010 (still in draft form as of March 2010) has been promoted as a Green PDP. Representatives from civil society have been invited to join a government working groups to review basic assumptions of the PDP. At the same time however forces beyond the domain of energy planning affect governance of the PDP. For example the instability of the Abhisit government in Thailand has resulted in a dynamic where elites in the Ministry of Energy (MOEN) appear to want the PDP 2010 approved as soon as possible. In early 2010 this resulted in an accelerated public hearing process, and the deferred incorporation of more detailed end-use electricity demand forecasts. Civil society critics complained of MOEN backsliding on commitments to a more refined and deliberative process.

An ongoing need for key actor capacity building exists. For example, the Thai energy regulator (ERC) has a mandate to comment on the controversial Power Development Plan (PDP) prepared by EGAT and Ministry of Energy. As of early 2010 it has not yet done so. From the standpoint of sustainability, the ERC, a new institution, can – and must – go beyond routine (and relatively mundane) regulatory affairs to exercise oversight over the PDP, as well as setting fair and attractive tariffs to stimulate investment in energy efficiency & clean energy (Foran 2008b).

Regional influences on national policy making – Regional policy initiatives in the past have sent mixed signals about sustainable hydropower and energy development. A need exists to identify and support initiatives with credible claims to sustainability, as opposed to initiatives that appropriate "sustainability" as a discourse (cf. ADB 2009, discussed above).

One example is the MRC Strategic Environment Assessment (SEA) of Proposed Mainstream Dams. This prominent initiative commenced in 2008 with a participatory and multi-disciplinary design. Its purpose is to inform – through a collaborative process – decision making about mainstream hydropower, in particular an inter-governmental process of prior notification, consultation and negotiated agreement regarding large-scale development on the Mekong mainstream.⁷ The main purpose of the SEA initiative includes: "evaluate the development opportunities and risks of proposed LMB mainstream dams and the regional distribution of these factors, as well as avoidance, mitigation and enhancement alternatives and strategies" (Haas 2009).

Outputs are scheduled to be delivered in June 2010. MRC initiatives have been criticized in the past for being state-centric and slow to respond to civil society concerns about hydropower and other large-scale WRC (Dore and Lazarus 2009). Member states have also been criticized for not assigning higher status to the work of their units ('National Mekong Committees') which interact with MRC, thus marginalizing the entire regional project of regional cooperation. In the context of the fast pace observed to develop hydropower, the SEA initiative will thus be watched both for its substantive contribution as well as for its ability, if any, to change state–state and state–society relations.

4.8.2 For future research

We need a better understanding of how particular international and transnational initiatives influence national electricity planning. Those include the ADB and MRC initiatives summarized above, as well as understanding how global climate change agendas influence the power development plans of Mekong countries.

The challenge of designing and implementing particular hydropower projects so as to achieve more equitable risk and benefit sharing has been on M-POWER's agenda since at least 2009. Because of partners' capacity and resource limitations, we did not implement research dedicated to this 'downstream' topic and can be the area of research in future.

4.9 Literature cited

- Dore, J., and K. Lazarus. 2009. Demarginalising the Mekong River Commission. In Molle et al. (eds) *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*. Earthscan.
- Dore, J., Y. Xiaogang, and K. Y. Li. 2007. China's energy reforms and hydropower expansion in Yunnan. In Lebel et al. (eds) *Democratizing Water Governance in the Mekong Region*. Mekong Press.

⁷ Led by MRC under the 1995 Mekong Agreement, the 'PNPCA' process is intended to optimize water use, assess impacts on the rights and interests of multiple stakeholders, and avoid disputes through an orderly planning process. The 1995 Agreement is a framework that supports decision making based on principles of rational, cooperative inter-state planning.

- EGAT. 2008. *Thailand Power Development Plan (PDP 2007: Revision 1)*, Electricity Generating Authority of Thailand, Nonthaburi.
- Foran, T. 2006a. Rivers of Contention: Pak Mun Dam, Electricity Planning, and State–Society Relations in Thailand, 1932–2004. PhD Thesis, Division of Geography, Department of Geosciences, University of Sydney. <http://hdl.handle.net/2123/1984>.
- Foran, T. 2006b. Thailand's Politics of Power System Planning and Reform. M-POWER Working Paper 2006-05. Chiang Mai: Unit for Social and Environmental Research: Chiang Mai University.
- Foran, T. 2008a. Comments from M-POWER regarding GMS Energy Strategy Draft Final Report. E-mail from T. Foran to R. Nangia & L. Schrattenholzer, 14 June 2008.
- Foran, T. 2008b. Better financial regulation could make energy organizations more sustainable. In *Generating Dialogue. A Forum on Sustainable Energy, Good Governance, and Electricity Regulation*. Centre on Asia and Globalization, National University of Singapore, 16 – 18 March 2008: World Resources Institute.
- Foran, T. 2010a. Analysis of Thailand's electricity planning process and demonstration of integrated electricity planning [in Thai and English]. USER Working Paper 2008-WP-14. Chiang Mai: Unit for Social and Environmental Research, Chiang Mai University.
- Foran, T. 2010b. Making hydropower more sustainable? A sustainability measurement approach led by the Hydropower Sustainability Assessment Forum. Policy Brief. Chiang Mai: Unit for Social and Environmental Research, Faculty of Social Sciences, Chiang Mai University.
- Foran, T., Manorom, K. 2009. Pak Mun dam: Perpetually contested? In Molle et al. (eds) *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*. Earthscan.
- Foran, T., P. T. du Pont, P. Parinya, and N. Phumaraphand. 2010. Securing energy efficiency as a high priority: scenarios for common appliance electricity consumption in Thailand. Energy Efficiency DOI 10.1007/s12053-009-9073-7.
- Friend, R., R. Arthur, and M. Keskinen. 2009. Songs of the doomed: The continuing neglect of capture fisheries in hydropower development in the Mekong. In Molle et al. (eds) *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*. Earthscan.
- Greacen, C. E., and A. Palettu. 2007. Electricity sector planning and hydropower. In Lebel et al. (eds) *Democratizing water governance in the Mekong region*. Mekong Press.
- Kelley, S. 2010. Hydropower Development on the Salween River in Myanmar: Troubled past, uncertain future. Chapter in M-POWER book 3.
- Lawrence, S. 2009. The Nam Theun 2 controversy and its lessons for Lao PDR. In Molle et al. (eds) *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*. Earthscan.
- Magee, D., Kelley, S. 2009. Damming the Salween River. In Molle et al. (eds) *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*. Earthscan.
- Middleton, C., Garcia, J., Foran, T. 2009. Old and new hydropower players in the Mekong region: Agendas and strategies. In Molle et al. (eds) *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*. Earthscan.
- Palang Thai and A W.I.S.H. 2009. Final Report Exchange Trip and Follow-up Activities of Thai Energy Delegates on Energy Regulatory and Planning Practices to Washington and Oregon. 27 September–5 October 2008 and 2–29 January 2009. Lopez, WA: Palang Thai & A World Institute for a Sustainable Humanity.
- Sarkkula, J., Keskinen, M., Koponen, J., Kumm, M., Richey, J., Varis, O. 2009. Hydropower in the Mekong region: What are the likely impacts upon fisheries? In Molle et al. (eds) *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*. Earthscan.

5 Case study 5: Watersheds

Upper tributary watersheds in the Mekong Region have become a contested zone over land, forest and water policies and management practices including issues of power and access to resources. M-POWER researchers working on the “watershed” theme have focused on the upper tributaries of the Ping River (northern Thailand), upland areas in Lao PDR and Yunnan province (China). In the initial stages, there was also focus to some extent on the Salween River basin (China-Burma-Thailand), northern Vietnam, and northeast Cambodia. The work of the M-POWER watershed group has strengthened regional and comparative perspectives on issues of governance of upper tributary watersheds in the Mekong region. It has provided new opportunities for critical analysis of watershed management issues.

The action-research work has initiated dialogue processes that are seen as facilitating indigenous or ethnic minority people to debate watershed issues in fora from which they are usually excluded. Moreover, the action-research, for example in the Upper Mae Hae watershed in Thailand, has been a catalyst for debate about watershed management and water-use in situations where no single agency has been able to take up hosting of forums to discuss and resolve the ongoing water or resource conflicts.

This sub-section⁸ summarizes the main issues, ideas and findings that have emerged from the watershed group’s activities – such as research, dialogue events and workshops – during the last four years. The summary also highlights implications for policy, practice and areas for future research.

5.1 Upland Watersheds in the Mekong: Discourses, Livelihoods and Ecosystems

Pressure on groups living in the uplands of the Mekong has increased over the past decades. Although the nature of this pressure has taken many forms, one basic question lies at the heart of the issue – rights to access resources – land, water and forests - to support upland livelihoods (Daniel and Ratanawilailak 2010).

Upland communities have come into conflict with the state, lowlanders, hydropower developers and they have also experienced conflict within upland communities themselves. The loss of upland forests and the potential impacts on water (and other services) (Lebel and Daniel 2009) availability in the lowlands has become an issue of high tensions. These concerns are local issues, for example, lowland Thai villages are looking to their upland neighbours for the causes of environmental change.

At the same time, the watershed issue plays out at the national scale, as the urban, industrial population identifies upland communities and their livelihoods as a problem, sometimes even as a threat, to mainstream society (Lebel et al. 2008). National policy – such as through reducing swidden cultivation – has greatly reduced the area available for upland livelihood activities. This has been done through the creation and expansion of protected areas and the establishment of a watershed classification with strict regulations on land use.

The most typical configuration sets State agencies with strong lowland perspectives against upland farmers with different land-use practices and cultures. NGOs, mass-media and academics align at opposite poles making contradictory claims about impacts on forest conservation, flood risks, poverty reduction, usage and availability of water.

Different kinds of actors, from grassroots organisations representing the interests of ethnic minorities, academic experts, and bureaucrats in State agencies have framed

⁸ This subsection was written with contribution from Dr Lu Xing.

environment and livelihood discourses in the uplands. Special attention needs to be paid to the role of 'water' and 'watershed' management in these discourses, policies and politics.

5.1.1 The meanings of watershed

One critical issue (and already explored by social scientists in the Mekong region) highlighted by M-POWER researchers was that "watershed" and watershed management" are highly contested terms. Who defines these terms and how, is crucial to what happens (or not) in terms of management practices in the uplands (Daniel and Ratanawilailak 2010).

What is 'good' watershed management, and should it involve people (and how)? Should it focus solely on water? In spatial terms there is the lowland/upland dichotomy; different scales and levels come into play (Lebel et al. 2008). There are also interactions in the watershed other than water, for example, related to fire.

In the Mekong region as a whole, there is a visible dichotomy between the state/official definition and the local/informal and vernacular definitions (Daniel et al. 2009). State meanings can be technical and emphasize solely the hydrological. The state is often much slower to respond to local ideas about watershed than vice versa. Local meanings are traditionally more dynamic: there is not only the hydrological relationship but also the social relationship. In Thailand, for instance, the term watershed is closely related to devolving control, local resistance and attempts at community-based management; the forestry agency uses it as a technical term for management and centralised control over upland forests. In China watershed means a place associated with nature and human beings for their living.

The Table 5 below outlines some of the official and vernacular meanings of watersheds in the Mekong region.

Table 5 Meanings of watersheds in the Mekong region

Country	Meanings
Lao PDR	By law, a watershed is identified as different areas: Main/River Basin (e.g. Mekong Basin), Watershed (e.g. tributary of the Mekong) and Sub-basin/Catchment (a functional unit based on a hydrological area for the purpose of activities). The local, informal definition is: an area of land from which water flows into the one river. For example in the Nam Ngoun watershed local farmers understand that watershed means the area covered by the state irrigation scheme.
Vietnam	The state policy refers to the social aspect as well as the ecosystems. Watershed management is usually seen as related to upland mountainous areas settled in by ethnic minorities. Laws are concerned with forest protection and land use in these upland areas. The local definition views the watershed as forest resources in the uplands.
Thailand	The state definition equals an area of forest, i.e. people can't live or farm there; this forest is located at the source of the water. The most common official perception is that there is a division between upland/lowland. The forestry department uses the technical term for management and the need for central control of watersheds. For local ethnic groups, the term watershed is closely related to control and resistance. Different ethnic groups may use different meanings and demonstrate very different ideas. For the Hmong, the watershed forest exists because of, and for, the village and thus directly involves the people. The Hmong think of the mountain as a whole conceptually, so watershed forest is also used for their local villages as well as for people lower down the mountain. The Karen have different classifications for the upland forest depending on the area's specific use and function. Of late, both government and local sides have tried to accommodate each other's perception even as local communities are vigorously contesting official definitions and introducing their own meanings and definitions.
Burma/ Myanmar	The upland people tend to define themselves by where they live in the watershed. They don't have an integrated watershed management definition in the language but the government uses the term "going in and flowing out". After recent heavy flooding in recent years, the military regime has tried to link this to deforestation in Kachin State and is also trying to look more at the relationship between dams and forests.
China	The government uses the word watershed but uses it differently in different agencies. It is used as a unit of measurement and designates particular areas. For most water officials the meaning is "where water comes from". The forest bureau has a slightly different idea, including the forest (where water comes from). The term is also used as a manageable unit but it doesn't always translate to the actual biophysical area. In the Tibetan region, the local concept includes the river, with animals and plants living on different parts of the river. This includes the forest, village, agricultural land and grassland. The upper area is for hunting and gathering, the middle stretch for grazing yaks and cows and the downstream for the village and agriculture. Sometimes conflict emerges between the upland and the lowland communities for example, the Naxi and Yi: the Naxi blame the Yi for agricultural expansion in the uplands but the Naxi have also removed timber from the uplands.

Source :(Adapted from M-POWER 2006)

5.1.2 *Upland development: Ethnicity and gender, poverty reduction and biodiversity conservation*

Upland watershed areas in the Mekong region are mainly settled in by ethnic communities, are often areas of high biodiversity of flora and fauna and of economic potentials, attract many development agencies as well as plans and projects such as roads, tourism and hydropower, and pose far-ranging – including transborder implications – for watershed governance.

The agencies may go it alone or in coordination with government and other groups, with activities that range from donor-driven blueprints to self-evolving development projects, and comprise varied intentions from opium replacement and agroforestry (Thailand), mixed cropping and halting of swidden farming (also called slash-and-burn) (Laos, Vietnam), and upland reforestation (Yunnan)

In upland development, issues of ethnicity and gender often emerge as priority areas or critical themes for development intervention, and in particular where discussions of biodiversity conservation are concerned. Watershed management programs are also introduced as “upland poverty reduction” in the assumption that poverty among upland ethnic minorities poses threats to the maintenance of the watershed forests.

As watershed management comprises the working of multi-layered institutions and actors’ strategies, issues of gender relations and the role of ethnic women are significant as many female seek seasonal jobs in urban areas. The role played by women in ethnic communities appears to be crucial for the use and conservation of biodiversity in rice fields and forests but they also appear to have only marginal roles in formal deliberations and upland development interventions. Table 6 below highlights some of the critical discussions and findings on issues of ethnicity, biodiversity conservation, poverty reduction and gender.

Table 6 Discourses on the watershed management

Indigenous people’s biodiversity conservation and the Salween River Basin in Burma/Myanmar, Yunnan (China) and Thailand	The Nu River in southwestern China (and running through Burma and a small corner of Thailand) is recognized as a biodiversity hotspot, boasting perhaps 30 percent of all of China’s plant and animal species. The entire area along the length of the river, located along the margins of all three countries, is home to indigenous people. An alliance of states, environmental agencies, civil society organizations, and most importantly local people is taking place for biodiversity conservation. The creation of the Three Parallel Rivers World Heritage Site in Yunnan – which includes parts of the Nu basin – is an example of this. But this example also illustrates the limitations to the top-down approach. While one part of the Chinese government was negotiating with UNESCO over world heritage, another part was simultaneously planning to build skyscraper-tall dams in one of the last great wild rivers in Asia (Rutherford 2006).
Poverty reduction for ethnic minorities in northern Vietnam	Lao Cai, a mountainous province located in the northern part of Vietnam that shares boundary with Yunnan province of China. Since the 1990s, Oxfam Great Britain, an independent development and relief agency based in United Kingdom, has initiated its support for ethnic minorities in poverty reduction The programme is comprised of different projects: Participatory Land Allocation; Participatory Irrigation and Watershed

<p>Transborder hydropower development and upland watersheds in northeast Cambodia</p>	<p>Resources Management; and Natural Resources Management for Poverty Reduction. The programme aims to support upland ethnic minorities to exercise their rights of having sustainable livelihood based by enhancing their access to and control over natural resources management particularly rain forest management (Dzung 2006).</p> <p>Stung Treng province in northeast Cambodia is rich in natural resources especially forests and fisheries. The majority of people living in this province are indigenous upland people with customs and traditions quite different from lowland people. Their livelihoods are to a great extent dependent on fishery, forestry and farming. During the last few years, upland people in Stung Treng have been facing many pressures on their resources caused by hydropower development in the Se San river basin that cuts across Cambodia and Vietnam (Vannara 2006).</p>
<p>Gender issues in Mae Hae watershed, Thailand</p>	<p>In the multi-ethnic Mae Hae sub-watershed in northern Thailand, water management using upland streams-PVC pipes-hillside sprinkler systems to irrigate cash crops like cabbage and strawberries criss-crosses across both biophysical and administrative boundaries.</p> <p>Women are either absent from formal conflict resolution arenas and activities, or if present, unable to have their voices heard and assert control over decisions compared to men. Cultural norms with respect to roles and rights of women among Karen, Hmong and lowland northern Thai, are different, again adding considerable complexity to gender balance in water governance.</p>

Source: (Adapted from M-POWER 2006)

5.2 Politics of Knowledge

5.2.1 Hydrological consequences

A lot of watershed politics and policy revolves around misunderstanding and misrepresentation of the hydrological consequences of changes in land-use in upper tributary watersheds. There is a lot of conventional wisdom, both in technical bureaucracies and in local rural communities, which may in fact be wrong. Observations made on individual trees and small experimental plots are up-scaled uncritically to surmise impacts over vast regions with totally different land-use mixtures. Researchers working on the hard politics of watershed management cannot afford to ignore issues of beliefs, understanding and strategic misuse of scientific information.

When looking for the causes of floods, the conventional view is to immediately look upstream at land-use and look for confirmatory evidence as either a patch with no trees on it or pile of tree trunks in the stream. Deforestation is the cause of floods downstream and disastrous landslides upstream. Or is it? Forest trees use water, often a lot. Vegetation, from the canopy through to ground vegetation intercepts a variable portion of the rainfall which instead of reaching the ground evaporates back into the atmosphere. In tropical forest the fraction intercepted can be substantial (5-20%).

Upper tributary watersheds themselves are often subject to important dry season water shortages for even household consumption. Most land-use systems are rain-fed and with little upstream catchment area to harvest from and often only very minimal wet season run-off storage capacity. Measures to address the basic shortage problems for upland people are often neglected in arguments about watershed management (Lebel 2006). For example forestry agency in China legitimises that reforestation program is an important measure to regulate water for flooding control and dry smoothening. However, caution must be taken (Xu, 2009).

5.2.2 Traditional knowledge of Hmong in Thailand

The Hmong ethnic communities have been in a central position in the upland development and conservation debate in Thailand. The Hmong have often been characterized as the source of many environmental problems in the uplands. Known first as growers of opium, the Hmong are now criticized for taking too enthusiastically to the market-led economy of cash cropping that was forced upon them by national and international development agencies in the 1970s and 1980s. Currently, there are frequent accusations of over-expansion of crop land, high levels of chemical input, and more recently, over-extraction of upland water resources. But this general characterization does not accurately reflect the Hmong role in upland landscape. The Hmong have developed, preserved and adapted a complex system of knowledge about the ecosystems in which they live. The Hmong have also developed social institutions to regulate the human-environment relationships upon which the sustainability of their livelihoods is based (Wanitpradit 2008).

5.3 Institutions, Representation and Accountability

5.3.1 Representation and accountability

The decentralization in Mekong region also put more responsibility for natural resources at local community. On the other hand, strong state regulation over forests gives power of forest agency to modified local responsibility and benefit.

In Thailand, governance reforms set in motion by the previous Constitution (1997) have resulted in a significantly recreated local government at the sub-district (tambon) level. Although central government policy still places great constraints on upland livelihood options, local communities are responding to the empowerment of the tambon. It is not yet clear what impacts a more representative, and theoretically more accountable, tambon government will have on local communities' access to resources to support their livelihoods. However, the more pertinent question is how institutions can be built in ways that enhance accountability of decision-making to the people affected by those decisions.

In Mae Chaem district of Chiang Mai province, the residents of Pang Hin Fon tambon have taken the recent election of the sub-district chief (*kamnan*), and officers of the Tambon Administration Organization (TAO), such as president of the tambon council (*prathan sapha*) and village tambon representatives (*samachik aw baw taw*) very seriously. After just two rounds of elections, the local constituents seem to be moving towards an issue-based politics, where previously local voting was done first and foremost along ethnic lines. The empowerment of the TAO is important because this institution is responsible for the allocation of budgetary resources for local development activities. The TAO is also moving into a new, expanded mandate governing the management of local environmental issues. For these reasons, the improved representation could bring development outcomes that more accurately reflect the interests of local people (Badenoch 2006).

In China, land reform and community election provides community and households to manage their natural resource. However, logging quota system is crucial policy instrument for forest agency to regulate volume of timber to be logged every year. Local government encourages community to cultivate NTFPs to benefit from forest land they own.

5.3.2 Exploring the implications of decentralisation for ethnic communities in Thailand

As mentioned above, Thailand's political reforms have resulted in the state devolving and decentralizing authority to provincial or district-level governance institutions. The ongoing decentralisation efforts are opening up greater political space for the many ethnic or indigenous communities predominantly settled in the uplands.⁹ The increasing involvement of ethnic peoples in local-level government (and ethnic people's representation in local state bodies) is now assuming greater significance for upland watershed governance as well as giving upland communities more opportunities at a mix of livelihood (including market-based) strategies.

Some of the implications of decentralisation for ethnic communities (and especially so from their own perspectives) in terms of ecosystems and livelihood security that need to be further explored are:

- does decentralisation assist or hinder local governance of natural resources; how can local governance deal with, or balance, the pressures and "national priorities" of state policy;
- are inter-ethnic and ethnic-lowland community conflicts or tensions eased or worsened through formal decentralisation mechanisms;
- how are customary or long-standing local ethnic institutions and village-level networks for resource management being influenced, affected by or working with emerging state local-level mechanisms;
- apart from the minority-majority dichotomy in ethnic groups, inter-ethnic issues also exist in the uplands (often described in terms of conflict). Can local governance provide ways to allow ethnic groups to address these issues among themselves;
- what are the most pressing concerns, points of interest or areas of success in this ongoing process of decentralisation from the perspectives of ethnic communities (Daniel 2006).

5.3.3 Institutional and policy analysis in Tibet

Deqin in south Tibet in the upper Mekong Region is a critical area undergoing significant development. Located at 3,400 meters above sea level, it is the highest and northernmost county in Yunnan Province. Three snow-capped mountains - Meili, Baimang and Haba are crisscrossed by the Jinsha (Yangtze) River and Lancang (Mekong) River which are flanked by overhanging gorges. Deqin town, the administrative center has 7,000 people, mostly ethnic Tibetans. Most Tibetans in Deqin are agro-pastoralists.

⁹ The right of local communities and local authorities to participate in the management of natural resources has been included in Thailand's 1997 Constitution. This was the result of modest decentralization processes that began during the early 1990s when sub-district (tambon) administration organizations (TAOs) were established, and were provided a greater degree of autonomy and fiscal opportunity in local development planning and administration. The sub-district administration – together with the line departments of the major ministries involved in resource governance – are now responsible for putting new approaches to participatory resource management into practice (Kaosa-ard et al, 1998.)

Objectives **CPWF Project Report**

Supporting investigative research and creating partnerships that will pay attention to this critical area, in terms of impacts on local livelihoods and ecological transformations such as tourism, infrastructure development, World Heritage sites, the logging ban and upland conversion programs will enhance our understanding of watershed governance and livelihood variance and fill the knowledge gap. Possible focus areas (building on the CBIK research) include:

- Understanding of the complex ecosystem in the upper watersheds and the linkages with the 3 parallel river systems (including biodiversity importance, indigenous uses, livelihood activities)
- Community livelihoods including understanding resource dynamics
- Institutional and policy analysis
- Water governance and dialogue (bringing different stakeholders together to discuss changes and better ways to manage the ecosystem and livelihoods)
- Understanding how this watershed system contributes to the overall dynamics within the Mekong Region (Lazarus 2006).

5.3.4 Evolving institutional changes accompanying technological innovations in Mae Hae Watershed, northern Thailand

In the multi-ethnic Mae Hae sub-watershed, northern Thailand, the spread of technological innovations in upland irrigation has resulted in increased competition and conflicts over water-use; many actors and several layers of institutions – both formal and informal – are becoming involved in water-sharing arrangements, water-use deliberations, and conflict resolution.

Recent research shows how a number of institutions, including traditional ethnic Hmong and Karen actors, are involved and have adapted to deal not just with resource issues but also water allocation problems. These include both informal that draw on traditional Karen and Hmong culture as well as formal institutions of the state. One important consequence of frequent water conflicts has been the adaptation of local institutions, like the inter-village watershed network. Other traditional and formal state institutions also appear to be engaged but others seem relatively resistant.

Different institutional actors and strategies or groups of actors use varying roles and strategies as well as discourses at, and across, multiple levels for ensuring their effectiveness in water management and, in particular, water dispute resolution.

Traditional leaders in the Hmong (Hao Yaw) and Karen (Hee Kho) communities play an important role in negotiations and conflict resolution. Both are invariably male. They have responsibilities for rituals and ceremonies important for management of water, land and forests (Ratanawilailak et al. 2009; Daniel and Ratanawilailak 2010).

5.4 Dialogue, grassroots research and integrated watershed management

M-POWER work has looked at different approaches to watershed management such as payment for environmental services. M-POWER researchers have also been involved in initiating or strengthening dialogue processes for better understanding of watershed governance issues, improve participation of neglected or marginalised stakeholders, and reduce tensions and conflict.

5.4.1 Payment for Environmental Services: Integrated watershed management in China

Global awareness has increased of the role of upland forest dwellers in providing ecosystem services by conserving water and forests. Policy-makers are looking at ways

of revising policy for better using market mechanisms to achieve a win-win model of reducing poverty in the uplands while improving forest conservation.

However, not all environmental uses generate financial returns commensurate with their true economic value. This is because several forest benefits, notably environmental services, are not traded in markets and have no observable price.

Most payment schemes for environmental services in China have been publicly financed (Lu, X. Li, H. Tong 2009) initiated by central government in a large-scale. Current observations of the implementation of these payment schemes illustrate the significance of political perspectives and not solely market mechanisms. In this sense, there are several critical issues that should be addressed:

Security of forest property rights: Long-term security of forest property is essential especially for giving poorer households control over, and right to benefit from, the environmental services they provide.

Social space for multi-stakeholder negotiation and participation: Social space is important to lead to improved negotiation, bargaining and participation in payment schemes. However, at present, the still limited participation by both local governments and residents in the design of payment schemes has impaired this space.

Valuation: There is need to develop tools help identify the values of watershed services (Lu, X. Li, H. Tong 2009). The current tools are based on ecological context rather than economic context. The tools will help increase community voices.

Good governance and cooperative institutions: The sustainable management of the natural resource to guarantee environmental service can be continuously provided and improved, and the improvement of policy design and implementation to ensure environmental payment should be made constantly and fairly. In this regard, cooperative institutions are important. The institutions should evolve based on multi-stakeholder participation and be active in strengthening transparency, accountability, responsiveness, equity and efficiency of policy design and implementation (He 2006).

5.4.2 *Mae Hae: Dialogue processes catalysing debate*

As part of the M-POWER action-research on water management in the Upper Mae Hae watershed, dialogue events were held at the level of the watershed network of 15 villages and two events at the sub-watershed level. The water conflict in Mae Hae is ongoing but no single agency has been able to take up hosting of forums to discuss and resolve conflicts. The villagers have welcomed the M-POWER research as the research process attempts to both understand the situation as well as facilitate dialogue.

The strength of the dialogues events at both network and stream level is to build space for villagers to discuss and reach better understanding about the overall situation of water-use; to understand in-depth the problems of water-use; help the community to build water-use regulations; and provide information such as the mapping of water infrastructure such as sprinklers, ponds, etc. It also helps to seek solutions to water-use conflicts in the dry-season. Communities have increased awareness of the research process especially about the information on water-use and data on available water infrastructure.

Improvements can be made to facilitation processes to ensure every one can speak and not just have 1 or 2 people dominate the dialogue. Sometimes we also have to form smaller groups that exclude the leaders or state agency representatives in order to bring out more information that otherwise villagers may feel reluctant to discuss. Also those

people with limitations in Thai language must be helped by a facilitator who can sit and discuss with them and then help summarise their discussions into Thai. More women must be encouraged to be part of these forums as women are involved in all facets of village water-use and are affected by water conflicts (Ratanawilailak et al. 2009).

5.4.3 Grassroots research and dialogue in Mae Samart watershed

The Mae Samart Watershed, a tributary of the Pai River, and in turn, the Salween River, in northern Thailand illustrates the institutional and cultural complexity that watershed management must deal with. In the watershed, communities from three different ethnic groups – Shan, Karen and Hmong heritage – share a landscape and compete over watershed resources which, for a long time, had no common institution or arenas for dialogue and negotiation. Over time, as a result of both conflict and cooperative gestures, a watershed network for addressing some of the pressing issues has emerged.

The M-POWER research addressed the question: can governance of the Mae Samart watershed be improved in terms of ecologically sound use and management and harmonious social relations between diverse ethnic communities through grassroots research and dialogue?

Grassroots research is a form of participatory action research that aims to address the inherent power differentials between highly educated researchers and facilitators and socially marginalized people. It does so by shifting ownership and control of key aspects of research process away from the conventional academic researchers, for instance, the setting of agendas, data collection, analysis and interpretation.

The conclusion is grassroots research and dialogue has already begun to make a contribution to governance of the Mae Samart watershed. There is a real prospect such activities will continue to do so even without the interventions of outside groups, although funding, through local government and other avenues is undoubtedly helpful to organizing meetings and gathering information. The initial steps towards better social relations and processes through which conflicts might be resolved and resources fairly allocated have been taken. Ecologically sound use and management is never a guaranteed outcome, but the prospects of working together with some shared interests increases the likelihood and opportunities (Singhaphongprai 2007).

5.4.4 Investigating upstream/downstream issues in the Nam Khan watershed, Lao PDR: Investment in ecosystems and implications for dialogue and policy

Research conducted in the Nam Khan watershed in the uplands of Laos shows that water rights and water governance in Laos are burgeoning concepts but deserve to be embedded within the local context to better understand the value of water for livelihoods, commercial, and other purposes. Yet these concepts emphasise the need for establishing a solid water resources management framework that includes institutional co-ordination and appropriate policies and regulations, supported by accurate and relevant technical data to make informed decisions.

The research presumed that water use is a key priority at village level, but various factors inhibit effective and sustainable provision, allocation and use. In particular, lack of robust and transparent decision-making processes, absence of a co-ordinating and authoritative watershed institution, and the pressure of external policies that increase water insecurity, all combine to create an unpredictable water resources future for the watershed.

The research concluded that any addressing of water access and equity in the Nam Khan watershed needs to be looked at in the local context of village level and watershed level stakeholders, their interactions, and the impacts of external policies that create uncertainty and instability. In the Nam Khan watershed, this specifically means improving decentralised decision-making between District and village levels, co-ordination in planning between watershed level actors facilitated by an overall administrative body or institution, and consideration of external policies and their impacts on water security.

What role the government decides to take in water resources management will shape the degree of access stakeholders enjoy or be restricted to, both villagers and neighbouring countries alike. Government may opt for facilitating negotiations, delegating responsibilities to sub-national bodies, or creating policies to assist users to manage water resources autonomously. Entrenching water rights within not only the context of natural resource management but development and economic agendas as well, would increase water security by establishing a clear need to invest in water resources, and thus conserve them for future use (Shue and Badenoch 2009).

5.5 Insights and implications for policy, practice and future research

The past few years of M-POWER action-research in the Mekong uplands has provided a number of in-depth case studies on a wide range of issues ranging from comparative perspectives on governance of watersheds to initiating grassroots research and dialogue processes for catalysing debate. This also shows the strength of the growing network of governance scholars especially younger researchers who are continuing to build on improving watershed governance policy and practices.

Some of the findings strengthen already well-known and previously researched areas. For instance how national watershed politics and policy has not found a way out of its narrow definitions of watershed or upland forests, even as it is contested by other more flexible local-level approaches and definitions. Also, watershed policy continues to be constructed around misunderstanding and misrepresentation of the hydrological consequences of land-use changes in upper tributary watersheds. Much of the conventional wisdom, both in technical bureaucracies and in local rural communities, appears to have little basis in reality. To this extent, it may appear that little has changed.

However, other findings help provide clarity in newer areas: the dynamism of local/cultural institutional capabilities and their potential for acting with government field-level agencies; the significance of gender, and women's role in resolving water conflicts and watershed management; newer approaches such as payments for environmental services that cannot ignore long-term security of forest property especially for poorer households.

Action-research interventions such as multi-level dialogues and debate appear to be useful and necessary to address issues of access and equity and to resolve conflicts. This appears especially true in situations where the issues at stake are multi-level (and even sometimes transboundary) and no single actor or agency is either able or willing to handle them.

A significant area for future research is the implications of climate change in the uplands; some analysis has already begun on the risks and rights based approaches to understanding climate change vulnerabilities in the uplands (Xu Jianchu and Daniel 2009).

Some themes can be put forward as requiring further in-depth research: further analysis of the numerous “upland development/poverty reduction” projects and their impacts and implications for watershed governance; ethnicity and decentralisation; upstream-downstream issues of water-use and equity; technological innovations in the uplands; lessons of various institutional arrangements to solve conflicts over resource uses.

5.6 Literature cited

- Badenoch, N. 2006. Representation and accountability in upland resource management, M-POWER Briefing MB-2006-07 Unit for Social and Environmental Research, Chiang Mai.
- Daniel, R. 2006. Watershed politics, ethnicity and decentralisation in north Thailand. *in* R. Daniel and L. Xing, editors. International Workshop on Public Participation in Watershed Management in Montane Southeast Asia: An evaluation of experiences and their contributions to governance. M-POWER, Kunming, Yunnan, China.
- Daniel, R., L. Lebel, and S. N. Nan. 2009. Forest use, conversion and governance. Pages 175-196 *in* L. Lebel, A. Snidvongs, C.-T. A. Chen, and R. Daniel, editors. Critical states: Environmental challenges to development in Monsoon Asia. Strategic Information and Research Development Centre, Selangor, Malaysia.
- Daniel, R., and S. Ratanawilailak. 2010. Coping with constraints: Actors and institutions in the local politics of watershed management in the uplands of northern Thailand. *in* K. Lazarus, B. Resurreccion, N. Dao, and N. Badenoch, editors. Rites of Access: Seeking Justice in Managing Mekong Region Waters. Earthscan.
- Lazarus, K. 2006. Watershed Governance in the Upper Mekong River Watershed: Case of Deqin, northwestern Yunnan Province. *in* R. Daniel and L. Xing, editors. International Workshop on Public Participation in Watershed Management in Montane Southeast Asia: An evaluation of experiences and their contributions to governance. M-POWER, Kunming, Yunnan, China.
- Lebel, L. 2006. Misrepresenting and misunderstanding hydrological knowledge. Pages On-line at: <http://www.sea-user.org/uweb.php?pg=71>. *in* USER Briefing BN-2006-03. Unit for Social and Environmental Research, Chiang Mai.
- Lebel, L., and R. Daniel. 2009. The governance of ecosystem services from tropical upland watersheds. *Current Opinion in Environmental Sustainability* **1**:61-68.
- Lebel, L., R. Daniel, N. Badenoch, and P. Garden 2008. A multi-level perspective on conserving with communities: experiences from upper tributary watersheds in montane mainland southeast Asia. *International Journal of the Commons* **1**:127-154.
- Lu, X., and Li, H.T. 2009. Rewarding the Upland Poor for Environment Services in the People's Republic of China. (edited), Lu X., and He, J. 2009. Payment for Environment Services: China's experiences of rewarding upland poor. Yunnan University Press
- M-POWER. 2006. Public participation in watershed management in montane mainland Southeast Asia. *in* R. Daniel and L. Xing, editors. International Workshop on Public Participation in Watershed Management in Montane Southeast Asia: An evaluation of experiences and their contributions to governance. M-POWER, Kunming, Yunnan, China.
- Ratanawilailak, S., R. Daniel, and L. Lebel. 2009. Managing multiple ecosystem services with communities: a case study of Mae Hae Upper tributary watershed, northern Thailand. USER Working Paper (Draft). Unit for Social and Environmental Research, Faculty of Social Sciences, Chiang Mai University, Chiang Mai.
- Rutherford, J. 2006. “If not the Lisu, then who? Indigenous people, Biodiversity Protection and Information Flows in the Nu-Salween Basin”. *in* R. Daniel and L. Xing, editors. International Workshop on Public Participation in Watershed Management in Montane Southeast Asia: An evaluation of experiences and their contributions to governance. M-POWER, Kunming, Yunnan, China.

- Shue, R., and N. Badenoch. 2009. Information, institutions and inequity: the case of the Nam Khan watershed in northern Laos. Unit for Social and Environmental Research (USER), Chiang Mai University, Chiang Mai.
- Singhaphongprai, D. 2007. Dialogue, grass-root research and management in Mae Samart Watershed, Northwest Thailand, M-POWER Fellowship Report. Unit for Social and Environmental Research (USER), Chiang Mai University, Chiang Mai.
- Wanitpradit, A. 2008. Emerging local institutions for watershed governance in the ethnically diverse Mae Tian sub-watershed, Mae Wang District, Northern Thailand. M-POWER Fellowship Report. Unit for Social and Environmental Research, Chiang Mai University, Chiang Mai.
- Xu Jianchu, and R. Daniel. 2009. Risks and Rights of Mountain Peoples. *in* K. Lazarus, B. Resurreccion, N. Dao, and N. Badenoch, editors. Rites of Access: Seeking Justice in Managing Mekong Region Waters. Earthscan, London.

6 Case study 6: Waterworks

The specific strategic objective of MPOWER, by 2010, for waterworks sector is: 'Develop effective regulatory regime for promoting ecologically healthy rivers, lakes, wetlands and groundwater in the urban and peri-urban areas that particularly address the pollution and degradation actions of municipal and industrial users of water bodies, ensure security of water supply to poorest households.'

The case studies in urban waterworks were led by theme leader and the contributions coming from M-POWER partner organizations and research fellows. This sub-section¹⁰ summarizes the main findings of the research under the waterworks theme and also highlights implications for future research.

6.1 Land Use and Equity in Water Governance in Peri-Urban Bangkok

Since the last decades of twentieth century a distinct form of urbanization has arisen in several Southeast Asian countries, known as the *desakota* or extended metropolitan region. This form has created a mixture of agricultural and non-agricultural activities and a marked heterogeneity of land use, putting in question the widely accepted notion of spatial separation of rural and urban activities. And many scholars raised questions regarding its implications for resource use competition and environmental pollution. One problem area in peri-urban Southeast Asia deserving closer examination is conflict laden situation arising from mixed land use and irrigation water use.

Sajor and Ongsakul (2007), with the case study of peri-urban Bangkok, described how, in an intensive mixed land use situation, the actions of new urban users of irrigation canals have degraded the water, unfairly prejudicing low-income farmers' entitlement to irrigation water of appropriate quality and harming their livelihood. It is argued that certain characteristics of existing land- and water-sector-related management institutions in Thailand encourage a disproportionate shift of the environmental burden to small farmers. This phenomenon also involves the violation of procedural equity — the farmers' right to be informed, to be able to assert a right to and negotiate for appropriate water, and to participate meaningfully in strategic decisions related to water governance in the peri-urban area. The problem is mediated by administrative separatism, ambiguity and multiplicity in the functional jurisdiction of water-related government bodies, and the general lack of a participatory culture in the bureaucracy. The authors further argue that, without state acknowledgement of this form of injustice, establishing appropriate mechanisms and public institutions that will purposively address concerns of environmental equity is a remote possibility, and that this inequity will likely continue to be patterned and inscribed in the peri-urban geography of the mega-cities of Southeast Asia.

6.2 Political rescaling: Eastern Seaboard Development Program, Thailand

During the recent 4-5 decades, Thailand has emphasized export-led economic growth; one prominent example is the establishment of the Eastern Seaboard port and industrial region in Rayong province. The ESB is a well-known case of rapid peri-urbanization and export-oriented manufacturing in Thailand. The rapid expansion of industrial establishment in the region resulted in competition for water resources among various sectors. Various inter-sub basin water transfer projects introduced especially to cater to the needs of industrial water uses. Water users other than in industrial sectors have found their water supplies degraded and insufficient for their needs. Janchidfa (2009) discusses how the ESB Development Program has affected water management in these

¹⁰ This subsection was written with contribution from Dr Edsel Sajor.

areas: the rescale of management from traditional scale (provincial arena) to development scale (regional arena) that affected water management and the movement of people in the area. ESB's industrial development is one example to show that the geographic scale interacts with social constitution scale as well as economic and political processes. Janchidfa's study showed how rescaling of political space in terms of official discourses and mandates of public sector agencies has been used to legitimize water decisions in favor of industries and urban interest groups. On the other hand, re-scaling of political space by affected local farmers has also been made to serve their advocacy of their own water rights.

6.3 Urbanization and pollution in Vietnam

The effect of urbanization on Saigon river of Vietnam in the form of high pollution load by industries and domestic waste and heavier navigation use of the system have put the river's health in a critical situation at present (Sajor and Thu, 2009). However, development trajectory and institutional fragmentation in the country relevant to the water sector have mitigated against an integrated approach to river management. On the other hand, Vietnam's increasing cooperation with the international development community in a number of agendas may provide entry points and change environment for needed institutional reforms for integrative approach.

Water governance in Vietnam is rather weak. At the national level, the system of water law and regulation is relatively new and incomplete. A Water Resource Law was issued for the first time ever in May 1998 and became effective in January 1999. By late 2006, the first National Strategy for Water Resource Management was completed and approved. However, the implementation of water law is limited due to lack of guidelines, its disconnectedness to the real current water situation, and inadequate enforcement capacity. Moreover, water institutional structures are fragmented and overlapping. In the peri-urban areas, there are no clear and distinct policies for integrated and inclusive management of water appropriate for industrial/craft production and agricultural cultivation in place. Pham (2008) studied the community based water governance with the case study of Peri-Urban Area of Bac Ninh City, Vietnam. Paper production is one of the major economic activities in the selected study area, and it has resulted in environmental problems related to waste water and solid waste. At the same time the institutional and infrastructural requirements to maintain minimum environmental quality have not been able to keep up.

6.4 Urbanization and policy transitions

Over the last five decades (1960–2009) water and land use in the Upper Ping River Basin in Northern Thailand around the Chiang Mai-Lamphun urban corridor has been transformed by the expansion and intensification of agriculture, urban-industrial growth and tourism (Rigg and Nattapoolwat, 2001; Lebel et al. 2009a). The national significance of the Upper Ping arises from its strategic position as the largest tributary of the Chao Phraya. The Bhumipol Dam, constructed in 1964, marks the lower end of the Upper Ping and is still the largest storage dam and hydropower source within Thailand.

At the same time interests in forest use and then conservation and upland watershed management have increased. This has produced new conflicts over water allocation, land uses and the ecosystem services from watersheds and floodplains (Walker, 2003; Lebel et al. 2008). Management priorities for seasonal flood plains, for instance, have shifted as sub-districts become more urban and traditional irrigation infrastructure is increasingly seen as a source of flood problems rather than way of growing food (Lebel

et al. 2009b). It has also created new incentives, increased technical capacities and political opportunities for pursuing major changes in water management policy.

Based on our analysis of historical documents and interviews we recognized three policy transitions during the last five decades (*Table 7*). Each transition involved major shifts in the content of policy – such as amounts and types of infrastructure that should be built and priorities for allocation of water – or changes in how policy is made or management functions are organized (Lebel et al. 2009a). Policy transitions are not tidy or smooth. They may be interrupted, abandoned or left incomplete. National level policies often trigger complex interplay between institutions at regional and more local levels. Nevertheless, each has had impacts upon the use and management of water in the Upper Ping. Transitions in water policy are an outcome of many social processes at multiple levels. Individuals have variable roles. Sometimes they are the source of new and alternative policy ideals. Sometimes they are institutionalized products of strong organizations. In other cases individuals influence comes from position of authority, the networks they belong to, or the coalitions they build. Sometimes, it is the aggregate, relatively independent, actions of individual water users, which through their practices have been driving changes in water policy (Lebel et al. 2009a).

Table 7. Selected features of three water policy transitions.

Transition	Objectives	Infrastructure	Institutions
Wet to dry	All year around irrigation, not just diversion in wet season	Larger storage dams and delivery canals; pumps and wells.	Agricultural export support
Farm to city	Provide secure supplies to urban and industrial users; reduce flood risks	New tap water provision; drainage and flood protection Hydropower	Service agreements and pricing Operating rules for dams and gates Warning systems - compensation
Good to services	Manage multiple services not just allocation of main river flows	Acknowledge ecosystems as service providers	Land-use planning Watershed management Multi-stakeholder engagement

(Source: Lebel et al. 2009)

6.5 Implications for future research

Some broad areas for in-depth research in peri-urban Southeast Asia on water issues in the future include: conflicts arising from mixed land use and irrigation water use; rescaling of political space to favor industrial water-use by official discourses and public sector agencies; contestation between agricultural versus craft production in water-use and implications for institutional and infrastructural requirements.

6.6 Literature cited

- Janchidfa, K. 2009. Political space rescaling: Case of Eastern Seaboard Development Program, Thailand. M-POWER Working Paper MP-2009-18. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.
- Lebel, L., Garden, P., Subsin, N., Nan, S.N., 2009a. Averted crises, contested transitions: water management in the Upper Ping River basin, northern Thailand In: Huitema, D., Meijerink, S. (Eds.), *Water policy entrepreneurs. A research companion to water transitions around the globe*. Edward Elgar, Cheltenham, UK, pp. 137-157.
- Lebel, L., R. T. Perez, T. Sukhappunnaphan, B. V. Hien, N. Vinh, and P. Garden. 2009b. Reducing vulnerability of urban communities to flooding. Pages 381-399 in L. Lebel, A. Snidvongs, C.-T. A. Chen, and R. Daniel, editors. *Critical states: Environmental challenges to development in Monsoon Asia*. Strategic Information and Research Development Centre, Selangor, Malaysia.
- Pham, T. T. V. 2008. Roles of Community User Groups in Water Governance: A Case Study on Institutions in the Peri-Urban Area of Bac Ninh City, Vietnam. M-POWER Fellowship Progress Report.
- Rigg, J. and S. Nattapoolwat (2001), 'Embracing the Global in Thailand: Activism and Pragmatism in an Era of Deagrarianization', *World Development*, **29**, 945-960.
- Sajor, E. and R. Ongsakul. 2007. Mixed Land Use and Equity in Water Governance in Peri-urban Bangkok. *International Journal of Urban Regional Research* 31 (4):782-801.
- Sajor, E. and Thu, M. (2009) "Institutional and Development Issues in Integrated Water Resource Management of Saigon River" *Journal of Environment & Development*, 18 (3): 268-290.
- Walker, A. (2003), 'Agricultural transformation and the politics of hydrology in northern Thailand', *Development and Change*, **34**, 941-964.

7 Governance summary

The initial M-POWER program envisaged four cross-cutting themes that would intersect with more conventional water sectors: Dialogue, Social Justice, Knowledge and Policies (see Figure 2). These four themes provide a way to organize a second, more integrative, look at the achievements and findings of the CPWF PN 50 project.

7.1 Dialogue

A strategic objective of M-POWER has been to establish, as normal practice for exploring and deciding upon important national and transnational water-related management and development options, public processes for taking into consideration the rights, risks and responsibilities of different groups and perspectives. This goal was approached in the CPWF PN50 project by a combination of leading by example, making constructive contributions to public processes convened by others, and critical reflection on dialogues.

At the regional level the most significant event co-convened by M-POWER was the “*Mekong Region Waters Dialogue: exploring water futures together*” in Vientiane, Lao PDR, in July 2006 (IUCN, TEI, IWMI, and M-POWER, 2007a; 2007b). The other convening partners were the World Conservation Union (IUCN), the Thailand Environment Institute (TEI), and the International Water Management Institute (IWMI) (Figure 9). At the time IUCN and IWMI were also partner organizations of M-POWER. The dialogue was triggered by draft strategies and plans of multi-lateral organizations which appeared to be ushering in a new era of large scale water infrastructure development without adequate public consultation. A key part of the meeting specifically asked participants to evaluate the role and governance performance of the World Bank, Asian Development Bank and Mekong River Commission in basin development with a focus on the Mekong Water Resources Assistance Strategy and the Mekong River Commission’s draft Strategic Plan. The idea was not to replace any public consultations by these agencies that should take place but to exchange of views on their content, the roles of these international organizations, and other critical water governance issues in the region.



Figure 9: Poster for the Mekong Region Waters Dialogue.

Multi-stakeholder dialogues are also important at local levels with various watershed and river basin organizations increasingly finding themselves functioning as platforms, especially among government agencies, but also with civil society representatives. Various regional and local events convened or facilitated by M-POWER members have helped demonstrate the plausibility of multi-stakeholder platforms to lift the standard of debate, share knowledge and improve mutual understanding. Contributing to dialogues convened by others has also been an important way for knowledge in the M-POWER network to be taken into the public space and policy process.

Multi-stakeholder platforms or dialogues have promise in practice many past exercises have fallen short of expectations for a variety of reasons (Dore, 2007). One of the key challenges for state-led exercises is extending meaningful opportunities for participation to non-state actors. Another is achieving the high standards of preparation and facilitation essential for open and fair deliberation of alternatives. A third and often most difficult dimension to assess is to link the exploration of decisions and alternative options with negotiations and decision-making in an appropriate way. Dialogue processes at all levels are enmeshed in a broader political and socio-economic context which constrains their effectiveness and influence.

7.2 Social justice

Another strategic objective of M-POWER was to increase awareness of social justice norms, including notions of fairness, equality of treatment and opportunity, and on this basis redress and transform gender, class, ethnic and other inequities through both research and action on water governance. This was a very ambitious objective, requiring both analytical and political engagement by the network.

Analysis of policies and practices in M-POWER often identified and highlighted the impacts, risks and opportunities of water infrastructure development projects on disadvantaged social groups.

One important lesson from several M-POWER studies is that public participation programs are not a panacea. Governments and other actors in the Mekong Region often take an instrumental approach to participation and as a consequence being included can be a cost not a benefit – for example by creating work but not empowering women (Resurreccion and Manorum, 2007) or local “community” members. Participation can also legitimize otherwise flawed processes and decisions. The terms and conditions of participation need to be examined critically.

Another insight from several studies is that many water projects continue to be evaluated and promoted in terms of their benefits with insufficient attention given to their costs, burdens or risks. As a consequence lists of stakeholder are often incomplete and outcomes for disadvantaged groups are neglected.

Reducing these differences in opportunities, rights, risks and benefits is a political challenge requiring engagement by researchers and those at a disadvantage. Protests and advocacy directly by and on behalf of small-scale fishers and farmers already or potentially affected by infrastructure projects and policy changes has often been important, especially in Thailand.

An outstanding challenge for water governance in the Mekong region remains that disenfranchised and vulnerable groups – women, children, the elderly, ethnic minorities, natural resource dependent households – still often have insufficient opportunities to influence water resources development.

7.3 Knowledge

Decision-making and action-taking are informed by different types of knowledge and learning processes. M-POWER has strategically sought ways to build links between formal, science-based knowledge and the experienced-based knowledge of local communities and other practitioners in the management of water. The idea has been that sustainable management of water resources will often require different forms of knowledge and privileging one form or holder of knowledge automatically is likely to lead to unfair and poor decisions.

In the Mekong Region this position sits somewhat uneasily between views of states and some development actors that experts can resolve water management problems with technological solutions with better infrastructure and institutions and others which see much a larger role for local expertise and knowledge. Examples of the latter range from village research, including the latest incarnation known as Tai Baan (Scurrah) that has spread across the region, and strategic engagement with national discourses by local actors in government planning exercises (Jakkrit). Research and engagement with how problems are defined and solutions identified highlight that a clear separation between politics – interests and power – and knowledge are rarely sharp (van Kerkhoff and Lebel, 2006). Boundaries between science and policy, or science and practice, are negotiated.

Analyses of what kinds of arguments are used and whose knowledge counts also underline the role of organizational interests in water resources development and management across the Mekong Region. Many actors, including politicians, are skillful at using the media to promote schemes promising grand benefits while ignoring social and environmental impacts (Garden and Nance, 2007; Molle and Floch, 2008). Water bureaucracies typically have a concentration of actors and relationships that favor large-scale infrastructure solutions (Lebel et al 2009a). There is a strong tendency to de-politicize assessments and projects, redirecting them to their own agencies experts and consultants (Contreras, 2007; Käkönen and Hirsch, 2009). Contested knowledge claims are a strong feature of many of the debates around large-scale water resource infrastructure development in the region.

Improving understanding of the contributions of individual and sets of projects to human well-being in the Mekong region remains an outstanding challenge in which issues of governance cannot be neglected. The way assessment and consultation processes are designed and implemented has implications for their credibility, legitimacy and saliency, and ultimately public acceptance. Several specific problems remain in current practices. Water projects continue to be assessed individually: the cumulative and aggregate environmental impacts of water resources development projects are ignored. The realized benefits from water infrastructure projects are often substantially less than those initially promised at the time decisions to go ahead with them were made suggesting that initial assessments were biased. Deliberative processes are important to strengthening the diversity and quality of knowledge inputs into decision-making but will have to overcome organizational cultures that have long emphasized technical expertise and infrastructure solutions to every water resource management problem.

7.4 Policy

Policy analysis in practice is part of politics. An understanding of how policies are made and implemented, therefore, can also be constructively used to influence processes and products. That has been an underlying rationale of much of M-POWER's work in this area. Several different dimensions of the policy cycle in the Mekong Region countries deserve attention.

First is the importance of problem framing. The pathways to influence are diverse and certainly do not just depend on expert advice or rationale comparison of policy options.

Discourses both drive policy change as well as inaction. Non-action is also a policy choice.

Second is the way policies are institutionalized. Here are there are major differences with level. Regional, state and local water policies typically have different forms. In the case of transboundary or regional water resources scale issues are a central feature of political contests with some actors benefiting from elevation of planning and policy to regional level and others favoring highly localized policy (Dore and Lebel, 2009; Lebel et al 2005). Broader decentralization reforms may interact in complex ways with movement towards basin level governance. The pre-existing institutional context in which a policy reforms is undertaken is critical to its impact.

Which brings us to a third issue - the influence policies have on practices. Water bureaucracies, for instance, have widely adopted modern discourses of participation and integration, but more rarely changed day-to-day practices. Gaps between management discourses, policies on paper and actions on the ground are often large. Individual government departments and political parties may pursue contradictory policies. Water users may simply ignore policies made at higher levels as irrelevant or unfair.

This raises the fourth issue of agency in the policy process. Although it is tempting to attribute laws, regulations and mandates to governments other external actors often have substantial influence. In the Mekong Region multi-lateral banks, for example, were particularly influential following the 1997-98 financial crisis (Lebel et al 2009b).

7.5 Prospects

7.5.1 Engagement

Given these common governance practices in the Mekong region discussed above the ultimate goal of pursuing improved livelihood security, human and ecosystem health still depends on further democratization of water governance. Several dimensions matter.

First is strengthening local representation. Here there clearly has been some progress with at least acknowledgement of the value of local inputs into planning and implementation increasingly recognized by central government agencies. Community-based flood disaster management experiments are expanding in useful ways in most countries. River sub-basin and watershed organizations have also proliferated. Water user groups are formed alongside new irrigation infrastructure. Opportunities for engaged researchers to contribute to emerging practices and improve them are numerous and M-POWER researchers have got involved. One common challenge is to encourage state schemes to pay greater attention to pre-existing institutions, such as those for local irrigation or watershed and community forest management in northern Thailand. The assumption of an institutional gap or absence of local capacity are often false. Finding ways to constructively link local representative government and local community contributions is also an outstanding challenge in many locations.

Second is improving the quality of deliberative processes. Here the growing body of event convening and facilitation experience and skills within the wider M-POWER network of collaboration is an important resource to draw on. There is likely to be an increasing number of dialogue-like processes held at regional, national and local levels in the coming years focused on water. Working with governments and non-state actors driving these activities to improve their formats, content and impact will provide excellent opportunities to put critical and reflective research back into practice.

Third is enhancing the constructive interplay between institutions both horizontally and vertically. There are important roles for engaged scholarship to help link non-state and

state actors at various levels. In local water governance, as noted above, much work needs to be done to bring together local community and government organizations. Such facilitation work is a precursor to more formal institutionalization of roles and participation. Likewise at the regional, level there is also still plenty of scope for making meaningful public participation and sharing of information development norms. The vertical challenges are also huge. Governance in the Mekong region is multi-level and frequently subject to a politics of scale (Lebel et al 2005). Looking for ways to link deliberative politics at different levels are needed. At a minimum this means at least providing some "local" representation and inputs into much broader regional consultations so that key level-dependent interests are less likely to be completely overlooked. Cross-scale institutions may sometimes be needed and network like organizations like M-POWER with multi-level interests and mixture of state and non-state actors may help serve those functions or help generate the interest in the creation of new links.

Fourth is building capacities to handle uncertainties and adapt to changes in flow regimes. Changes in water- and land-use are already impacting on seasonality of flows in many basins. Climate change may further exacerbate or confound these changes. Institutions and strategies for dealing with uncertainty are under-developed in the Mekong Region even under current conditions – for instance, climate variability. Long-lasting infrastructure, committed landscapes, and long-term uncertainties in climate suggest that more adaptive models of governance or co-management will be needed. Mechanisms to improve learning from past policy as well as anticipating change through assessments, scenario-building and other forward-looking tools should be explored without doing away with traditional concerns of accountability, transparency and fairness. Knowledge and policy networks like M-POWER, with rapid and flexible response capacity, are also crucial for dealing with growing uncertainties.

An outstanding question is to what extent such changes in the water sector are plausible while dominant political structures in the region vary from authoritarian states and single-party states to semi-democracies in which military intervention is not infrequent. Likewise it may be wishful thinking to expect mobilization around water management issues can contribute much to broader social and political change. Clearly spaces for exploring alternatives and expressing dissent remain extremely important and something for which networks of engaged governance research well linked regional and internationally can contribute in different ways. Despite many constraints improvements in practices are possible and being pursued by broad coalitions of state and non-state actors. Such initiatives will have to be persistent and patient.

7.5.2 Research

Although the objectives and broad outlines of what types of approaches are needed are well known how to effectively engage multiple stakeholders, link deliberations at different levels, and design effective and fair water management institutions remain major puzzles. Engaged and critical research is still need in many areas of water governance in the Mekong Region (Molle et al 2009). Work carried out by M-POWER partners and under the CPWF PN50 project has certainly pushed the field forward in many domains but there are also vast areas of scholarship which have barely been touched. Here we highlight just a few promising areas for further research that would also have high relevance for policy and action in the Mekong context.

While the value of multi-stakeholder dialogues is increasingly recognized and there are some insights in how they can be made more effective in the Mekong Region much more experimentation with formats and venues and learning by doing and from critical reflection on past experiences is needed. More research is also needed on sources of legitimacy, discursive power and problems of scale in deliberative politics.

In practice there are also many questions about how to make water decision-making procedures and outcomes fairer for what are often the most vulnerable, marginalized groups. Many of the promising advances in practices still fail to reach and cater sufficiently for the needs or empower those most likely to be adversely affected by water resources development projects and policy changes. Avoiding instrumentalists traps in participatory processes and building capacity for self-representation and determination are outstanding challenges which like advocacy, resistance and protest, have not received enough practical attention from researchers in the Mekong Region.

The technical side of water management problems does not disappear by declaring that interests, discourses and politics matter. Improved understanding is still often very important to making better decisions and negotiating fairer solutions. Research and politics will never be sharply separated and the political elements in knowledge claims never completely implemented so finding ways to manage the tense boundary between research and policy or practice is crucial. More research is needed on past efforts to manage that boundary, for example, through assessments and dialogues, and other social processes. Further experimentation is also needed with new approaches, like joint assessment and fact-finding. Research on knowledge systems should also help foster interactions that will lead to more of the knowledge relevant to sustainable development actions being effectively used.

Finally and in some ways most fundamentally is the issue of democratization itself. Nobody in the Mekong Region believes there is a single institution, practice or model that will immediately and once and for all improve governance overall and thus of water. Many actors feel threatened even by discussions of the term. The M-POWER network has often promoted deliberative approaches through consultations, dialogues and inputs from a knowledge network. But what exactly can deliberative politics hope to contribute in a region still struggling with notions of representative democracy? More research is needed on the interactions between representative and deliberative processes, how ideas of democracy and government are evolving, and the prospects for a fairer society in a region in which access to and allocation of water and associated risks is crucial to social justice.

7.6 Impact, significance and future

CPWF PN50 was the largest individual project taken on by the M-POWER network and as it largely supported coordination, collaboration and network-building activities it is reasonable to assess the impact and significance of this project by examining the influence of the network itself.

A key strengths of M-POWER as a network has been its rapid response capacity. As important events are announced or opportunities arise to influence policy, members of the network have been quick to let each other know what is happening and where appropriate organize a constructive and coordinated response. The mixture and coverage of the network allows for very flexible mix of individuals and actions. As a consequence some people have begun referring to M-POWER as a knowledge network. The main niche appears to have been at the regional level or more locally when dealing with regional or widely shared issues.

The network grew substantially as a result of activities funded by CWPWF PN50. The fellowship program was particularly significant capacity building initiative and has left as a legacy a networked cohort of engaged governance scholars and future policy-makers within the Mekong Region. One can anticipate that this cohort will continue to have a constructive influence on water policy and decision-making in the regions for decades to come.

Objectives CPWF Project Report

This claim is an unusual one for a research project and deserves some clarification. One of the unusual features of the M-POWER program has been the dual emphasis on engagement and scholarship. Although network members have published widely on their analyses and findings in books and journals many have also engaged in public debates and events. Indeed there has been a continuous and explicit effort to take knowledge and understanding from research into practice, policy, and political debates.

The relevance of the M-POWER program and network remains high in the Mekong Region. It is certain that M-POWER will continue after the CPWF PN50 project ends. Already one key project in collaboration with CPWF has been taken on by partners in the network. In the future different projects will likely be coordinated by a more diverse set of members. Some re-organization of priorities and themes as laid out in the series of M-POWER guides (M-POWER, 2008) will be needed to fit changing political dynamics and water governance challenges in the region, but we would also anticipate that the commitment to collaboration established in CPWF PN50 and network identity will continue for many years to come.

7.7 Literature cited

- Contreras, A. (2007). *Synthesis: discourse, power and knowledge*. In *Democratizing water governance in the Mekong region*, L. Lebel, et al., Editors. Mekong Press: Chiang Mai. Pages 227-236.
- Dore, J. (2007). *Multi-stakeholder platforms (MSPS): unfulfilled potential*. In *Democratizing water governance in the Mekong region*, L. Lebel, et al., Editors. Mekong Press: Chiang Mai. Pages 197-226.
- Dore, J. and L. Lebel (2009). *Deliberation, scale and the governance of water resources in the Mekong Region* Environmental Management: (under revision).
- Garden, P. and S.L. Nance (2007). *Forums and flows: emerging media trends*. In *Democratizing water governance in the Mekong region*, L. Lebel, et al., Editors. Mekong Press: Chiang Mai. Pages 157-176.
- IUCN, TEI, IWMI, and M-POWER (2007a). *Exploring water futures together: Mekong Region Waters Dialogue. Report from regional Dialogue, Vientiane, Lao PDR*. World Conservation Union, Thailand Environment Institute, International Water Management Institute, Mekong Program on Water, Environment & Resilience. Available on-line: http://www.mpower.net.org/download_pubdoc.php?doc=3274
- IUCN, TEI, IWMI, and M-POWER (2007b). *Exploring water futures together: Mekong Region Waters Dialogue. Resource papers from regional Dialogue, Vientiane, Lao PDR*. World Conservation Union, Thailand Environment Institute, International Water Management Institute, Mekong Program on Water, Environment & Resilience. Available on-line: http://www.mpower.net.org/download_pubdoc.php?doc=4059.
- Käkönen, M. and P. Hirsch (2009). *The antipolitics of Mekong knowledge production*. In *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, F. Molle, T. Foran, and M. Käkönen, Editors. Earthscan: London. Pages 333-365.
- Lebel, L., B.T. Sinh, P. Garden, S. Seng, L.A. Tuan, and D.V. Truc (2009a). *The promise of flood protection: Dykes and dams, drains and diversions*. In *Contested Waterscapes in the Mekong Region*, F. Molle, T. Foran, and J. Kakonen, Editors. Earthscan: London. Pages 283-306.
- Lebel, L., P. Garden, N. Subsin, and S.N. Nan (2009b). *Averted crises, contested transitions: water management in the Upper Ping River basin, northern Thailand* In *Water policy entrepreneurs. A research companion to water transitions around the globe*, D. Huitema and S. Meijerink, Editors. Edward Elgar: Cheltenham, UK. Pages 137-157.
- Lebel, L., P. Garden, and M. Imamura (2005). *Politics of scale, position and place in the governance of water resources in the Mekong region*. *Ecology and Society* 10(2): 18. [online] URL: <http://www.ecologyandsociety.org/vol10/iss2/art18/>.
- Molle, F. and P. Floch (2008). *Megaprojects and social and environmental changes: the case of the Thai "water grid"*. *Ambio* 37(3): 199-204.
- Molle, F., L. Lebel, and T. Foran (2009). *Contested Mekong Waterscapes: Where to next?* . In *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, F. Molle, T. Foran, and M. Käkönen, Editors. Earthscan: London. Pages 383-413.
- M-POWER (2008). *Mekong Program on Water, Environment and Resilience. Guide 2008*. Unit for Social and Environmental Research: Chiang Mai.
- Resurreccion, B. and K. Manorum (2007). *Gender myths in water governance: a survey of program discourses*. In *Democratizing water governance in the Mekong region*, L. Lebel, et al., Editors. Mekong Press: Chiang Mai. Pages 177-196.
- van Kerkhoff, L. and L. Lebel (2006). *Linking knowledge and action for sustainable development*. *Annual Review of Environment and Resources* 31: 445-477.

OUTCOMES AND IMPACTS

8 Impact Pathways

This project was explicitly designed to engage with a diverse range of stakeholders to improve decision-making around water resources development and management. The strategies and tactics adopted by project participants were also diverse reflecting the capacities and missions of individuals and organizations along a spectrum from groups most comfortable in conventional research and scholarship through others with experience in action-research to yet others most familiar with communication or advocacy. This provided a broad range of experiences from which different actors could learn about ways to influence and become a part of water governance processes in the Mekong Region (see Section 7.6). In this section we reflect on evidence about how the project influenced stakeholders and helped bring about change.

In assessing impact pathways it is conventional to focus on specific actors, especially those whose behavior was targeted, but also including others which turned out to be important for bringing about change. As governance is multi-scale it is important to consider the possibilities that pathways vary with scale of issues dealt with and levels of governance engaged.

8.1 Regional

At the regional level there were a few major impact pathways which could be identified (Table 8). These focused on multi-lateral organizations, in particular, the main international development banks and the Mekong River Commission. Many M-POWER activities involved engagements with these actors. A few are highlighted in Table 8. These actors were seen as crucial because of the influence their policies and practices have on other much harder to directly influence developers in the region. Improving sustainability assessment protocols for hydropower projects with HSAF and then pushing that such standards be followed as an essential requirement could influence practices of an entire set of hydropower developers. M-POWER continues to follow-up these avenues of influence through other funded projects (e.g. Foran 2010).

8.2 National and local

At national and more local levels there many impact pathways associated with many different types of engagement and project activities. Here we select just a few examples to illustrate the types of impact pathways which are possible (Table 8).

First partner organizations within the M-POWER network themselves can be thought of as stakeholders whose practices were changed as a result of this project. In the proposal, action research groups "*striving to understand and improve water governance at multiple levels in the Mekong Region*" (M-POWER 2005) were identified as one of the primary target groups. As the project developed the number of partner organizations and individuals involved in M-POWER actions expanded. Project PN50 had substantial impacts on this target group as this was where some of the more intense and iterative interaction occurred. Social learning within the expanding network about ways to promote and support public participation and more deliberative forms of politics, would rank among the most important long-term outcomes of the project as it has created a cohort of public intellectuals and engaged scholars with expertise and interest on water governance in the Mekong Region.

Second are the relationships developed by particular individuals and partner organizations with other stakeholders, often in the bureaucracy (national line agencies or local governments), but in some cases in the private sector and other non-state actors.

A few examples of pathways to impact are provided in **Error! Reference source not found.** A common feature was explicit strategies to develop and sustain relationships likely to be of mutual benefit or in pursuit of shared goals. These included facilitated study tours, reciprocal exchange visits and joint assessments and analyses. Doing things together over more extended periods of time supports social learning as much as more formal and discrete multi-stakeholder events.

From the outset the PN50 project declared that *“the target of our research is the systems of governance themselves rather than particular subset of actors”* (M-POWER 2005). Evidence for such changes is less direct than behavior of individual actors but might be recognized as shifts in norms. One area which M-POWER has emphasized strongly in many of its activities has been the importance of including the rural poor, ethnic minorities and other disadvantaged groups and those which represent them in formal water governance processes. Another area has been encouraging and demanding more independent scrutiny of proposals and plans. In these two areas at least the international regional level there has been something of a norm shift underway in which it is now becoming more standard practice to engage the public, in particular, potentially affected people, earlier and more openly when considering new water infrastructure projects and management approaches.

Outcomes and impacts CPWF Project Report

Table 8 Summary of the Project's Main Impact Pathways

Actor or actors who have changed at least partly due to project activities	What is their change in practice? i.e., what are they now doing differently?	What are the changes in knowledge, attitude and skills that helped bring this change about?	What were the project strategies that contributed to the change? What research outputs were involved?	Please quantify the change(s) as far as possible
International region level				
World Bank, Asian Development Bank	Improved public consultation procedures More cautious approach to promoting large-scale coordinated investment in water infrastructure	Better understanding of risks posed by dam cascades to fisheries and affected peoples Improved capacity to convene and facilitate public events	Convened the regional dialogue: " <i>Mekong Region Waters Dialogue: exploring water futures together</i> " (July 2006) Follow-up reports and events	Not applicable (n/a)
Mekong River Commission	Improved format of stakeholders consultation in basin development planning process	Knowledge contribution by case studies findings and expert technical inputs on direct request and in response to calls for general public inputs	Facilitate, attend and contribute technical inputs to numerous MRC events	n/a
Hydropower Sustainability Assessment Forum (HSAF)	Acceptance of need for standardized sustainability assessment protocol to screen hydropower projects	Provide comments and feedbacks on Hydropower Sustainability Assessment Protocol (HSAP) Compare HSAP with other frameworks Better understanding of HSAP tool through rapid assessments using draft protocol	Convene national and regional forum to discuss ways of improving hydropower governance in the Mekong Region Case studies of hydropower development input into forums	n/a

Actor or actors who have changed at least partly due to project activities	What is their change in practice? i.e., what are they now doing differently?	What are the changes in knowledge, attitude and skills that helped bring this change about?	What were the project strategies that contributed to the change? What research outputs were involved?	Please quantify the change(s) as far as possible
National level (example)				
Energy Regulatory Commission (ERC) and Electricity Generating Authority of Thailand (EGAT)	Improved capacity around integrated energy resource planning and regulation	Increased awareness of alternative planning and regulatory practices; helping ERC pursue its energy efficiency mandate and demonstrating to other actors (EGAT) that such agencies have independent regulatory in other countries	Sharing of case study analyses Facilitating study tour for officials to US to meet other planners and policy-makers Supporting reciprocal return visit of senior planners	n/a
Irrigation developers in Cambodia	Increased practice of multi-stakeholders involvement in irrigation planning, development and management	Increased awareness of the costs and benefits of different size and types of irrigation schemes and the impacts of water-related infrastructure on Tonle Sap fisheries	Convening series of meetings of water users in Cambodia Ten-day bicycle ride around Tonle Sap Lake with regular briefings covered by media	n/a
Local level (examples)				
State-based M-POWER Partner organizations	Increased openness to partnerships with non-state actors	Improved awareness of the roles and limitations of conventional forms of research and advocacy	Facilitating exchange visits supported by researchers	n/a
Non-state M-POWER partner organizations	Increased openness to collaboration with state	Improved awareness of the roles and limitations of	Analytical and writing support as well as space	n/a

Outcomes and impacts **CPWF Project Report**

Actor or actors who have changed at least partly due to project activities	What is their change in practice? i.e., what are they now doing differently?	What are the changes in knowledge, attitude and skills that helped bring this change about?	What were the project strategies that contributed to the change? What research outputs were involved?	Please quantify the change(s) as far as possible
	agencies and use of formal research	conventional forms of research and advocacy	in meeting for representatives	
Collaborating state agencies	Increased openness to partnerships with non-state actors and use of formal research	Improved awareness of possible contributions and limitations of governance research to practices	Joint assessment and writing as well as participation in each others meetings.	n/a

Of the changes listed above, which have the greatest potential to be adopted and have impact? What might the potential be on the ultimate beneficiaries?

- Observation of changes implies practice already adopted by some actors. The key question is therefore whether change has been secured, will expand to others, and lead to benefits for the target group of poor and disadvantaged people.
- For example when it comes to investments the multilateral banks are often under substantial public scrutiny and need to show they are doing things “better” or the “right way”. The same kind of pressure that public forums and media exert on these actors is much harder to extend to the more diverse and less accountable set of private commercial banks providing loans for water infrastructure development. Here an alternative tactic may be to gain commitments to international standards of good practice like the Equator Principles or HSAF guidelines.
- At the national level the focus on energy and electricity planning as a way to influence water resources development may seem at first indirect, but it must be remembered that rising energy consumption (demand) is an important rationale and driver for hydropower resource development. When complimented by internationally agreed standards and assessment protocols the prospects of unnecessary and bad projects being pursued can be reduced. That in itself is an important step towards more sustainable water resources management.
- At the local level the diversity of engagements by M-POWER partners precludes prioritization, but a few general points can be reiterated. First, constructive and stable partnerships between local and central government agencies and non-state actors can be forged which bring together complimentary skills in strengthening water governance. Second, meaningful exchange among local places and agencies that expands and deepens change can be facilitated by informal collaborative networks like M-POWER: that is the special added-value of network-oriented projects like PN50.

What still needs to be done to achieve this potential? Are measures in place (e.g., a new project, on-going commitments) to achieve this potential? Please describe what will happen when the project ends.

- Improving the practices of investors in water-related infrastructure is a core objective of follow-up projects to PN50 being carried out by M-POWER including work funded by the Blue Moon Fund and CPWF Phase 2. M-POWER, in short, is pursuing these alternatives pathways to impact for these other actors in the financial sector related to the water and energy sectors.
- At the national level, in most instances, there is still a significant challenge of moving from better awareness and improved capacity issues to higher quality governance practices. Reforming systems of governance is a long-term challenge and will likely need continuing surveillance, demonstration and pressure. M-POWER as a network has committed itself to pursuing a significant second phase after the completion of the PN50 project.
- At the local level much depends on the interests, commitments and relationships of individual partner organizations. For many the collaborations facilitated by M-POWER and PN50 were a way to exchange experiences with others in countries or places in the same country dealing with similar issues. Those links have been made and many found useful and are likely to be an on-going source of peer support.

*Each row of the table above is an impact pathway describing how the project contributed to outcomes in a particular actor or actors.
Which of these impact pathways were unexpected (compared to expectations at the beginning of the project?) Why were they unexpected? How was the project able to take advantage of them?*

- The PN50 project is built around the complimentary skills and capacities of the M-POWER network. The likelihood of social learning among project participants related to strategies and practices of engagement was anticipated and supported through network activities like annual meetings, ad hoc issue-based working groups respond to opportunities and crises, and active management of communications in the network. The specific impact pathways were often not anticipated at the beginning of the project, as it was recognized early on that contingent events and individual leaders bring a lot of uncertainty to political processes. However as the project unfolded much more specific and strategic planning for particular target actors or political processes could draw on the networks' experience and greatly increase the chances of constructive influence.
- Nevertheless, there were some unexpected opportunities and surprises. Changes in the individual leadership of the MRC, for example, made a substantial difference to the level of and more formal and constructive engagement the M-POWER network could make with MRC activities (in contrast to more confrontational and challenging tactics that were deemed more suitable way to have influence in earlier phases).
- In many of the national and more local studies relationships with bureaucrats and planners involved in flood, hydropower, watershed, energy or irrigation management often turned out to be easier than the initial perceptions of action-research groups and bureaucrats. Joint analysis, assessment and site visit activities proved mutually beneficial and helped build trust. Many of these relationships have potential to persist well beyond the PN50 project and ultimately may be among the most important outcomes of the project for improving governance practices on the ground.

What would you do differently next time to better achieve outcomes (i.e. changes in stakeholder knowledge, attitudes, skills and practice)?

- Improved links between "regional" level efforts and more local forms of engagement. While M-POWER did significant work at several scales it was not always simple to link these coherently as a result some opportunities for synergies were missed.
- Make more systematic and better use of mass media. One partner organization IPS excelled, and a few others did okay, but most did not link up or make as good use of public media channels as they might have. Better use of mass media would have increased the impact of policy analyses, strengthened support for multi-stakeholder initiatives, and led to greater political impact of research findings.

9 International Public Goods

9.1 Tools and Methodology

Scholarship in the PN50 project was predominantly in social science disciplines with an emphasis on qualitative methods of inquiry but also some exploration of mixed methods (e.g. Bryman, 2006; Mason 2006) and more quantitative analysis and modeling in a few case studies (e.g. Foran 2008; Lebel P, et al. 2010). Efforts to make synthesis of pre-existing work more systematic as is typical and health research (Dixon-Woods et al. 2006) were also explored for water governance topics.

The PN50 project involved a lot of comparative analysis at different scales from international regimes, through national policies and strategies to the implementation of specific local projects. This experience in developing shared conceptual and analytical frameworks, data collection protocols for qualitative data, and so on has been of tremendous benefit to M-POWER partners. In addition some of these experiences have been shared with and influenced the design of comparative studies of water governance elsewhere in the world, for example, the EU Twin2Go project (See www.twin2go.uos.de).

Another feature of the research work carried out by M-POWER has been careful analysis of discourses – spoken and in texts. Although no truly novel methods were invented many of the applications extend previous areas of inquiries. Several key papers in the M-POWER edited books make use of discourse analysis and related techniques to help explain policy-making patterns in the Mekong region (e.g. Lebel et al. 2007; Molle et al. 2009).

9.2 Project Insights

Apart from methodological issues the PN50 project also made clearer several issues in water management that we increasingly find are important in many other basins around the world not just in the Mekong Region. Here we highlight five.

First is the relative neglect of divergent interests and social justice issues in many flood and disaster management initiatives. Climate change and other factors influencing flood regimes are likely to exacerbate these issues especially if adaptation interventions do not take into account social vulnerabilities.

Second is the emphasis on project benefits and frequent neglect of costs and adverse impacts of flood, irrigation and hydropower infrastructure projects. Not only are the promises of protection exaggerated, the benefits of extra dry season water inflated, and the sharing of energy and income misjudged, but the adverse impacts on ecosystems and people who are not among the “beneficiaries” or the “stakeholders” ignored.

Third, and related to above, is the failure to consider in key policy the ecosystem services most important to livelihoods of disadvantaged groups, typically lowland fishers and upland farmers. This occurs despite substantial evidence to the contrary with priorities being set to serve other interests, like energy, again and again.

Fourth is the erroneous assumption that science and politics can be neatly separated. In the real world knowledge claims are contestable and contested; decisions are value-

laden and frequently interest-driven. The politics of knowledge is invariably an important dimension of water governance.

Fifth the pursuit of more inclusive and deliberative forms of water governance faces many obstacles in practice, but in semi-democratic states the challenges are often multiplied.

10 Partnership Achievements

Participation in CPWF has helped the M-POWER program develop new partnerships in four main ways.

First the PN50 project provided substantial and fundamental support for networking activities. These included important Annual Meetings, many smaller working group events, and website development and e-mail list serves. During the course of the project the number of individuals and organizations actively contributing to M-POWER's activities expanded substantially.

Second the PN50 project helped project participants develop relationships with and influence other stakeholders (Table 8). Some of the relationships began as relatively antagonistic as our analyses and commentaries challenged status quo practices. In many cases the relationships became more collaborative over time especially where common goals were recognized or negotiated.

Third association with the wider CPWF project created some opportunities for collaboration with other CPWF projects and partners. Most notable among these were two follow-up projects involving some of the same partners as involved in PN50 but also new organizations and individuals – in particular PN67 on water allocation and Phase 2 project on meeting Basin Development Challenges through multiple use reservoirs. Association with CPWF and the CGIAR system also lent credibility in both directions improving M-POWER's standing in some international forum and with some donors, and vice versa, strengthening CPWF's position as a relevant collection of actors in the Mekong basin.

Finally the CPWF project helped connect project participants with the wider international research community. This includes for example the major meeting in Ethiopia as well as joint attendance in other international conferences. For some researchers many of the key follow-up activities to PN50 are in comparative work on water governance with other groups working in other regions. The CPWF project was helpful in making some of these links.

11 Recommendations

11.1 Research

Although the objectives and broad outlines of what types of approaches are needed are well known how to effectively engage multiple stakeholders, link deliberations at different levels, and design effective and fair water management institutions remain major research puzzles. In every sector there are more detailed and specific areas of inquiry that researchers in M-POWER have identified needing follow-up (See discussion on research needs in Sections 1-6). Engaged and critical research, in short, is still needed in many areas of water governance in the Mekong Region (see Section 7.5.2). Here we highlight just four critical areas that have both practical or policy relevance and which are important to several sectors.

First is the problem of effectiveness and legitimacy of multi-stakeholder dialogues and related processes. More experimentation with process, formats and venues is needed as is learning by doing and from critical reflection on past experiences. More research is also needed on sources of legitimacy, discursive power and problems of scale in deliberative politics. Theoretical and conceptual guidance is needed for better practice. More work is also needed on social learning processes and how deliberative forms of engagement support and constrain adaptive governance. Global climate change agendas are likely to be increasingly important in decision-making in many areas of water resources development and management in the Mekong region. Can better deliberative politics lead to more climate adaptive policy-making?

Second is the problem of how to make water decision-making procedures and outcomes fairer. Many of the promising advances in practices still fail to reach and cater sufficiently for the needs or empower those most likely to be adversely affected by water resources development projects and policy changes. Avoiding instrumentalists traps in participatory processes and building capacity for self-representation and determination are outstanding challenges. In designing and implementing hydropower projects, for instance, better ways of achieving more equitable risk and benefit sharing need to be found.

Third is the problem of how to best make use of scientific and other forms of technical knowledge. The technical side of water management problems does not disappear by declaring that interests, discourses and politics matter. Improved understanding is still often very important to making better decisions and negotiating fairer solutions. Research and politics will never be sharply separated and the political elements in knowledge claims never completely implemented so finding ways to manage the tense boundary between research and policy or practice is crucial. More research is needed on past efforts to manage that boundary, for example, through assessments and dialogues, and other social processes. Further experimentation is also needed with new approaches, like joint assessment and fact-finding. We need also need a better understanding of planning processes, for example, how international and transnational initiatives influence national electricity planning and the consequences this has for hydropower development. Research on knowledge systems should also help foster interactions that will lead to more of the knowledge relevant to sustainable development actions being effectively used.

Fourth and in some ways most fundamentally is the bigger problem of democratization itself. How should it be conceptualized? Nobody in the Mekong Region believes there is a single institution, practice or model that will immediately and once and for all improve governance overall and thus of water. Many actors feel threatened even by discussions of the term. The M-POWER network has often promoted deliberative approaches through consultations, dialogues and inputs from a knowledge network. But what exactly can deliberative politics hope to contribute in a region still struggling with notions of representative democracy? More critical research is needed on the interactions between

representative and deliberative processes, how ideas of democracy and government are evolving, and the prospects for a fairer society in a region in which access to and allocation of water and associated risks is crucial to advancing and achieving social justice.

11.2 Policy

General and specific suggestions to improve policy and policy-making processes are scattered through this summary report on project PN50 and in many of the more detailed case study activities. In Section 7.5.1 several key areas were identified in which engaged researchers could contribute to improving water governance at the policy level. These are summarized here and turned into policy suggestions.

First is strengthening local representation. Here there clearly has been some progress with at least acknowledgement of the value of local inputs into planning and implementation increasingly recognized by central government agencies. Effective representation of the interests and understanding of marginalized groups usually needs pro-active engagement and resources. Meaningful representation will reduce social injustices in water management. At the same public participation programs are not a panacea. Governments and other actors in the Mekong Region often take an instrumental approach to participation and as a consequence being included can be a cost not a benefit. Participation can also legitimize otherwise flawed processes and decisions.

Second is improving the quality of deliberative processes. Here the growing body of event convening and facilitation experience and skills within the wider M-POWER network of collaboration is an important resource to draw on. In the past there has been an emphasis on project benefits and a neglect of costs and adverse impacts in many flood, irrigation and hydropower infrastructure projects. Better use of research-based knowledge should extend to making sure there are genuine opportunities to review and challenge claims and interpretations. In the Mekong region in particular it is crucial that key ecosystem services important to fishers and upland farmers and forest users are fully included when considering alternative development options. Deliberative politics does not assume a neat separation of science and politics, but that informed dialogue can lead to social learning and support fairer negotiations and agreements.

Third is enhancing the constructive interplay between institutions both horizontally and vertically. There are important roles for engaged scholarship to help link non-state and state actors at various levels. Within states there has been much progress but there is still huge gaps in translating cooperative structures among countries sharing a river basin and bureaucratic structures with water-related responsibilities within countries. There are also substantial problems with implement decentralization reforms so that bottom-up perspectives on suitable projects, plans and policies can actually influence national level policies. Water governance in the Mekong region still needs to become more multi-level.

Fourth is building capacities to handle uncertainties and adapt to changes in flow regimes. Changes in water- and land-use are already impacting on seasonality of flows in many basins and prospects are that climate change will further compound these changes. This is particular important for improving flood management and dealing with seasonal scarcity in irrigation schemes. Institutions and strategies for dealing with uncertainty are under-developed in the Mekong Region even under current conditions.

These policy suggestions are broad. In practice much more specific recommendations can be derived for different types of actors working in different political and water resource contexts at different scales.

12 PUBLICATIONS

Lists of project publications and other tangible outputs are presented in the following sections. At the time of completion of this report, project PN50 had contributed to publication of 29 journal articles, 35 book chapters, 13 public reports and 2 books. In addition 64 other working papers had been drafted most of which were being prepared for publication as articles or chapters, including M-POWER books 3 and 4 destined to go to publishers in end 2010.

12.1 Journal articles

- Foran, T., P. T. du Pont, P. Parinya, and N. Phumaraphand. 2010. Securing energy efficiency as a high priority: scenarios for common appliance electricity consumption in Thailand. *Energy Efficiency* DOI10.1007/s12053-009-9073-7.
- Friend, R. M. 2009. Fishing for Influence; fisheries science and evidence in water resource development in the Mekong Basin. *Water Alternatives*, 2(2): 167-182
- Friend, R. M., and Blake, D. J. H. 2009. Negotiating trade-offs in dam development in the Mekong – implications for fisheries and fishery-based livelihoods. *Water Policy*, 11 (1): 13-30.
- Jianchu, X., Y. Yang, J. Fox, and X. Yang. 2007. Forest transition, its causes and environmental consequences: An empirical evidence from Yunnan of Southwest China. *Tropical Ecology* 48(2): 1-14.
- Lebel, L. 2006. Multi-level scenarios for exploring alternative futures for upper tributary watersheds in mainland Southeast Asia. *Mountain Research and Development* 26:263-273.
- Lebel, L. 2007. Adapting to climate change. *Global Asia* 2(3): 15-21.
- Lebel, L., Daniel, R. 2009. The governance of ecosystem services from tropical upland watersheds. *Current Opinion in Environmental Sustainability* 1:61-68.
- Lebel, L., Daniel, R, Badenoch N, Garden P, Imamura M. 2008. A multi-level perspective on conserving with communities: experiences from upper tributary watersheds in montane mainland southeast Asia. *International Journal of the Commons*, 2 (1):127-154.
- Lebel, L., E. Nikitina, and J. Manuta. 2006. Flood disaster risk management in Asia: an institutional and political perspective. *Science and Culture* 72:2-9.
- Lebel, L., J. M. Anderies, B. Campbell, C. Folke, S. Hatfield-Dodds, T. P. Hughes and J. Wilson 2006. Governance and the Capacity to Manage Resilience in Regional Social-Ecological Systems. *Ecology and Society* 11 (1): 19. [online] URL: <http://www.ecologyandsociety.org/vol11/iss1/art19/>
- Lebel, L., P Garden, and M. Imamura. 2005. "The Politics of Scale, Position, and Place in the Governance of Water Resources in the Mekong Region. *Ecology and Society* 10(2): 18.
- Lebel, L., Manuta, B.J., and P. Garden. 2010. Institutional traps and vulnerability to changes in climate and flood regimes in Thailand. *Regional Environmental Change*, DOI: 10.1007/s10113-010-0118-4
- Lebel, L., Sinh, B.T. 2009. Risk reduction or redistribution? Flood management in the Mekong region. *Asian Journal of Environment and Disaster Management* 1:23-39.
- Lebel, P., P. Chaibu, B. Jaichaichom, and L. Lebel. 2008. Gender and the culture of Tilapia in the Upper Ping River in Chiang Mai and Lamphun Provinces [in Thai]. *Journal of Fisheries Technology* 2:168-178.

- Lebel, P., S. Leudpasuk, L. Lebel, and P. Chaibu. 2007. Fish cage culture in upper part of Ping river. [in Thai]. *Journal of Fisheries Technology* 1:160-170.
- Lebel, L., Manuta, B.J., and P. Garden. 2010. Institutional traps and vulnerability to changes in climate and flood regimes in Thailand. *Regional Environmental Change*, in press
- Lebel P, Chaibu, P, and Lebel, L. 2009. Women farm fish: gender and commercial fish cage culture in the Upper Ping River, northern Thailand. *Gender, Technology & Development*, 13(2): 199-224.
- Ma X., J. C. Xu, Y. Luo, S.P. Aggarwal, J.T. Li, 2009. Response of hydrological processes to land-cover and climate changes in Kejie watershed, SW China. *Hydrological Processes*, 23 (8): 1179-1191.
- Ma X., J.C. Xu, J. Qian. 2008. Water resource management in a middle mountain watershed. *Mountain Research and Development*, 28(3/4):286-291.
- Manuta, J., S. Khрутmuang, D. Huaisai, and L. Lebel. 2006. Institutionalized incapacities and practice in flood disaster management in Thailand. *Science and Culture* 72:10-22.
- Molle, F. and Chu Thai Hoanh. 2009. Implementing Integrated River Basin Management: Lessons from the Red River Basin, Vietnam. IWMI Research Report No 131. Colombo, Sri Lanka: IWMI.
- Molle, F. and P. Floch. 2008. Megaprojects and Social and Environmental Changes: The Case of the Thai "Water Grid". *Ambio* 37(3): 199-204.
- Sajor, E. and R. Ongsakul. 2007. Mixed Land Use and Equity in Water Governance in Peri-urban Bangkok. *International Journal of Urban Regional Research* 31 (4):782-801.
- Sajor, E. and Thu, M. 2009 "Institutional and Development Issues in Integrated Water Resource Management of Saigon River" *Journal of Environment & Development*, 18 (3): 268-290.
- Sangkhamanee, J. 2009. When An Anthropologist Meets Hydrologists: A Reflection on Epistemology and Sociology of Knowledge on Mekong Waters. *Journal Of Liberal Arts (Special Issue - Mekong Studies: River, People, Border, Culture, Trade, and Politics)*: 431-462.

12.1.1 Under Revision

- Bastakoti, R. C., Shivakoti G. P., and Lebel L. 2010. Local irrigation management institutions mediate changes driven by external policy and market pressures in Nepal and Thailand. *Environmental Management*, in revision
- Dore, J and Lebel L. 2010. Deliberation, scales and levels in Mekong Region water governance. *Environmental Management*, in revision
- Lebel L, Xu, J, Bastakoti, RC, and Lamba, A. 2010. Pursuits of adaptiveness in the shared rivers of Monsoon Asia. *International Environmental Agreements*, in revision
- Sophat, S., D. Schmidt-Vogt, and G. B. Thapa. 2010. Monitoring biodiversity and biological resources in Tonle Sap Biosphere Reserve, Cambodia: A comparison of external and local systems. *Biodiversity and Conservation*, in revision

12.2 Book chapters

- Biggs, D.; Miller, F.; Hoanh, C.T. and Molle, F. 2009. Built Waterscapes: Environmental History and Development Politics in the Mekong Delta. In Molle, F.; Foran, T. and

- Käkönen, M. (eds), *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, pp. 203-226. London: Earthscan.
- Blake, D.J.H.; Friend, R. and Promphakping, B. 2009. The Nam Songkhram River Basin landscape transformations and new approaches to wetlands management. In Molle, F.; Foran, T. and Käkönen, M. (eds), *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, pp. 173-202. London: Earthscan.
- Contreras, A. 2007. Synthesis: discourse, power and knowledge. Pages 227-236 *in* L. Lebel, J. Dore, R. Daniel, and Y. S. Koma, editors. *Democratizing water governance in the Mekong region*. Mekong Press, Chiang Mai.
- Dore, J. 2007. Multi-stakeholder platforms (MSPs): unfulfilled potential. Pages 197-226 *in* L. Lebel, J. Dore, R. Daniel, and Y. Koma, editors. *Democratizing water governance in the Mekong region*. Mekong Press, Chiang Mai.
- Dore, J., Yu, X., and Li, K. Y. 2007. China's energy reforms and hydropower expansion in Yunnan. Pages 55-92 *in* L. Lebel, J. Dore, R. Daniel, and Y. S. Koma, editors. *Democratizing water governance in the Mekong region*. Mekong Press, Chiang Mai.
- Dore, J. 2007. Mekong Region water-related MSPs: Unfulfilled potential'. Pages 205-234 *in* J. Warner, editor. *Multi-Stakeholder Platforms for Integrated Water Management*. Ashgate, Aldershot.
- Dore, J. and Lazarus, K. 2009. Demarginalising the Mekong River Commission. In Molle, F.; Foran, T. and Käkönen, M. (eds), *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, pp. 357-382. London: Earthscan.
- Foran, T. and Manorom, K. 2009. Pak Mun Dam: Perpetually Contested? In Molle, F.; Foran, T. and Käkönen, M. (eds), *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, pp. 55-80. London: Earthscan.
- Friend, R.; Arthur, R. and Keskinen, M. 2009. Songs of the Doomed: The continuing neglect of capture fisheries in hydropower development in the Mekong. In Molle, F.; Foran, T. and Käkönen, M. (eds), *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, pp. 307-332. London: Earthscan.
- Garden, P., and S. L. Nance. 2007. Forums and flows: emerging media trends. Pages 157-176 *in* L. Lebel, J. Dore, R. Daniel, and Y. S. Koma, editors. *Democratizing water governance in the Mekong region*. Mekong Press, Chiang Mai.
- Greacen, C., and A. Palettu. 2007. Electricity sector planning and hydropower. Pages 93-126 *in* L. Lebel, J. Dore, R. Daniel, and Y. S. Koma, editors. *Democratizing water governance in the Mekong region*. Mekong Press, Chiang Mai.
- Hoanh, C.T.; Facon, T.; Thuon, T.; Bastakoti, R.C.; Molle, F. and Phengphaengsy, F. 2009. Irrigation in the Lower Mekong Basin countries: the beginning of a new era? In Molle, F.; Foran, T. and Käkönen, M. (eds), *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, pp. 143-172. London: Earthscan.
- Imamura, M. 2007. Introduction: water governance in the Mekong region. Pages 1-8 *in* L. Lebel, J. Dore, R. Daniel, and Y. Koma, editors. *Democratizing water governance in the Mekong region*. Mekong Press, Chiang Mai.
- Käkönen, M. and Hirsch, P. 2009. The antipolitics of Mekong knowledge production. In Molle, F.; Foran, T. and Käkönen, M. (eds), *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, pp. 333-365. London: Earthscan.

- Lawrence, S. 2009. The Nam Theun 2 Controversy and its lessons for Laos. In Molle, F.; Foran, T. and Kähkönen, M. (eds), *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, pp. 81-114. London: Earthscan.
- Lebel L, Garden P. 2008. Deliberation, negotiation and scale in the governance of water resources in the Mekong region. Pages 205-225 in C. Pahl-Wostl, P. Kabat and J. Möltgen, editors. *Adaptive and Integrated Water Management, Coping with Complexity and Uncertainty*, Springer Berlin Heidelberg.
- Lebel, L. 2008. Climate change, water insecurities and food systems in Monsoon Asia. Pages 88-99 in C. Loh, A. Stevenson, and S. Tay, editors. *Climate change negotiations: can Asia change the game?* Civic Exchange, Hong Kong.
- Lebel, L., E. Nikitina, V. Kotov, and J. Manuta. 2006. Assessing institutionalized capacities and practices to reduce the risks of flood disaster. Pages 359-379 in Birkmann J (Ed). *Measuring Vulnerability to Natural Hazards - Towards Disaster Resilient Societies*. UNU Press: Tokyo.
- Lebel, L., Garden, P., Subsin, N., Nan, S.N., 2009. Averted crises, contested transitions: water management in the Upper Ping River basin, northern Thailand In: Huitema, D., Meijerink, S. (Eds.), *Water policy entrepreneurs. A research companion to water transitions around the globe*. Edward Elgar, Cheltenham, UK, pp. 137-157.
- Lebel, L., R. Daniel, and X. Jianchu. 2006. Crises in the commons. Pages 1-9 in L. Lebel, X. Jianchu, and A. P. Contreras, editors. *Institutional dynamics and crisis: how crises alter the way common pool resources are perceived, used and governed*. Regional Center for Social Science and Sustainable Development, Chiang Mai University, Chiang Mai.
- Lebel, L., R. T. Perez, T. Sukhapunphan, B. V. Hien, N. Vinh, and P. Garden. 2009. Reducing vulnerability of urban communities to flooding. Pages 381-399 in L. Lebel, A. Snidvongs, C.-T. A. Chen, and R. Daniel, editors. *Critical states: Environmental challenges to development in Monsoon Asia*. Strategic Information and Research Development Centre, Selangor, Malaysia.
- Lebel, L., Sinh, B. T. 2007. Politics of floods and disasters. Pages 37-54 in L. Lebel, J. Dore, R. Daniel, & Y. S. Koma (Eds.), *Democratizing water governance in the Mekong region*. Chiang Mai: Mekong Press.
- Lebel, L., T. Foran, P. Garden, and J.B. Manuta. 2009. Adaptation to climate change and social justice: challenges for flood and disaster management in Thailand. Pages 125-141 in F. Ludwig, P. Kabat, H. van Schaik, and M. van der Valk, editors. *Climate change adaptation in the water sector*. Earthscan, London.
- Lebel, L.; Sinh, B.T.; Garden, P.; Seng, S.; Tuan, L.A. and Truc, D.V. 2009. The promise of flood protection: Dykes and dams, drains and diversions. In Molle, F.; Foran, T. and Kähkönen, M. (eds), *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, pp. 283-306. London: Earthscan.
- Magee, D. and Kelley, S. 2009. Damming the Nu-Salween River. In Molle, F.; Foran, T. and Kähkönen, M. (eds), *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, pp. 115-142. London: Earthscan.
- Middleton, C.; Garcia, J. and Foran, T. 2009. Old and New Hydropower Players in the Mekong Region: Agendas and Strategies. In Molle, F.; Foran, T. and Kähkönen, M. (eds), *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, pp. 23-54. London: Earthscan.
- Molle, F. 2007. Irrigation and water policies: trends and challenges. Pages 9-36 in L. Lebel, J. Dore, R. Daniel, and Y. S. Koma, editors. *Democratizing water governance in the Mekong region*. Mekong Press, Chiang Mai.

- Molle, F.; Floch, P.; Promphaking, B. and Blake, D.J.H. 2009. "Greening Isaan": Politics, Ideology, and Irrigation Development in Northeast Thailand. In Molle, F.; Foran, T. and Kähkönen, M. (eds), *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, pp. 253-282. London: Earthscan.
- Molle, F.; Foran, T. and Floch, P. 2009. Changing Waterscapes in the Mekong Region. Historical background and context. In Molle, F.; Foran, T. and Kähkönen, M. (eds), *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, pp. 1-13. London: Earthscan.
- Molle, F.; Lebel, L. and Foran, T. 2009. Contested Mekong Waterscapes: Where to next? In Molle, F.; Foran, T. and Kähkönen, M. (eds), *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, pp. 383-413. London: Earthscan.
- Resurreccion, B., and K. Manorom. 2007. Gender myths in water governance: a survey of program discourses. Pages 177-196 *in* L. Lebel, J. Dore, R. Daniel, and Y. S. Koma, editors. *Democratizing water governance in the Mekong region*. Mekong Press, Chiang Mai.
- Resurreccion B P. 2008. Gender, Legitimacy and Patronage-Driven Participation: Fisheries Management in the Tonle Sap Great Lake, Cambodia. In Resurreccion, B. and E. Rebecca (eds) *Gender and Natural Resource Management: Livelihoods, Mobility and Interventions*. London and Ottawa: Earthscan and IDRC. Pp 151-173.
- Sarkkula, J., M. Keskinen, J. Koponen, M. Kummumäki, J. Nikula, O. Varis, and M. Virtanen. 2007. Mathematical modeling in integrated management of water resources: magical tool, mathematical toy or something in between? Pages 127-156 *in* L. Lebel, J. Dore, R. Daniel, and Y. S. Koma, editors. *Democratizing water governance in the Mekong region*. Mekong Press, Chiang Mai.
- Sarkkula, J.; Keskinen, M.; Koponen, J.; Kummumäki, M.; Richey, J. and Varis, O. 2009. Hydropower in the Mekong region: What are the impacts on fisheries? In Molle, F.; Foran, T. and Kähkönen, M. (eds), *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*, pp. 227-251. London: Earthscan.
- Sinh, B. T., L. Lebel, and N. T. Tung. 2009. Indigenous knowledge and decision-making in Vietnam: the case of living with floods in An Giang Province, Mekong Delta. Pages Chapter 30 *in* R. Shaw, A. Sharma, and Y. Takeuchi, editors. *Indigenous knowledge and disaster risk reduction: from practice to policy*. NOVA Science Publishers.

12.2.1 In press

- Lebel, L., Garden, P., Lebel, P. 2010. Managing floods and scarcity in a monsoon climate. In Kasperson, R. (eds) *Bridges and Spider Webs: Closing the decision making gap in global environmental change*.
- Lebel, L., Imamura M. 2010. Water governance at multiple levels and scales in the Mekong Region. In Gupta, Joyeeta and Dave Huitema eds. *Scale in Environmental Governance: A Theoretical and Empirical exploration of the concept of scale and its relevance for environmental governance*. MIT Press: Cambridge, Massachusetts.
- Lebel, L., Sinh B.T., and E. Nikitina 2010. Adaptive governance of risks: climate, water and disasters. In Shaw, R (eds). *Climate Change Adaptation and Disaster Risk Reduction*.

12.3 Books

- Molle, F., Foran, T., Kakonen, M. (eds.) 2009. *Contested waterscapes in the Mekong region. Hydropower, Livelihoods and Governance*. Earthscan. 416pp. See: <http://www.earthscan.co.uk/?TabId=49419&v=454883>
- Lebel, L., J. Dore, R. Daniel and Y.S. Koma, eds. 2007. *Democratizing water governance in the Mekong region*. Chiang Mai: Mekong Press. 283pp. See: http://www.mekongpress.com/each_titles/DWG.htm

12.3.1 Books in preparation

- Bastakoti, R. C., Floch, P., Manorom, K., Xing L., and Sinh, B. T. (eds). [Forthcoming] *Water governance in practice: Evidence from local studies in the Mekong Region*. Strategic Information and Research Development Centre, Selangor, Malaysia.
- Lazarus, K., Resurreccion, B., Dao, N., and Badenoch, N. (eds) [Forthcoming] *Rites of Access: Seeking Justice in Managing Mekong Region Waters*. Earthscan.

12.4 Public reports

- Daniel, R., editor. 2009. Shangri-La Workshop 2009. Sustainable land management in the highlands of Asia. 18-22 May 2009, Northwest Yunnan, China. Workshop synthesis - final report. ICRAF China Program, Kunming Institute of Botany, Kunming, PR China. http://www.sea-user.org/download_pubdoc.php?doc=4879
- Foran T. 2008. Analysis of Thailand's electricity planning process and demonstration of integrated electricity planning.[in Thai] USER Working Paper WP-2008-14, Unit for Social and Environmental Research, Chiang Mai University, Chiang Mai. http://www.sea-user.org/download_pubdoc.php?doc=4926
- Foran T, Lebel L. 2007. Informed and fair? Water and trade futures in the border regions of mainland southeast Asia. Report from an M-POWER Dialogue workshop. USER Working Paper WP-2007-14. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai. http://www.sea-user.org/download_pubdoc.php?doc=3730
- IUCN, TEI, IWMI and M-POWER, 2007. *Exploring water futures together: Mekong Region Waters Dialogue. Report from regional Dialogue, Vientiane, Lao PDR* World Conservation Union, Thailand Environment Institute, International Water Management Institute, Mekong Program on Water, Environment & Resilience. 75pp http://www.mpowernet.org/download_pubdoc.php?doc=3274
- IUCN, TEI, IWMI and M-POWER. 2007. *Exploring Water Futures Together: Mekong Region Waters Dialogue*, Resource papers from Regional Dialogue 6-7 July 2006, Vientiane, Lao PDR. 132pp. See http://www.mpowernet.org/download_pubdoc.php?doc=4059
- Lebel, L., E. Nikitina, and B. T. Sinh, editors. 2008. Climate change and the science and practice of managing floods in urbanizing regions of Monsoon Asia. MAIRS Working Paper Series No.4. Monsoon Asia Integrated Regional Study International Project Office and the Institute for Atmospheric Physics, Chinese Academy of Science, Beijing.
- Lebel, P., Lebel L, Chaibu P. 2007. Fish cage aquaculture in the Upper Ping River. USER Working Paper WP-2007-21. Unit for Social and Environmental Research: Chiang

- Mai University. [in Thai]
http://www.sea-user.org/download_pubdoc.php?doc=3967
- M-POWER. 2008. Guide 2008.
http://www.mpowernet.org/download_pubdoc.php?doc=4065
- M-POWER. 2008. Report of the M-POWER Annual Meeting 2008. 30 January - 1 February 2008, Hanoi, Vietnam.
http://www.mpowernet.org/download_pubdoc.php?doc=4239
- M-POWER. 2009. Report of the M-POWER Annual Meeting 2009. 19 - 21 February 2009, Kunming, China. http://www.mpowernet.org/download_pubdoc.php?doc=4735
- M-POWER, IVL, GU. 2008. Workshop Report: Critical Reflections on Water Governance Dialogue. 20-21 March 2008, Chiang Mai, Thailand.
http://www.mpowernet.org/download_pubdoc.php?doc=4149
- Xu, Jianchu, 2008. The highlands: a shared water tower in a changing climate and changing Asia. ICRAF Working paper No 64. ICRAF, CMES and M-POWER.

12.5 Working papers¹¹

- Bastakoti, G. B., S. Rattanawilailak, T. T. Trieu, R. C. Bastakoti, and L. Lebel. 2009. Gender, water insecurities and conflict in the Mekong region. M-POWER Working Paper MP-2009-05. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.
- Bastakoti, R. C., G. P. Shivakoti, and L. Lebel. 2008. Irrigation systems under market pressure and changing institutional settings: Comparative perspective from Nepal and Thailand. USER Working Paper WP-2008-11. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Bastakoti, R. C., Shivakoti G. P. 2009. Context and Institutions in Irrigation Management: Applicability of Design Principles in Nepal and Thailand. M-POWER Working Paper MP-2009-06. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.
- Bastakoti, R.C., Lebel L, Dore J, Contreras A, Jianchu X. Collective action in water management through regional networks: Critical reflections from M-POWER experiences. Short Paper presented in CPWF 2nd forum in Ethiopia, November 2008.
- Bijoor S, Greacen C, Greacen CC, 2007. Citizen-Oriented Power Sector Reform in Thailand. M-POWER Working Paper MP-2007-05. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Daniel, R. and Ratanawilailak, S. 2009. Contested watersheds: Actors and institutions in the local politics of watershed management in the uplands of northern Thailand. M-POWER Working Paper MP-2009-02. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.
- Deeburee, K. 2009. The responses to resource territorializations: an experience of fish-based property right processes in floodplain of Songkhram River Basin. M-POWER Working Paper MP-2009-10. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.

¹¹ Working papers are articles, book chapters, and books in preparation for publication. Listed and available with permission from: <http://www.mpowernet.org/mweb.php?pg=92> or for USER Working Papers at www.sea-user.org/uweb.php?pg=5.

- Dore, J. 2008. A theory and practice of deliberative water politics for the Mekong Region. Short Paper presented in CPWF 2nd forum in Ethiopia, November 2008.
- Dore, J., T. Foran, E. Sajor, and K. Lazarus. 2008. Improving Mekong Water Investment and Allocation Choices. Short Paper presented in CPWF 2nd forum in Ethiopia, November 2008.
- Floch P, Molle F, Loiskandl. 2007. Marshalling Water Resources: A Chronology of Irrigation Development in the Chi-Mun River Basin, Northeast Thailand. M-POWER Working Paper MP-2007-02. Unit of Social and Environmental Research: Chiang Mai University.
- Floch P. and Molle F. 2009. Water Traps: The Elusive Quest for Water Storage in the Chi-Mun Basin, Thailand. M-POWER Working Paper MP-2009-04. University of Natural Resources and Applied Life Sciences, Institut de Recherche pour le Développement, Unit for Social and Environmental Research (USER), Chiang Mai, Thailand.
- Floch, P. and F. Molle. 2009. Pump Irrigation Development and Rural Change in Northeast Thailand. MP-2009-01. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.
- Foran T, and Greacen C. 2007. Towards more sustainable energy futures for the Mekong Region: Policy options for development donors. USER Working Paper WP-2007-22. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Foran T. 2007. Advocacy pathways towards decision making in Thailand. USER Working Paper WP-2007- 20. Unit for Social and Environmental Research, Chiang Mai University, Chiang Mai
- Foran, T. 2006. Thailand's politics of power system planning and reform. M-POWER Working Paper MP-2006-05. Unit for Social and Environmental Research: Chiang Mai University.
- Foran, T. 2008. Fisheries and livelihoods in dispute around Pak Mun Dam, Thailand. Short Paper presented in CPWF 2nd forum in Ethiopia, November 2008.
- Foran, T. 2008b. Better financial regulation could make energy organizations more sustainable. USER Working Paper WP 2008-05 Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Foran, T. 2009. Good principles in search of better developers? The Equator Principles and Mekong infrastructure development. USER Working Paper WP-2009-15. Chiang Mai University, Unit for Social and Environmental Research (USER), Chiang Mai, Thailand.
- Foran, T. 2009. Making hydropower more sustainable? A sustainability measurement approach led by the Hydropower Sustainability Assessment Forum. Policy Brief. Draft July 2009. USER Working Paper WP-2009-14, Unit for Social and Environmental Research, Chiang Mai University, Chiang Mai.
- Friend, R. M., and Arthur, R. I. 'Over-playing over-fishing: a cautionary tale from the Mekong'. Development & Change, in review
- Garden P. 2007. The Chiang Mai floods of 2005. USER Working Paper WP-2007-19. Unit for Social and Environmental Research, Chiang Mai University, Chiang Mai
- Greacen C, and Bijoor S, 2007. Decentralized Energy in Thailand: An Emerging Light. M-POWER Working Paper MP-2007-04. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Imamura M, Lebel L. 2006. Geographical shadows and flows. M-POWER Working Paper MP-2006-06. Unit for Social and Environmental Research: Chiang Mai.

Outcomes and impacts **CPWF Project Report**

- Janchidfa, K. 2009. Political space rescaling: Case of Eastern Seaboard Development Program, Thailand. M-POWER Working Paper MP-2009-18. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.
- Jun, H., and X Jianchu. 2009. Mainstreaming payment for environmental service: an application of SWOT-AHP model for improving Asian water tower governance in Yunnan, Southwest China. M-POWER Working Paper MP-2009-09. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.
- Kim Thu, D. T. 2009. Water-Pricing Policies in The Red River Delta Over The Last Five Decades. M-POWER Working Paper MP-2009-16. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.
- Lebel, L., Bastakoti, R.C., R. Daniel and S. Ratanawilailak. 2008. Beyond 'Basin': the politics of scale in Mekong water governance. Short Paper presented in CPWF 2nd forum in Ethiopia, November 2008.
- Lebel, L., S. Ganjanapan, P. Lebel, S. Mith, T. T. N. Trinh, G. B. Bastakoti, and C. Chitmanat. 2009. USER Working Paper WP-2009-01. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Magee, D., Kelley, S. 2008. Damming the Salween River. M-POWER Working Paper MP-2008-08. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Middleton, C., Garcia, J., Foran, T. 2008. Old and new hydropower players in the Mekong region: Agendas and strategies. M-POWER Working Paper MP-2008-05. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Molle F, and Floch P. 2007. Water, Poverty and the Governance of Mega projects: The Thai "Water Grid". M-POWER Working Paper MP-2007-01. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Molle F., Floch P. 2008. The "Desert Bloom" Syndrome: Politics, Ideology, and Irrigation Development in the Northeast of Thailand. M-POWER Working Paper MP-2008-03. IRD/M-POWER/IWMI.
- Rajesh, D.N., Lebel L. 2006. Land policy, tenure and use: institutional interplay at the rural-forest interface in Thailand. . M-POWER Working Paper MP-2006-01. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Sangkhamanee, J. 2009. Hydraulics of Water Projects: An Ethnography of Community's Water Development in Northeastern Thailand. M-POWER Working Paper MP-2009-08. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.
- Sangkhamanee, J. 2009. Writing Community: Water Project Proposal and Tactical Knowledge. M-POWER Working Paper MP-2009-12. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.
- Sarkkula, J., Keskinen, M., Koponen, J., Kummu, M., Richey, J., Varis, O. 2008. Hydropower in the Mekong region: What are the impacts on fisheries? Working Paper MP-2008-12. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Scurrah, N. 2009. 'Countering hegemony' and 'institutional integration': Two approaches to using Tai Baan (villagers') research for local knowledge advocacy. M-POWER Working Paper MP-2009-11. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.
- Seng, S., L. Soviet and N. Sokha. 2009. What do floods take from and bring to community people living in flood affected areas? M-POWER Working Paper MP-2009-17. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.

- Seng, S., L. Soviet, and R. C. Bastakoti. Local adaptation to climate change: Changing livelihood systems due to the changes of flood regimes in Cambodia. M-POWER Working Paper MP-2010-01. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Serey, S., and O. T. Sana. 2009. Public Participation in Fisheries Governance in the Greater Mekong Sub-Region (GMS): A Case Study of Province along the Tonle Sap Lake in Cambodia. M-POWER Working Paper MP-2009-13. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.
- Shue, R., and Badenoch, N. 2009. Information, institutions and inequity: the case of the Nam Khan watershed in northern Laos. M-POWER Working Paper MP-2009-14. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.
- Sophat, S. 2009. Biodiversity monitoring: status, challenge and opportunity. A case study of Tonle Sap Biosphere Reserve, Cambodia. M-POWER Working Paper MP-2009-19. Unit for Social and Environmental Research, Chiang Mai University: Chiang Mai.
- Thuon, T. 2008. Agriculture and Fishery Concerns in Stung Chinit Irrigation, Cambodia. Short Paper presented in CPWF 2nd forum in Ethiopia, November 2008.
- Try, T., Lebel, L., and Bastakoti, RC. 2009 Making projects fit: early lessons from Stung Chinit Irrigation Scheme and Rural Infrastructure Project, Cambodia. M-POWER Working Paper MP-2009-07. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.
- Xu, Jianchu and Devid Melick. 2007. Towards Community-driven Conservation in Southwest China: Reconciling State and Local Perceptions. M-POWER Working Paper MP-2007-07. ICRAF China.
- Xu, Jianchu and Rajesh Daniel. 2009. Risks and Rights of Mountain Peoples. M-POWER Working Paper MP-2009-03. World Agroforestry Centre, China Program and Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.
- Xuan, Q. T., D. V. Khiem, and B. T. T. Hoa. 2009. Estimation of deadweight losses caused by the policy of exempting the irrigation fee: Case study of selected irrigation schemes in the Red River Delta, Vietnam. M-POWER Working Paper MP-2009-15. Unit for Social and Environmental Research (USER), Chiang Mai University, Thailand.

12.6 Films

'The Mekong River: Feeding Southeast Asia'. 2010. International Rivers, Unit for Social and Environmental Research, Fisheries Action Coalition Team (FACT), Center for Water Resources Conservation and Development (WARECOD).

'Fish Cage Farming in the Upper Ping River basin'. 2009. Unit for Social and Environmental Research, Chiang Mai University, Chiang Mai.

<http://www.sea-user.org/uweb.php?pg=196>

'What is water politics?' 2009. Unit for Social and Environmental Research, Chiang Mai University, Chiang Mai.

<http://www.mpowernet.org/mweb.php?pg=93>

BIBLIOGRAPHY

References cited in the report other than project publications

- ADB, 2004. Thailand: A Regional Leader in Water Resources Management. The Asian Development Bank. August 2004. Manila, The Phillippines
- ADB, and UNEP 2004. Greater Mekong Subregion Atlas of the Environment. Asian Development Bank, and the United Nations Environment Programme Regional Resource Centre for Asia and the Pacific.
- Asian Development Bank. 2009. Building a sustainable energy future: the Greater Mekong Sub-region. Manila: Asian Development Bank.
- Béné C., and Friend R.M, (*in press*) 'Poverty in small-scale inland fisheries: old issues, new analysis.' *Progress in Development Studies*
- Béné C. and R.M. Friend (2009) 'Water, poverty and inland fisheries: some lessons from Africa and Asia' (based on paper presented at the World Water Council 13th Conference, Montpellier, September, 2008) *Water International* 34(1) pp 47-61
- Bryman, A. (2006). Integrating quantitative and qualitative research: how is it done? *Qualitative Research*, 6, 97-113.
- Dixon-Woods, M., Bonas, S., Booth, A., Jones, D. R., Miller, T., Sutton, A. J., Shaw, R. L., Smith, J. A., & Young, B. (2006). How can systematic reviews incorporate qualitative research? A critical perspective. *Qualitative Research*, 6, 27-44.
- Dzung, N. T. 2006. Promoting the Participation of Ethnic Minorities in Natural Resources Management (NRM) for Poverty Reduction in Uplands of Vietnam. *in* R. Daniel and L. Xing, editors. International Workshop on Public Participation in Watershed Management in Montane Southeast Asia: An evaluation of experiences and their contributions to governance. M-POWER, Kunming, Yunnan, China.
- EGAT. 2008. *Thailand Power Development Plan (PDP 2007: Revision 1)*, Electricity Generating Authority of Thailand, Nonthaburi.
- Foran, T. 2010. Making hydropower more sustainable? A sustainability measurement approach led by the Hydropower Sustainability Assessment Forum. Mekong Program on Water Environment and Resilience (M-POWER), Unit for Social and Environmental Research, Chiang Mai University, Chiang Mai.
- Haas, L. 2009. Short briefing on the MRC Strategic Environment Assessment (SEA) of Proposed Mainstream Dams. Line-Agency / Developer Dialogue Meeting. 20 October 2009. Presentation. Vientiane: MRC.
- He, J. 2006. Mushroom in political economy of commons creating: a study on Matsutake mushroom in Tibetan region of Yunnan. Pages 10-23 *in* L. Lebel, X. Jianchu, and A. Contreras, editors. Institutional dynamics and stasis: how crises alter the way common pool natural resources are perceived, used and governed in Asia. RCSD, Chiang Mai University, Chiang Mai.
- Mason, J. (2006). Mixing methods in a qualitatively driven way. *Qualitative Research*, 6, 9-25.
- Mingsarn Kaosa-ard, and J. Dore, editors. 2003. Social Challenges for the Mekong Region. White Lotus, Bangkok.
- M-POWER (2005). Enhancing multi-scale water governance. Proposal #50 of the CGIAR Challenge Program on Water and Food. CP Full Proposal, fully Revised, August 2005.
- MRC (2009). Supplement Note for 5th RTWG meeting on scenario formulation and assessment of hydrological changes. Internal Technical Note, Basin Development Plan Programme Phase 2. Mekong River Commission Secretariat, Vientiane, Lao PDR.
- Palang Thai and A W.I.S.H. 2009. Final Report Exchange Trip and Follow-up Activities of Thai Energy Delegates on Energy Regulatory and Planning Practices to Washington and Oregon. 27 September–5 October 2008 and 2–29 January 2009. Lopez, WA: Palang Thai & A World Institute for a Sustainable Humanity.

- Rogers, P., and A. W. Hall. 2003. *Effective Water Governance*. Global Water Partnership (GWP) Secretariat, Stockholm.
- Vannara, T. 2006. *Role of Local Community in Watershed Management: Experiences from Mekong, SeSan, Sekong and Srepok rivers community in Stung Treng province, Cambodia*. *in* R. Daniel and L. Xing, editors. *International Workshop on Public Participation in Watershed Management in Montane Southeast Asia: An evaluation of experiences and their contributions to governance*. M-POWER, Kunming, Yunnan, China.

PROJECT PARTICIPANTS

The project participants included: M-POWER Steering Committee, Theme Leaders, Partner Organizations, and Research Fellows. The details are provided below.

A. M-POWER Steering Committee

Name	Affiliation	Email
John Dore	AusAID, Australian Embassy Vientiane, Lao PDR	johndore@loxinfo.co.th
Dr Bach Tan Sinh	National Institute for Science and Technology Policy and Strategy Studies, Hanoi, Viet Nam	sinhbt@yahoo.com
Dr Bernadette Resurreccion	School of Environment, Resources & Development, Asian Institute of Technology, Thailand	babette@ait.ac.th
Dr Francois Molle	Institut de Recherche pour le Développement/ International Water Management Institute, Montpellier, France	molle@mpl.ird.fr
Dr Kanokwan Manorom	Ubon Ratchathani University Ubon Ratchathani, Thailand	k_manorom@yahoo.com
Kate Lazarus	Independent Researcher, Lao PDR	katelazarus2008@gmail.com
Dr Lu Xing	Yunnan University - Regional Development Research Center Kunming, Yunnan	xing.lu.gms@gmail.com
Dr Louis Lebel	Unit for Social and Environmental Research, Chiang Mai University, Thailand	lebel@loxinfo.co.th
Dr Pech Sokhem	Hatfield Consultants, Vancouver, Canada	spech@hatfieldgroup.com
Dr Surichai Wun'gao	Social Research Institute, Chulalongkorn University, Thailand	surichai1984@yahoo.com
Dr Yang Saing Koma	Centre for Study & Development in Agriculture (CEDAC), Cambodia	yskoma@cedac.org.kh

B. M-POWER Theme Leaders

Theme/Sector	Name	Organization	Email
Fisheries	Dr Richard Friend	Independent Researcher, Thailand	richardfriend10@gmail.com
Floods	Dr Bach Tan Sinh	National Institute for Science and Technology Policy and Strategy Studies Hanoi, Viet Nam	sinhbt@yahoo.com
Irrigation	Dr Chu Thai Hoanh	IWMI, Lao PDR	C.T.Hoanh@CGIAR.ORG
Hydropower	Dr Tira Foran	USER/CMU, Thailand	
Watersheds	Dr Lu Xing	Yunnan University - Regional Development Research Center Kunming, Yunnan	xing.lu.gms@gmail.com
Water works	Dr Edsel Sajor	Asian Institute of Technology Bangkok, Thailand	esajor@ait.ac.th
Social Justice	Dr Babette Resurreccion	Asian Institute of Technology Bangkok, Thailand	babette@ait.ac.th
Policy	Dr François Molle	IRD/IWMI, France	molle@mpl.ird.fr
Dialogue	John Dore	AusAID, Australian Embassy, Vientiane, Lao, PDR	johndore@loxinfo.co.th
	Kate Lazarus	Independent Researcher	katelazarus2008@gmail.com
Knowledge	Dr Antonio Contreras	De La Salle University, Philippines	contrerasa@dlsu.edu.ph
Synthesis	Dr Xu Jianchu	ICRAF, China	J.C.Xu@cgiar.org

C. M-POWER Partner organizations

Partners organizations	Contributors
Asian Institute of Technology Bangkok, Thailand	Dr Bernadette Resurreccion (babette@ait.ac.th) Dr Edsel Sajor (esajor@ait.ac.th)
Cantho University Vietnam	Dr Le Anh Tuan (latuan@ctu.edu.vn) Dr Nguyen Hieu Trung (nhtrung@ctu.edu.vn) Tran Thi Trieu (trieubmt15@yahoo.com)
Capacity Building Initiative Myanmar	Shwe Shwe Sein Latt (mishwelatt@gmail.com)
Center for Biodiversity and Indigenous Knowledge Kunming, Yunnan, China	Yin Lun (lun.yin@gmail.com)
Centre for Study and Development in Agriculture Phnom Penh, Cambodia	Dr Yang Saing Koma (yskoma@cedac.org.kh) Khim Sophana (khimsophanna@online.com.kh) Try Thuon (trythuon@yahoo.com)
Chiang Mai University Unit for Social and Environmental Research Chiang Mai, Thailand	Dr Louis Lebel (lebel@loxinfo.co.th) Ram C Bastakoti (rcbastakoti@gmail.com) Rajesh Daniel (noelrajesh@gmail.com) Phimphakan Lebel (phimphakan@sea-user.org) Dr Tira Foran (tiraforan@gmail.com) Po Garden (po@internews.org) Masao Imamura (imamuramasao@gmail.com) Geeta Bastakoti (geetab2008@gmail.com) Songphonsak Rattinawilailak (songphonsak@sea-user.org)
Chulalongkorn University Bangkok, Thailand	Dr Surichai Wun'Geao (surichai1984@yahoo.com) Dr Chantana Wun'Geao (cwungaeo@yahoo.com)
Finnish Environment Institute Vientiane, Lao PDR	Dr Juha Sarkkula (sarkkula@yahoo.com)
Fisheries Action Coalition Team Phnom Penh, Cambodia	Mak Sithrith (maksithrith@fact.org.kh)
Green Watershed Kunming, Yunnan, China	Dr Yu Xiaogang (yxgood@hotmail.com)
Griffin nrm, Thailand/Australia	John Dore (johndore@loxinfo.co.th)
Hatfield Consultants, Vancouver, Canada	Dr Pech Sokhem (spech@hatfieldgroup.com)
Helsinki University of Technology, Finland	Dr Marko Keskinen (keskinen@iki.fi) Dr Matti Kummu (matti.kummu@iki.fi)
ICRAF-China	Dr Xu Jianchu (J.C.Xu@cgiar.org)
Institut de Recherche pour le Développement Vientiane, Lao PDR	Dr Bernard Moizo (Bernard.Moizo@ird.fr) Dr Jean-Christophe Castella (j.castella@ird.fr)

Partners organizations

Inter Press Service
Bangkok, Thailand

International Centre for
Integrated Mountain
Development
Kathmandu, Nepal

International Rivers
Thailand

International Water
Management Institute-SEA
Vientiane, Lao PDR

IUCN – The World
Conservation Union

National Institute for
Science and Technology
Policy and Strategy Studies
Hanoi, Viet Nam

National University of Laos
Vientiane, Lao PDR

Palang Thai

Ubon Ratchathani University
Ubon Ratchathani, Thailand

Center for Water Resources
Conservation and
Development
Vietnam

Water, Research and
Training Centre
Myanmar

Yunnan University -
Regional Development
Research Center
Kunming, Yunnan

Contributors

Johanna Son (json@ipsnews.net)

Dr Xu Jianchu (J.C.Xu@cgiar.org)

Dr Mats Eriksson (meriksson@icimod.org)

Dr Carl Middleton (carl@internationalrivers.org)

Dr Andrew Noble (a.noble@cgiar.org)

Dr Chu Thai Hoanh (C.T.Hoanh@cgiar.org)

Dr Francois Molle (francois.molle@ird.fr)

Kate Lazarus (katelazarus2008@gmail.com)

Latsamay Silavong (latsamay@iucnlao.org)

Dr Bach Tan Sinh (sinhbt@yahoo.com)

Phouth Simmalavong (phouth_s@nuol.edu.la)

Dr Chris Greacen (chris@palangthai.org)

Dr Kanokwan Manorum (k_manorum@yahoo.com)

Nga Dao (ngadao@yorku.ca)

Dr Khin Ni Ni Thein (aiweb.lead@gmail.com)

Khin Thein Htwe (theinkhinhtwe@gmail.com)

Dr Lu Xing (xing.lu.gms@gmail.com)

Wang Wanying (wyywang110@126.com)

D. M-POWER Research Fellows

Research Fellows	Research title	Host organizations
Batch 1 (February 2006)		
Philippe Floch (floch@gmx.net)	The dynamics of water resources development and institutional change in Northeast Thailand	IWMI, Sri Lanka
Tira Foran (tiraforan@gmail.com)	State-society dialogue on energy conservation alternatives in the Mekong region	IUCN, Bangkok, Thailand
Try Thuon (trythuon@yahoo.com)	Localizing development and irrigation management system in management system in Cambodia	CEDAC, Cambodia
Darunee Singhaphongphrai (darunee_sh@yahoo.com)	Dialogue in multi-ethnic Mae Samart Watershed in Northwest Thailand	USER, Chiang Mai University, Thailand
Natalia Scurrah (nscurrah@gmail.com)	Politics of environmental knowledge in the Mekong River Basin : A case study from Eastern Thailand	Ubon Ratchatani University, Thailand
Batch 2(August 2006)		
Ubolratana Suntornratana (ubolrana@gmail.com)	Assessment and Management of Fisheries Sector in Applicability of Flow Modelling, a case study: the Lower Songkhram River Basin	Finnish Environment Institute, Lao PDR
Qu Jianwen (jwqu1231@yahoo.com.cn)	Decision-making process assessment in the construction of Qi Ma Ling hydropower station	Yunnan University – RDRC, China
Surangrut Jumnianpol (sjumni@hotmail.com)	Politics of water privatization in : A Case Study in Eastern Region	Chulalongkorn University, Thailand
Apai Wanitpradit (apaiwa@hotmail.com)	Emerging local institutions for watershed governance in the ethnically diverse Mae Hae sub-watershed, Mae Chaem District, Northern Thailand	USER, Chiang Mai University, Thailand
Yin Lun (lun.yin@gmail.com)	Enhancing the capacity of civil society to influence decision-making through multi-stakeholder dialogue in the upper-reaches of the Mekong, Yunnan, China	CBIK, China
Bui Viet Hien (buiviethien@gmail.com) Nguyen Thi Phuong Vinh (nphvinh@yahoo.com)	Institutionalized Capacities and Practices and Community Resilience to Flood Risk in Central Vietnam	NISTPASS, Vietnam
Le Trang	Vietnam Alternative Power	Palang Thai, Thailand

Research Fellows	Research title	Host organizations
(Isanh@yahoo.com)	Development Plan	
Tuong-Vi Thi Pham (phamtuongvi0@gmail.com)	Roles of Community User Groups in Water Governance: A Case Study on Institutions in the Peri-Urban Area of Bac Ninh City, Vietnam	AIT, Thailand
Batch 3 (February 2007)		
Le Anh Tuan (latuan@ctu.edu.vn) Nguyen Hieu Trung (nhtrung@ctu.edu.vn) Tran Thi Trieu (trieubmt15@yahoo.com)	Multi-level adaptation to floods and the governance of risk in the Mekong Delta, Vietnam	Cantho University, Vietnam
Jelson Garcia (jelson975@gmail.com)	Civil society-State relation in the context of watershed management in Yunnan , China: The case of Green Watershed	Green Watershed, China
Jakkrit Sangkhamanee (jakkrits@hotmail.com)	Ethnohydrological Knowledge and the Mekong Resource Management	Ubon Ratchatani University, Thailand
Batch 4 (August 2007)		
Kanokporn Deeburee (kanokpd@hotmail.com)	Women's strategies and negotiating power in managing fisheries resources in the floodplains of the Songkhram river basin	Ubon Ratchatani University, Thailand
Kim Thu Duong Thi (kimthuvkhtl@gmail.com)	Review of water-pricing policy in the Red River Delta over the last five decades	NISTPASS, Vietnam
Man Purotaganon (Man.Purotaganon@ait.ac.th)	Negotiating water policy: Multi-stakeholders negotiation in Prachinburi sub watershed, central Thailand	Chulalongkorn University, Thailand
Rachel Shue (rachel.shue@gmail.com)	Investigating upstream/ downstream issues in the Nam Khan watershed, Lao PDR: Investment in Ecosystems and Implications for Dialogue and Policy in Water Governance	IUCN, Lao PDR
Kannika Janchidfa (kannika_j@hotmail.com)	Rescaling the political space for water policy and decision making: The case of Eastern Seaboard Development Program (ESDP) in Thailand	AIT, Thailand
Batch 5 (February 2008)		
Sok Serey (sereyhawaii@yahoo.com)	Public Participation in Fisheries Governance in the Greater	FACT, Cambodia

Project Participants **CPWF Project Report**

Research Fellows	Research title	Host organizations
Sar Sopheap (sarsopheapworld@yahoo.com)	Mekong Sub-Region (GMS): A Case Study of Provinces along the Tonle Sap in Cambodia	
Suon Seng (suonseng@online.com.kh)	What do floods take from and bring to community people living in flood affected areas?	CEDAC, Cambodia
Shawn Kelley (nanceshawn@gmail.com)	The Anatomy of the Salween Dams in Myanmar/Burma	Chulalongkorn University, Thailand
Philippe Floch (floch@gmx.net)	Pump Irrigation and the Dynamics of State and Non-State Water Resources Developments: The Lam Se Bai River, Northeast Thailand	IWMI, Sri Lanka
Batch 6 (August 2008)		
Seak Sophat (seaksophat@gmail.com)	Improving local biodiversity monitoring through participatory methods to tighten biodiversity governance: a case in Boeng Tonle Chhmar core area of Tonle Sap biosphere reserve, Cambodia	FACT, Cambodia
Yu Yin (yuyin98@yahoo.com)	Political Risk Insurance and Corporate Social Responsibility in Laos Hydropower Development: The Case of Sinohydro, MIGA and NamNgum 5	Griffin nrm, Australia
Xuan Quach Thi (quachthixuan@gmail.com)	Estimation of the deadweight losses caused by a policy of exempting the irrigation fee in some irrigation schemes – A case study in the Red River Delta, Vietnam	NISTPASS, Vietnam
He Jun (h.jun@cgiar.org)	Governing Asian Water Tower: Mainstreaming Payment for Environmental Service in the changing climate and society of Yunna, China	ICRAF, China
Songphonsak Ratanawilailak (songphonsak@sea-user.org)	Water conflicts, gender and ethnicity: Evolving institutional changes accompanying technological innovations in Mae Hae Watershed, northern Thailand	USER, Chiang Mai University, Thailand
Batch 7 (February 2009)		
Khin Thein Htwe (theinkhinhtwe@gmail.com)	Flood Risk Reduction in Pyapon Township of the Ayeyarwady Delta in Myanmar	WRTC, Myanmar/Burma

Research Fellows	Research title	Host organizations
Batch 8 (July 2009)		
Fongsamuth Phengphaengsy (fongsamuth@iucnlao.org)	Re-considering Irrigation Management Transfer (IMT) in Lao PDR	IWMI, Lao PDR

Project Participants **CPWF Project Report**

E. **M-POWER Coordination Unit**

Name	Position and duration	Role
Dr Louis Lebel (lebel@loxinfo.co.th)	Program Leader (October 2005 – June 2010)	Overall research and management leadership (part-time)
Ram C Bastakoti (rcbastakoti@gmail.com)	M-POWER Coordinator (August 2007 – April 2010)	Overall coordination of PN 50 research activities
Masao Imamura (imamuramasao@gmail.com)	M-POWER Coordinator (October 2005 – August 2007)	Overall coordination of PN 50 research activities
Rajesh Daniel (noelrajesh@gmail.com)	Editor (January 2006 – June 2010)	Editing and research network support
Phimphakan Lebel (phimphakan@sea-user.org)	Administration (October 2005 – June 2010)	Financial administration and network support (part-time)
Po Garden (po@internews.org)	Media and Communications (December 2006 – November 2007)	Communications and research network support
John Dore (johndore@loxinfo.co.th)	Communications and Liaison (March 2008 – December 2008)	Communications and research network support (part-time)
Geeta Bastakoti (geetab2008@gmail.com)	Assistant Coordinator (May 2008 – July 2009)	Assist network coordinator in M-POWER related activities
Chinwei Tang	Assistant Coordinator (February 2006 – January 2007)	Assist network coordinator in M-POWER related activities
Chinapat Kanpakdee	Assistant Coordinator (February 2007 – April 2007)	Assist network coordinator in M-POWER related activities
Prakit Siriplankganont	IT and media support (April 2006 – November 2008)	Website, databases, networks and multi-media (part-time)
Suchat Kanchai	IT and media support (October 2005-March 2006; December 2008-June 2010)	Website, databases, networks and multi-media (part-time)

APPENDICES

Appendix A. Abstracts of key publications

Cross-cutting

Molle, F., Foran, T., Kakonen, M. (eds.) 2009. *Contested waterscapes in the Mekong region. Hydropower, Livelihoods and Governance*. Earthscan. 416pp. See: <http://www.earthscan.co.uk/?TabId=49419&v=454883>

The catchment area of the Mekong River and its tributaries extends from China, through Burma/Myanmar, Thailand, Laos, Cambodia and to Vietnam. The water resources of the Mekong region - from the Irrawaddy and Nu-Salween in the west, across the Chao Phraya to the Lancang-Mekong and Red River in the east- are increasingly contested. Governments, companies, and banks are driving new investments in roads, dams, diversions, irrigation schemes, navigation facilities, power plants and other emblems of conventional 'development'. Their plans and interventions should provide some benefits, but also pose multiple burdens and risks to millions of people dependent on wetlands, floodplains and aquatic resources, in particular, the wild capture fisheries of rivers and lakes.

This book examines how large-scale projects are being proposed, justified, and built. How are such projects contested and how do specific governance regimes influence decision making? The book also highlights the emergence of new actors, rights and trade-off debates, and the social and environmental consequences of 'water resources development'. This book shows how diverse, and often antagonistic, ideologies and interests are contesting for legitimacy. It argues that the distribution of decision-making, political, and discursive power influences how the waterscapes of the region will ultimately look and how benefits, costs and risks will be distributed. These issues are crucial for the transformation of waterscapes and the prospects for democratizing water governance in the Mekong region.

Lebel, L., J. Dore, R. Daniel and Y.S. Koma, eds. 2007. *Democratizing water governance in the Mekong region*. Chiang Mai: Mekong Press. 283pp. See: http://www.mekongpress.com/each_titles/DWG.htm

Over the last few decades, the Mekong region has been facing complex pressures and challenges in water governance driven by a range of economic integration efforts and relationships motivated by national self-interest. This book, the first in a three-volume series, brings together the work of engaged researchers, scholars, and leaders in the Mekong region to provide a baseline, state-of-knowledge review of the contemporary politics and discourses of water use, sharing, and management, and their implications for local livelihoods.

The chapters critically analyze contested discourses on such topics as regional hydropower development, floods, and irrigation, along with the broader yet interrelated issues of gender, media, dialogue, and impact assessment. The writers explore the interplay of power relationships between actors such as state planners, regional institutions, the private sector, and various water users, in particular, politically marginalized groups including women, urban and rural poor, and ethnic peoples. The diverse array of topics and perspectives provides a sound basis for engaging in policy-related action. Written in straightforward language that elucidates complex issues from hydrological modeling to energy planning and reform, the volume presents the evolving study and knowledge of water governance in the Mekong region.

Lebel, L., P. Garden, and M. Imamura. 2005. The politics of scale, position, and place in the governance of water resources in the Mekong region. *Ecology and Society* 10(2): 18. [online] [URL:http://www.ecologyandsociety.org/vol10/iss2/art18/](http://www.ecologyandsociety.org/vol10/iss2/art18/)

The appropriate scales for science, management, and decision making cannot be unambiguously derived from physical characteristics of water resources. Scales are a joint product of social and biophysical processes. The politics-of-scale metaphor has been helpful in drawing attention to the ways in which scale choices are constrained overtly by politics, and more subtly by choices of technologies, institutional designs, and measurements. In doing so, however, the scale metaphor has been stretched to cover a lot of different spatial relationships. In this paper, we argue that there are benefits to understanding—and actions to distinguish—issues of scale from those of place and position. We illustrate our arguments with examples from the governance of water resources in the Mekong region, where key scientific information is often limited to a few sources. Acknowledging how actors' interests fit along various spatial, temporal, jurisdictional, and other social scales helps make the case for innovative and more inclusive means for bringing multi-level interests to a common forum. Deliberation can provide a check on the extent of shared understanding and key uncertainties.

Lebel, L., J. M. Anderies, B. Campbell, C. Folke, S. Hatfield-Dodds, T. P. Hughes and J. Wilson 2006. Governance and the Capacity to Manage Resilience in Regional Social-Ecological Systems. *Ecology and Society* 11 (1): 19. [online] URL: <http://www.ecologyandsociety.org/vol11/iss1/art19/>

The sustainability of regional development can be usefully explored through several different lenses. In situations in which uncertainties and change are key features of the ecological landscape and social organization, critical factors for sustainability are resilience, the capacity to cope and adapt, and the conservation of sources of innovation and renewal. However, interventions in social-ecological systems with the aim of altering resilience immediately confront issues of governance. Who decides what should be made resilient to what? For whom is resilience to be managed, and for what purpose? In this paper we draw on the insights from a diverse set of case studies from around the world in which members of the Resilience Alliance have observed or engaged with sustainability problems at regional scales. Our central question is: How do certain attributes of governance function in society to enhance the capacity to manage resilience? Three specific propositions were explored: (1) participation builds trust, and deliberation leads to the shared understanding needed to mobilize and self-organize; (2) polycentric and multilayered institutions improve the fit between knowledge, action, and social-ecological contexts in ways that allow societies to respond more adaptively at appropriate levels; and (3) accountable authorities that also pursue just distributions of benefits and involuntary risks enhance the adaptive capacity of vulnerable groups and society as a whole. Some support was found for parts of all three propositions. In exploring the sustainability of regional social-ecological systems, we are usually faced with a set of ecosystem goods and services that interact with a collection of users with different technologies, interests, and levels of power. In this situation in our roles as analysts, facilitators, change agents, or stakeholders, we not only need to ask: The resilience of what, to what? We must also ask: For whom?

Sangkhamanee, J. 2009. When An Anthropologist Meets Hydrologists: A Reflection on Epistemology and Sociology of Knowledge on Mekong Waters. *Journal Of Liberal Arts (Special Issue - Mekong Studies: River, People, Border, Culture, Trade, and Politics)*: 431-462.

The article discusses how hydrological science came to be benchmark knowledge in regional management of the Mekong River. It examines 'hydrology' through sociological studies of science classrooms and laboratories and offers a philosophical analysis of scientific practices. The author, as an anthropologist, argues that scientific knowledge of water, and the science community that produces it, are cultural constructs. Since scientific hydrology is always shaped by social factors, there is no absolute legitimacy in claiming scientific practice, bias-free methodology, and universality of knowledge implementation. The article calls for a non-monolithic standard in justifying knowledge employed in river management.

Watersheds

Lebel, L., R. Daniel. 2009. The governance of ecosystem services from tropical upland watersheds. *Current Opinion in Environmental Sustainability* 1:61-68

Upland watersheds in the tropics provide a range of crucial ecosystem goods and services. How they are governed can be crucial to human well-being and environmental sustainability. Communities, governments and firms have taken many different approaches to sharing these benefits, negotiating trade-offs between them, and allocating the risks and burdens if services are degraded or lost. This review of policies and projects draws four initial conclusions: (1) multi-stakeholder planning improves the assessment of underappreciated services and users, but does not eliminate importance of power relations; (2) regulations invariably create winners and losers with outcomes that often depend on pre-existing institutions; (3) information and incentives can change behaviours and are therefore important complement to plans and regulations; (4) monitoring is the least well developed area of governance. Many challenges in integrating ecological and social understanding remain.

Jianchu, X., Y. Yang, J. Fox, and X. Yang. 2007. Forest transition, its causes and environmental consequences: An empirical evidence from Yunnan of Southwest China. *Tropical Ecology* 48(2): 1-14.

China is experiencing forest transition with its associated environmental and geopolitical impacts. This paper examines forest transition with empirical evidences experienced over the last half century at five sites in Yunnan Province of Southwest China. Results suggest that the forest transitions in Yunnan were mainly driven by economic growth that created off-farm opportunities. It was also supported by state policies favourable for environmental conservation that secured tenure and provided technical assistance and financial compensation. The forest transition in China contributes to global carbon sequestration, biodiversity conservation and in improving local and regional environment. The forest transition was also useful in understanding people and land interactions in the coupled human-environment systems in Yunnan of the eastern Himalayas; this also provided potential policy understandings for regional application specifically when it comes to environmental conservation and economic development.

Lebel, L. 2006. Multi-level scenarios for exploring alternative futures for upper tributary watersheds in mainland Southeast Asia. *Mountain Research and Development* 26:263-273.

Nested scenarios at 2 spatial levels were constructed to explore key uncertainties about how livelihoods and landscapes in upper tributary watersheds of montane mainland Southeast Asia might unfold in the coming decades. At the regional level the scenarios highlight the implications of different forms of market and political integration. At the upper tributary level the scenarios highlight changing dependencies on local natural resources and the extent of empowerment of local stakeholders in their management. The scenarios are intended as a starting point for discussions among stakeholders, as a framework for designing and interpreting land use and land cover change simulation studies, and as a tool to help identify resilient livelihood and regional development strategies. The multi-level approach to scenario building introduced here shows considerable promise for mountain regions, as it encourages analyses to be cognizant of broader-scale economic and social changes as well as the uncertainties specific to these upland environments.

Lebel, L., Daniel, R, Badenoch N, Garden P, Imamura M. 2008. A multi-level perspective on conserving with communities: experiences from upper tributary watersheds in montane mainland southeast Asia. *International Journal of the Commons*, 2 (1):127-154.

Many of the critical tensions around conservation with people in upper tributary watersheds involve challenges of scale. Ecosystem goods and services derived from these watersheds are frequently used and valued by people at several different spatial levels, making these resources difficult to manage effectively without taking cross-level interactions into account. A multi-level perspective allows a more nuanced understanding of the governance challenges in conservation. Rather than assuming that the correct and best levels are known, we look at how discourses and social practices privilege certain levels over others and help shape the way decisions are made.

A multi-level perspective also helps explain why the expectations of different actors are hard to satisfy, and why projects are often perceived as failures by some but not all actors. Some of the differences are a result of looking at the system from different levels, others are the result of the failure to acknowledge important crosslevel interactions, and yet others arise from over-reliance on single-level theories. An improved understanding of scale-related politics in conservation creates opportunities for evolving more appropriate institutions to the challenges at hand.

Ma X., J.C. Xu, J. Qian. 2008. Water resource management in a middle mountain watershed. *Mountain Research and Development*, 28(3/4):286-291.

As development and population increase, efficient use and management of water in mountain watersheds is of growing concern in Asia. The work presented in this article applied hydro-meteorological monitoring and participatory action research on water availability to improve water management in Xizhuang watershed in Yunnan Province, China. With an area of 34.56 km² and a population of 4501, Xizhuang watershed is typical of the watersheds in the middle mountains that feed the Salween River. Although this catchment provides plentiful water (rainfall and runoff), the temporal and spatial distribution of this supply is uneven. Together with uneven distribution, major issues include water shortages for irrigation, domestic use, and livestock; poor water quality; and conflicts among different stakeholders. To improve sustainable use and conservation, this paper suggests developing integrated water resource management and water harvest technology.

Ma X., J. C. Xu, Y. Luo, S.P. Aggarwal, J.T. Li, 2009. Response of hydrological processes to land-cover and climate changes in Kejie watershed, SW China. *Hydrological Processes*, 23 (8): 1179-1191.

Land-cover/climate changes and their impacts on hydrological processes are of widespread concern and a great challenge to researchers and policy makers. Kejie Watershed in the Salween River Basin in Yunnan, south-west China, has been reforested extensively during the past two decades. In terms of climate change, there has been a marked increase in temperature. The impact of these changes on hydrological processes required investigation: hence, this paper assesses aspects of changes in land cover and climate. The response of hydrological processes to land-cover/climate changes was examined using the Soil and Water Assessment Tool (SWAT) and impacts of single factor, land-use/climate change on hydrological processes were differentiated. Land-cover maps revealed extensive reforestation at the expense of grassland, cropland, and barren land. A significant monotonic trend and noticeable changes had occurred in annual temperature over the long term. Long-term changes in annual rainfall and streamflow were weak; and changes in monthly rainfall (May, June, July, and September) were apparent. Hydrological simulations showed that the impact of climate change on surface water, baseflow, and streamflow was offset by the impact of land-cover change. Seasonal variation in streamflow was influenced by seasonal variation in rainfall. The earlier onset of monsoon and the variability of rainfall resulted in extreme monthly streamflow. Land-cover change played a dominant role in mean annual values; seasonal variation in surface water and streamflow was influenced mainly by seasonal variation in rainfall; and land-cover change played a regulating role in this. Surface water is more sensitive to land-cover change and climate change: an increase in surface water in September and May due to increased rainfall was offset by a decrease in surface water due to land-cover change. A decrease in baseflow caused by changes in rainfall and temperature was offset by an increase in baseflow due to land-cover change.

Fisheries

Lebel P, Chaibu, P, and Lebel, L. 2009. Women farm fish: gender and commercial fish cage culture in the Upper Ping River, northern Thailand. *Gender, Technology & Development*, 13(2): 199-224.

Studies from around the world underline the work of women in household-based aquaculture. Many extension and rural development programs and some commercial activities target women. Over the past decade, a tilapia fish cage industry has emerged on the Upper Ping River in northern Thailand. We interviewed 38 fish farmers, both women and men, about their practices and decision-making behavior and exploring gender relations. In addition, we collected quantitative data from 275 fish farms that allowed comparison of farming practices of women and men and in a second survey compared 200 households which have farmed fish with 200 that have not to explore gender issues in access and decision-making. Women are frequently engaged in day-to-day management of fish farms, most often working as part of a household team, but sometimes in senior management positions. Women attend trainings and their experience and skills are largely recognized by male counterparts. Fish farms managed by men, women or jointly yield similar profits. Women who farm fish for commercial profit are often empowered by such engagement within households. But empowerment in one arena does not easily translate into decision-making authority in others; few women hold real authority in community affairs and those that do so have primarily risen to prominence within women's groups or with respect to women's issues. Successful engagement in aquaculture, arguably, contributed to such success, but also benefited from social position relative to both other women and men.

Friend, R. M. 2009. Fishing for Influence; fisheries science and evidence in water resource development in the Mekong Basin. *Water Alternatives*, 2(2): 167-182

During the last decade there has been a concerted effort in the Mekong basin to research the capture fisheries in an attempt to influence national and regional water resource policy and practice, particularly hydropower development. As a result of this research effort, the Mekong capture fisheries are better documented than ever before. There is broad consensus on the key conclusions of this research –on the scale and value of production, its importance to local livelihoods, and the ecological drivers of the natural productivity. Despite this research success the agendas of water resources management have not changed, and the pace of hydropower development has accelerated. This presents a dilemma for fisheries science and research in its efforts to influence policy.

This paper considers the models and assumptions of policy influence that have underpinned this fisheries research effort, and presents alternative approaches for fisheries science to better engage in influencing policy. The paper argues that addressing the neglect of capture fisheries in the Mekong is fundamentally a governance challenge of setting development values and pathways. Meeting such a challenge, in the context of the Mekong, requires a democratizing and civic science that broadens the decision - making arena as much as it produces new evidence and arguments.

Friend, R. M., and Blake, D. J. H. 2009. Negotiating trade-offs in dam development in the Mekong – implications for fisheries and fishery-based livelihoods. *Water Policy*, 11 (1): 13-30.

A revitalised hydropower development narrative is emerging in the Mekong in which the concept of 'trade-offs' plays a central role. The importance of and risks to capture fisheries in the Mekong is such that any degradation has huge social, economic and environmental implications. While potential impacts of hydropower development on capture fisheries are acknowledged in this emerging narrative, it is argued that these are less than anticipated previously, that impacts can be assessed, mitigation measures introduced and trade-offs negotiated. The concept of trade-offs has an immediate appeal but it is also problematic. It draws attention away from considering development objectives and options towards focusing on impacts, and infers a technical approach as opposed to a political process of decision making. This paper draws on anthropological approaches to development policy to consider the implications of a hydropower narrative based on trade-offs in light of experience in the Mekong Basin, and to consider alternative ways of framing debate on hydropower and capture fisheries.

Floods

Lebel, L., Sinh, B.T. 2009. Risk reduction or redistribution? Flood management in the Mekong region. *Asian Journal of Environment and Disaster Management* 1:23-39.

In the main valleys and plains rapid economic and social development over the past several decades has altered the use of land and water in ways that profoundly affect vulnerability of households, firms and regional economies to individual flood events and longer-term changes in flood regimes. Disaster risk reduction measures usually involve structural interventions in the form of walls, channel modification, drains, pumping stations, diversions and storage dams. Institutional measures, like early warning systems, community capacity building, insurance and compensation schemes may also be supported and promoted to reduce risks of damage and burdens from losses. In this paper we review instances and conditions under which flood management policies, measures and practices in the greater Mekong region, intended to reduce risks, appear to have shifted risks onto already vulnerable and disadvantaged groups. We classify these observations into six mechanisms through which risks may be redistributed. This analysis highlights the importance of public participation and negotiation in handling various risks associated with flood management, and, conversely, why purely technical, expert-driven, approaches to flood disaster management are unlikely to succeed in reducing the risks of flood disasters.

Lebel, L., Manuta, B.J., and P. Garden. 2010. Institutional traps and vulnerability to changes in climate and flood regimes in Thailand. *Regional Environmental Change*, DOI: 10.1007/s10113-010-0118-4

Vulnerabilities to floods in Thailand are changing as a result of many factors. Formal and informal institutions help shape exposure, sensitivity and capacities to respond of individuals, social groups and social-ecological systems. In this paper we draw on several case studies of flood events and flood-affected communities to first assess how current practices reflect various laws, procedures, programs and policies for managing floods and disasters and then explore the implications for dealing with additional challenges posed by climate change. Our analysis identifies several institutional traps which need to be overcome if vulnerability is to be reduced, namely: capture of agendas by technical elites; single-level or centralized concentration of capacities; organizational fragmentation; and, over emphasis on reactive crisis management. Possible responses are to: expand public participation in managing risks; build adaptive capacities at multiple levels and link them; integrate flood disaster management and climate change adaptation into development planning; prioritize risk reduction for socially vulnerable groups; and, strengthen links between knowledge and practice. Responses like these could help reduce vulnerabilities under current climate and flood regimes, while also improving capacities to handle the future which every way that unfolds.

Lebel, L., E. Nikitina, and J. Manuta. 2006. Flood disaster risk management in Asia: an institutional and political perspective. *Science and Culture* 72:2-9.

States no longer respond to disasters, they manage disaster risks, and do so with increasingly sophisticated institutional frameworks. But are these efforts leading to reduced risks? Are capacities for risk reduction being institutionalized? Are the livelihoods of poor and vulnerable groups being secured? This opening article of a special issue reviews experiences in reforming flood disaster management and from this derives an initial framework for assessing institutional capacities for flood disaster risk reduction. The paper raised several questions that lead up to this framework: When is a flood disaster? Who and what should be at risk? Who is or should be responsible? How were risks of disaster changed? How was performance evaluated?

Manuta, J., S. Khрутmuang, D. Huaisai, and L. Lebel. 2006. Institutionalized incapacities and practice in flood disaster management in Thailand. *Science and Culture* 72:10-22.

This paper focuses on the institutional capacity within the Thai nation-state to manage floods and the risks of flood-related disasters. The research aims to understand how various laws, policies, programs and procedures for managing floods and the risks of flood-related disaster came about and how they have performed. It further examines the capacity to mobilize and coordinate resources as well as deliberate, negotiate, monitor and evaluate the formal institutions from the national to local level.

Focusing the analysis on institutional changes and river-based flood events during the last two decades, the paper explores ways of reducing the risks of flood disasters in ways that do not further disadvantage already socially vulnerable groups. Documents and reports were reviewed. In addition, interviews and field observations on site after flood events were carried out.

There are indications of improved institutional performance of the government in the areas of relief and emergency, the formation of the flood disaster emergency committee at the outset of the monsoon season in flood prone areas, and initial efforts to involve communities in flood prevention and mitigation. Several institutionalized incapacities, however, continue to undermine the provision of assistance and services that would reduce the risk of flood disaster. Poor coordination across administrative bodies and line agencies results in fragmented flood mitigation and prevention intervention measures. Flood disaster victims are left alone to fend themselves especially in remote areas due to incomplete implementation, poor follow up, and structural biases. Many problems are aggravated by the absence of monitoring and evaluation of state agency's performance. Social mobilization on flood management may be necessary to re-enable these institutions to perform the roles in society for which they were created – reducing vulnerabilities and risks of flood disasters.

Hydropower

Foran, T., P. T. du Pont, P. Parinya, and N. Phumaraphand. 2010. Securing energy efficiency as a high priority: scenarios for common appliance electricity consumption in Thailand. *Energy Efficiency* DOI10.1007/s12053-009-9073-7.

Between 1995 and 2008, Thailand's energy efficiency programs produced an estimated total of 8,369 GWh/year energy savings and 1,471MW avoided peak power. Despite these impressive saving figures, relatively little future scenario analysis is available to policy makers. Before the 2008 global financial crisis, electricity planners forecasted 5–6% long-term increases in demand. We explored options for efficiency improvements in Thailand's residential sector, which consumes more than 20% of Thailand's total electricity consumption of 150 TWh/year. We constructed baseline and efficient scenarios for the period 2006–2026, for air conditioners, refrigerators, fans, rice cookers, and compact fluorescent light bulbs. We drew on an appliance database maintained by Electricity Generating Authority of Thailand's voluntary labeling program. For the five appliances modeled, the efficiency scenario results in total savings of 12% of baseline consumption after 10 years and 29% of baseline after 20 years. Approximately 80% of savings come from more stringent standards for air conditioners, including phasing out unregulated air conditioner sales within 6 years. Shifting appliance efficiency standards to current best-in-market levels within 6 years produces additional savings. We discuss institutional aspects of energy planning in Thailand that thus far have limited the consideration of energy efficiency as a high-priority resource.

Irrigation

Molle, F. and Chu Thai Hoanh. 2009. Implementing Integrated River Basin Management: Lessons from the Red River Basin, Vietnam. IWMI Research Report No 131. Colombo, Sri Lanka: IWMI.

In the last decade many Southeast Asian countries have remodeled part or all of their water policies. Development banks, notably the Asian Development Bank (ADB), and multilateral cooperation agencies have been quite influential in supporting the adoption of policies and reforms that embody principles held as modern and internationally sanctioned. This includes the drafting of national policy and laws, the creation of 'apex bodies', the establishment of river basin organizations (RBOs), the privatization of public companies, and increased financial contribution from users (e.g., through water pricing and the formation of water user groups). While these principles and reforms provide sound and useful guidelines for national water policies at a certain level of generalization, their confrontation with reality has more often than not yielded disappointing results.

Vietnam has recently adopted several of these policy recommendations. A new Law on Water Resources released in 1998 was followed by the creation of an 'apex body' (the Office of the National Water Resources Council (ONWRC) in 2000), and three RBOs (in 2001), before the Ministry of Natural Resources and Environment (MoNRE) was set up in 2002. Although institutional changes are often gradual, these few years of experience in reforming the water sector offer an opportunity to examine the implementation of these new policy frameworks. The present report focuses on the establishment of the Red River Basin Organization (RRBO), but expands its analysis to the wider transformations of the water sector that impinge on the formation and effectiveness of this organization. A few reflections on the policy process are drawn from this analysis, albeit in a tentative form given the relatively limited period of time considered here.

The report shows that the promotion of IWRM icons such as RBOs by donors has been quite disconnected from the existing institutional framework. In contradiction with IWRM principles, RBOs were established under the Ministry of Agriculture and Rural Development (MARD), with little means and power, while the ONWRC remained dormant. The RRBO was set up on the premise that a RBO was needed, but it was soon found that basin-wide participation was both difficult and unnecessary, with the focus being shifted to lower sub-basin levels.

The report also shows that if policy reforms promoted by donors and development banks have triggered some changes, these changes may have come not as a result of the reforms themselves but, rather, due to the institutional confusion they have created when confronted with the emergence of the MoNRE, which itself was largely destined – at first – to solving land rather than water issues. For the MoNRE, the river basin scale became crucial for grounding its legitimacy and finding its roles among the established layers of the administration, while for MARD, RBOs became a focal point where power over financial resources and political power might potentially be relocated at its expense. Thus, the collision of donor-driven projects to establish RBOs and the conflict between MARD and MoNRE helped strengthen changes in the direction of a better separation of duties and integrated planning. It is too early to assess whether this transition towards a separation of the operation and regulation roles will be sustained, and whether RBOs will be endowed with substantial power. However, institutional change is shown to result from the interaction between endogenous processes and external pressures, in ways that are barely predictable.

Molle, F. and P. Floch. 2008. Megaprojects and Social and Environmental Changes: The Case of the Thai "Water Grid". *Ambio* 37(3): 199-204.

Large-scale development of irrigation has long been an attractive option of postwar development, and the Mekong region has been no exception. Thailand has developed approximately four million hectares of irrigated land, and its northeastern region (*Isaan*)—both the driest and poorest part of the country—has been the target of many water projects. However, "full development" of its potential has been constrained by the lack of storage sites and the difficulty of diverting water from the Mekong River. Several ambitious projects have been discussed during the last 50 y, all of which have been aimed at "greening *Isaan*." In 2003, the Thai administration launched the idea of a national "water grid" that would triple the area of irrigated land in the country. This paper analyzes the emergence of this megaproject, its governance, and its economic and environmental soundness.

Waterworks

Sajor, E. and R. Ongsakul. 2007. Mixed Land Use and Equity in Water Governance in Peri-urban Bangkok. *International Journal of Urban Regional Research* 31 (4):782-801.

This article addresses a dearth in the literature on environmental equity in water governance in the *desakota*, the extended metropolitan region of the great cities of Southeast Asia. Through a case study, the authors describe how, in an intensive mixed land use situation, the actions of new urban users of irrigation canals have degraded the water, unfairly prejudicing low-income farmers' entitlement to irrigation water of appropriate quality and harming their livelihood. It is argued that certain characteristics of existing land- and water-sector-related management institutions in Thailand encourage a disproportionate shift of the environmental burden to small farmers. This phenomenon also involves the violation of procedural equity — the farmers' right to be informed, to be able to assert a right to and negotiate for appropriate water, and to participate meaningfully in strategic decisions related to water governance in the peri-urban area. The problem is mediated by administrative separatism, ambiguity and multiplicity in the functional jurisdiction of water-related government bodies, and the general lack of a participatory culture in the bureaucracy. The authors further argue that, without state acknowledgement of this form of injustice, establishing appropriate mechanisms and public institutions that will purposively address concerns of environmental equity is a remote possibility, and that this inequity will likely continue to be patterned and inscribed in the peri-urban geography of the mega-cities of Southeast Asia.

Sajor, E. and Thu, M. 2009. Institutional and Development Issues in Integrated Water Resource Management of Saigon River. *Journal of Environment & Development*, 18 (3): 268-290.

The article focuses on endogenous institutional factors in the water sector and the challenges and opportunities to an alternative integrated management approach in Vietnam, particularly in the context of its political legacy, current development goal, and Doi Moi reforms, using Saigon River as a case study. It investigates three institutional problem areas constituting major constraints to integrated water resources management (IWRM): (a) bureaucratic fragmentation and separatism, (b) top-downism negating multistakeholder participation, and (c) highly centralized administration. It also highlights how the goal of rapid industrialization and economic growth tends to marginalize environmental concerns in policies in water and river management. The authors argue that despite great incompatibilities of the legacy and present features of water-related institutions to IWRM, broader exogenous factors in the country can provide impetus to water institutional changes. These are the currently ongoing reforms of grassroots participation and decentralization as well as the country's enhanced integration and cooperation with the international community, especially with development donor agencies.