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Mira Käkönen

## **FIXING THE FLUID:**

Making resources and ordering hydrosocial relations in the Mekong Region

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FIXING THE FLUID:  
MAKING RESOURCES AND ORDERING HYDROSOCIAL  
RELATIONS IN THE MEKONG REGION

MIRA KÄKÖNEN

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# ABSTRACT

This is a study of expertise and power relations in riverine resourcification processes. With a focus on the hydraulic infrastructuring and hydrosocial ordering efforts in the Mekong Region, I seek to contribute new perspectives to the analysis of water, energy and climate change governing. Through five published articles I examine different attempts to fix in place certain sets of biophysical, infrastructural, discursive and socio-political relations. I approach these fixing efforts as part of resource-making processes that seek to render the Mekong's riverine flows and environments more 'productive', investable and exploitable, and governable and controllable. The waterscapes in the making form frontiers of (eco-)modernisation and expansion of capital circulation, as well as fixation of territorial state power. The constituent and constitutive power formations of resourcification include technoscientific, infrastructural, discursive, corporate and different aspects of state powers. I also analyse the socio-spatial configurations that emerge from resource-making processes.

The research is grounded in the interpretive research tradition of the social sciences and situated at the interface of environmental and development studies. I build on Foucault-inspired research especially in the field of political ecology. The central research question for my work has been **how water resources are made and governed in the Mekong Region**, through what kind of rationales, techniques and power relations, and **with what effects**, especially in terms of the consequent **new power formations** and **implications for the lives of the Mekong's riverine** residents. This question is timely. Currently, the rivers in the region are being dammed and engineered at accelerating pace, making the Mekong Basin a scene for one of the most intensive hydropower developments in the world. Around two hundred large dams are at different stages of development in the mainstream and tributaries of the Mekong. The study has global relevance because the actors, rationales and techniques involved, epitomise those shaping the current resurgence of hydropower development and other large infrastructure projects in the global South. As I argue, the emergent governmental assemblages enabling the hydropower development are not only intensively present in the Mekong but also partially created there.

My methodological choices have been guided by a commitment to understanding nature-society relations in specific contexts, necessitating qualitative and field-based research methods. The fieldwork periods in Vietnam, Laos and Cambodia comprised intensive and open-ended methods of querying research materials through observing, listening to and

interviewing various experts and policy-makers, ministry, provincial, district and village officials, development practitioners and NGO staff members, and different groups of farmers and fishers. The aim of understanding governing rationales and techniques has involved the identification, collection and analysis of key policy documents and various technical reports. The research contributes to studies of hydrosocial relations by examining the continuities and changes in the rationalisations and techniques of Mekong's water resourcification. It bridges the political-ecological research on water and climate change by examining how climate change-related governmental rationales and techniques have opened a new space for hydraulic infrastructuring. Moreover, it provides new insights on the co-constitutive relations between resources and power formations bearing relevance on recent political ecology discussions on resource- and state-making. The analysis of the ways technoscience and technical infrastructures are implicated in the possibilities of hydrosocial ordering also forges connections with science and technology studies.

I begin the analysis with the Mekong Delta of Vietnam, the early colonial frontier for water resourcification that has since formed the part of the Mekong Basin where the plans of 'full control' with aspirations of 'acclimatisation' have been materialised to the fullest extent. I sketch out the main continuities and ruptures in the Delta's intensive hydrosocial and agro-hydraulic ordering efforts, and outline their major effects. I then shift attention to the more recent hydropower boom in Laos and Cambodia, and the various elements enabling it in terms of knowledge production, the new sustainability standards of hydropower dams and climate change-related rationalisations and techniques. Finally, I bring to the fore how enclavistic, postneoliberal hydropower projects in Cambodia get entangled with other processes of resource-making, with illiberal processes of state formation and the intensification of Chinese influence.

The study shows how the past and current modes of fixing hydrosocial relations have been shaped by a complex interplay of different rationales and techniques of governing. It also highlights the importance of the legacies of past hydraulic endeavours, their infrastructural powers, and those of fluvial waters. I identify two waves of hydraulic infrastructuring with differing patterns of water resourcification. Characteristic for the first wave is that the resourcification efforts tend to uniform and centrally coordinated hydrosocial orderings while the resourcification efforts of the second wave tend to exhibit more dispersed, corporate-led modes of hydrosocial orderings. A major change in hydraulic infrastructuring has been the increasing disjointedness between damming and river basin planning because of the proliferation of concessionary hydropower projects. The contradictory predicament of the current resurgence of hydropower is, that while

large dams are being justified with multiplying purposes, from poverty alleviation to better governing of climate change, the concessionary dams are, in fact, geared almost solely towards optimising riverine affordances in terms of their hydroelectricity production. The concessionary governing mode through which the enclavistic, water-resourcification pattern of second wave dams has evolved is shown to be animated by neoliberal governing rationales but also shaped by illiberal governing logics. While the enclavistic dams strengthen corporate powers over hydrosocial relations and may limit the development of state hydraulic powers, the study highlights effects which overflow the enclave boundaries and strengthen other aspects of party-state rule in Laos and Cambodia.

The resultant waterscapes of the various infrastructuring efforts analysed in this study are variegated: variously networked and with divergent power formations. There is also variation in the magnitude of the effects and in the mechanisms of how the benefits and adversities of the projects are distributed. Yet all of them, including the 'sustainable' dams with eco-modern safeguard policies, radically disrupt fluvial relationalities, diminish possibilities for diverse and decentralised river uses, tend toward more centralised control of hydrosocial relations, and make vulnerable those with the most intimate riverine connections. Despite these similar effects, a nuanced analysis of the ordering assemblages constituting each effort of fixing the fluid is relevant, as it enables more detailed reflection on the distributed responsibilities. Overall, the analysis illustrates how large-scale hydraulic infrastructures built and planned in the Mekong Region entail drastic alterations in hydrosocial relations.

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# LIST OF ORIGINAL PUBLICATIONS

- I Mira Käkönen (2008) Mekong Delta at crossroads: More adaptation or control? *Ambio* 37(3): 205-212.
- II Mira Käkönen and Philip Hirsch (2009) The Anti-Politics of Mekong Knowledge Production. In Francois Molle, Tira Foran and Mira Käkönen (eds), *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*. London: Earthscan, 333-365.
- III Mira Käkönen and Hanna Kaisti (2012) The World Bank, Laos and Renewable Energy Revolution in the Making: Challenges in Alleviating Poverty and Mitigating Climate Change. *Forum for Development Studies* 39(2): 159-184.
- IV Mira Käkönen, Louis Lebel, Kamilla Karhunmaa, Dany Va and Try Thuon (2014) Rendering Climate Change Governable in the Least-Developed Countries: Policy Narratives and Expert Technologies in Cambodia. *Forum for Development Studies* 41(3): 351-376.
- V Mira Käkönen and Try Thuon (2019) Overlapping zones of exclusion: carbon markets, corporate hydropower enclaves and timber extraction in Cambodia. *The Journal of Peasant Studies* 46(6): 1192-1218.

These composite publications of the thesis are referred to in the synthesis by their Roman numerals as Article I, II, III, IV and V.



# ABBREVIATIONS

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
BOT	Build-Operate-Transfer
CDM	Clean Development Mechanism
EIA	Environmental Impact Assessment
EU ETS	European Union Emissions Trading System
GMS	Greater Mekong Subregion Programme
ICEM	International Center for Environmental Management
IHA	International Hydropower Association
IPCC	Intergovernmental Panel on Climate Change
IR	International Rivers
IWRM	Integrated Water Resources Management
LDCs	Least Developed Countries
MRC	Mekong River Commission
NGO	Non-governmental organisation
NT2	Nam Theun 2 hydropower project
RGC	Royal Government of Cambodia
SOE	State-Owned Enterprise
STS	Science and Technology Studies
TVA	Tennessee Valley Authority
UNFCCC	United Nations Framework Convention on Climate Change
UNEP DTU	United Nations Environment Programme partnership with the Technical University of Denmark (DTU) and the Danish Ministry of Foreign Affairs
WCD	World Commission on Dams
WLE	Research Program on Water, Land and Ecosystems



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# 1. INTRODUCTION

This is a study of expertise and power relations in riverine resourcification processes with a focus on hydraulic infrastructuring efforts in the Mekong Region. The study is timely because the rivers in the region are being dammed and engineered at an accelerating pace. Around two hundred large dams are at different stages of development in the mainstream and tributaries of the Mekong, and other rivers in the region are undergoing similar change (Geheb and Suhardiman 2019). This makes the Mekong Basin and the broader Mekong Region a scene for one of the most intensive hydropower developments in the world. The study also has global relevance because the actors, rationales and techniques involved, epitomise those shaping the current resurgence of hydropower development and other large infrastructure projects in the global South (Sneddon 2015, Ahlers et al. 2017, Mohan and Tan-Mullins 2019). Moreover, the emergent governmental assemblages enabling the hydropower development are not only intensively present in the Mekong but also partially created there.

Through five articles I have explored different attempts to fix in place certain sets of biophysical, infrastructural, discursive and socio-political relations fuelled by a desire to control, arrest or regulate the fluid riverine environments and to rearrange and order hydro-social relations. I have approached these fixing efforts as elements of resource-making processes that seek to render the Mekong's riverine flows and environments more 'productive', investable and exploitable, as well as governable and controllable. The central research question for my work has been **how water resources are made and governed in the Mekong Region**, through what kind of rationales, techniques and power relations, and **with what effects**, especially in terms of the consequent **new power formations** and **implications for the lives of the Mekong's riverine residents**. To answer this the analysis covers various efforts fused with power relations that enable and shape water resourcification and result in new hydrosocial orderings. Hydropower development, while important, is only one of the examined modes of hydrosocial ordering. Others include hydraulic infrastructuring efforts in the form of flood and saline water control, as well as irrigation schemes, broader basin management schemes, technoscientific knowledge-making and the attempts to govern climate change that materialise in hydraulic infrastructures.

The study is grounded in a tradition of interpretive analytics and located at the interface of environmental and development studies. I have built my analysis on Foucault-inspired

research on development and environment, especially in the field of political ecology. Hence the focus on the governmental rationalities, discourses and technologies that shape water resourcification processes. Equally important is the interest in the consequential effects of these processes: the new power constellations, modes of hydrosocial ordering and relations of resource control. In other words, I have paid close attention to the reciprocally constitutive relations between resources and power formations. I have looked at how relations of power shape water resourcification, and on the other hand, how new relations of power are constituted and consolidated in relation to resource-making. The power formations (Li 2019) shaping and resulting from resource-making efforts include technoscientific, infrastructural, discursive, corporate and state powers. The analysis contributes to identification and untangling of the assemblages or the complex webs of relations shaping and forming the resourcification processes and thus also enables reflection on the distributed responsibilities at stake.

The approach is also inspired by science and technology studies, taking seriously the importance of hydraulic expertise, technologies and infrastructures as well as the materiality of fluvial waters in the analysis of power formations. While fluvial environments and hydraulic infrastructures are, on the one hand, shaped by power/knowledge, they are not, on the other, entirely malleable, inhering instead potentialities to insert their own effects independent of the rationalities and intentionalities of the political authorities, planners and engineers. While the infrastructuring efforts often aim for ecological simplification, they may instead produce new socio-ecological complexities as well as newly volatile powers of water that may get further augmented by changing climate.

The research contributes to studies of hydrosocial relations by examining the continuities and changes in Mekong water resourcification processes and their rationalisations and techniques. It also bridges the political-ecological research on water and climate change by examining how climate change-related discursive formations, techniques and policies have opened new space for hydraulic infrastructuring, especially hydropower dams. More broadly, the research provides new insights on the co-constitutive relations between resources and power formations as well as on the socio-spatial configurations that emerge from resource-making processes. This bears relevance on recent political ecology discussions on resource- and state-making (Bridge 2014, Lund 2016, Rasmussen and Lund 2018) currently advanced also in the political ecology of water (Harris 2012; 2017, Menga and Swyngedouw 2018). It might also enrich frontier discussions which have evolved around transforming regimes of control over land and forests (e.g. Peluso and Lund 2011, Eilenberg 2014, Kelly and Peluso 2015) by exploring frontier dynamics in relation to water

resourcification. Moreover, the study responds to a recent call in studies of science and technology (Jasanoff 2015: 15) for studying more rigorously how technoscience and technical infrastructures are implicated in the possibilities of governing and thus in the formation and exercise of power.

In the rest of this chapter I underline the importance of studying the entanglements of water and power and explain how I try to understand them by studying attempts at fixing the fluid, fluvial flows of water and riverine relationalities. I shed light on some of the key conceptualisations of this study, which are further elaborated in Chapter 2. I also sketch out global trajectories of damming rivers, explain why the Mekong offers an intriguing window onto understanding changing modes of hydraulic infrastructuring in the global South and highlight what is at stake with all these drastic changes. I then elaborate my research questions in more detail, explaining how they are addressed in each article of this study.

## 1.1 HYDROSOCIAL ORDERING, WATER RESOURCIFICATION AND HYDRAULIC INFRASTRUCTURING

Water is a condition of liveability. It is also integral to all economic activities, agricultural as well as industrial. The rendering/directing of water to these uses has increasingly implied resourcification and commodification. Because of its essentiality in all productive processes, water is susceptible to different attempts at political control over it (Krause and Strang 2013). Yet water's fundamentality to life also means that the attempts to commodify and control it are continuously open to contestations and conflicts (Bakker 2012), which, in turn, are often attempted to be stabilised, depoliticised and rendered governable with newly structured modes of hydrosocial ordering. Nonetheless, while water figures prominently in today's headlines, it often does so within apolitical frames. One persistent water topic relates to concerns over a water crisis within the frames of increasing water scarcity (e.g. World Economic Forum 2011). Scarcity frames water in terms of absolute quantities while side-lining considerations on how it is distributed to different groups of people through different ways of governing it, and excluding ways of perceiving and approaching water as something other than an inert resource (Mehta 2005; 2010). Water is increasingly topical also through climate change. The IPCC reports (Bates et al. 2008, IPCC 2018) highlight that climate change materialises most concretely through water: either there is too much of it and in the 'wrong' places, as in devastating floods, or there is too little as in distressing draughts. Yet often the climate change perspective naturalises these events, obscuring how many of them are not only caused by changing

climate but, rather, co-produced by previous decisions on water use and by efforts to govern water. The river systems in particular have been modified, engineered and infrastructured at an accelerated pace. According to Williams et al. (2014:61), ‘rivers have been more thoroughly re-engineered by humans than any other geomorphic feature’.

Bringing hydrosocial relations to the centre of focus means approaching water flows through their various engagements with social and political relationships. It means that water flows are not something external and pre-given but continuously shaped by social, economic and political relationships and marked by power differentials: the ways water moves and gets distributed is socially, economically and politically inflicted, at the same time as socio-political formations are shaped by water (Swyngedouw 1999; 2009, Krause 2017). In the circulation of water, nature and society are fused together. Accordingly, water flows through our societies (in more or less disrupted ways) not in hydrological but rather in hydrosocial cycles (Swyngedouw 2009, Linton and Budds 2014). With the concept of hydrosocial ordering I explicitly bring into focus the relations of power (including relations of governing and control as well as infrastructuring), and how ways of governing water are intimately connected to ways of governing people. I use the concept of ordering because it covers and bridges the vast array of power modalities that are at stake in this work from governmental to sovereign, and from the more discursive to the most materialised forms of arranging relations between people and things (Law 2003, Dean 2013). The hydrosocial relations at the centre in this study are riverine. With the concept of fluvial relationalities I refer to all kinds of riverine hydrosocial relations including the multispecies entanglements (Haraway 2016) between fluvial flows, sediments, fisheries, riverine people and modes of organising lives and livelihoods around river use. When rivers meet the sea, as for example in the Mekong Delta, fluvial relationalities also get entangled with marine or oceanic relationalities.

In this study, I examine attempts to fix the fluid, to transform the fluidity characteristic of fluvial waters and fluvial relationalities, into a dependency on the fixed, and, in the case of most hydraulic infrastructuring efforts, into a dependency on solid built structures. I am especially interested in the processes that resourcify fluvial waters, which have a common aim of intervening, rearranging and fixing hydrosocial relations so that they are rendered more controllable, allowing the optimisation of certain, limited affordances of water to intensified productive uses. At its very core I approach resourcification as a condition for orderability and governability as well as a condition for commodification. Resourcification is thus a broader process than commodification, entailing processes that could be conceptualised as meta-commodification (Biggs 2008). Modern resourcification entails externalisation and objectification of water, and in the case of fluvial waters, alienation

(Tsing 2015) and disentanglement of water as H<sub>2</sub>O from its manifold riverine relations with sediments, fisheries and people, as well as from the multiple meanings attached to it (Bakker 2002, Linton 2010). Technoscientific inscription devices like hydrological models may enact this disentanglement abstractly while hydraulic infrastructuring like large dams or flood control dikes do this very materially.

Techno-scientific knowledge production and hydraulic infrastructuring reorganise not only fluvial flows but also hydrosocial relations and are thus co-constitutive of new power formations (Swyngedouw 1999, Mitchell 2014, Morita 2016). Hydraulic infrastructure enables and stabilises particular kinds of hydrosocial orderings while often foreclosing others. Larger scale infrastructures re-scale power relations by creating new sites or nodes for authoritative decision-making. Hydraulic infrastructures also disrupt fluvial relationalities, thereby making obsolete previous ways of organising life around them, meanwhile suspending previous modes of controlling and making decisions over riverine uses. Thus they entangle with the establishment of new regimes of resource control also assisting in cementing them in place. Different modes of hydrosocial ordering and hydraulic infrastructuring thus rearrange power relations, and the large-scale water-works in particular are susceptible for opening new avenues for expert, state and corporate power formations. I also demonstrate that the ordering capacities inherent to hydraulic infrastructures can be multivalent, meaning that at times they may get newly geared to differing political and economic purposes.

Efforts to fix the fluid and attempts to make 'the fluid to depend on the solid' (Deleuze and Guattari 1987: 363) often imply a move from amphibious to terrestrial infrastructuring and environment-making. A major part of hydraulic engineering projects have centred on land reclamation, drainage and irrigation. The 'hydraulic missions' (Molle et al. 2009) that have transformed river basins through dams and large-scale irrigation schemes, especially in the early and mid-decades of the 20<sup>th</sup> century, were animated by a high-modern rationale (Scott 1998). They also epitomise what Jensen (2017: 225) has called attempts to manage 'amphibious spaces through terrestrial approaches' that are premised on impounding water and in demarcating clearly the boundaries between land and water (Lahiri-Dutt 2014), in contrast to more amphibious approaches that would organise life around moving waters and the constant variations in wetlands and other watery lands (Lahiri-Dutt 2014, Jensen 2017). Modern hydraulic infrastructuring efforts have thus centred on terrestrialising riverine relationalities (Morita 2016, Krause 2017, Richardson 2018). The fixing efforts never really achieve the aimed for fixity: the verbal form of *fixing* and *infrastructuring* draws attention to the on-goingness of the ordering efforts (Blok et al. 2016).

The terrestrialising hydraulic missions in the colonial or postcolonial contexts of the global South have often entailed 'hydraulic Orientalism' (Linton 2010: 123). In other words, attempts to resourcify rivers have been based on certain, often implicit and unexamined, assumptions about rivers in temperate European and North American climates. In the Mekong Region this has meant that the pulsating temporalities characteristic of monsoon rivers have appeared as something to be rectified and disciplined (Sneddon and Fox 2006, Sneddon 2015). Terrestrialising hydrosocial ordering and infrastructuring is thus combined with what I would call - inspired by Frewer (2016) - an acclimatising approach, which aims to temper, if not to omit, the seasonal climatic changes in water's affordances to assist efforts to secure more stabilised systems of agro-industrial production. My research shows that, at the scale of the Mekong Delta, this fusion of terrestrialising and acclimatising attempts has materialised in infrastructures that aim to secure year-round separation of water and land by keeping floods or brackish water out of previous wetlands. I also demonstrate how the predominant ways of approaching climate change add new meanings and also new kind of plausibility for acclimatisation through hydraulic infrastructuring. In the next section, I discuss how dams have become central to changes in river-society relations and how damming rivers that in the past often aligned with acclimatisation efforts at the scale of the Basin, currently advance mostly through enclavistic projects that optimise the affordances of water principally in terms of electricity production.

## 1.2 THE MEKONG AS MIRROR TO GLOBAL WAVES OF DAMMING RIVERS AND THE MORPHING OF GLOBAL DEVELOPMENT

Large dams are amongst the key technologies used for hydrosocial ordering and also amongst the most massive infrastructure projects worldwide (Nüsser and Baghel 2017). Large dams and the changes in how they are developed can be seen as epitomising broader changes in global development and environmental governance. Dams have morphed from triumphs of modernisation and 'temples of modernity', as India's Prime Minister Nehru famously stated in the 1950s, to embodiments of the failures of high-modernist schemes, only to be transformed again to contested carriers of sustainable development and climate change agendas (Scott 1998, Kaika 2006, Molle 2009). Changes in dam development also reflect the way infrastructure projects in the global South have been increasingly promoted as private and financialised assets (Hildyard 2016, Ahlers 2020). Moreover, changes in dam development reflect changes in the geographies and geopolitics of global development (Sneddon 2015, Hirsch 2016, Mohan and Tan-Mullins

2019). While in the post-war period dams were intimately entwined with US Cold War geopolitics and rivalries between the US and the Soviet Union, the more recent resurgence of hydropower seems to reflect the end of the era dominated by the Washington-based Bretton Woods institutions and the 'rise of China'. The dam development trajectories in the Mekong Region are illustrative of these changes.

### **The first wave of resourcifying and damming rivers**

The first wave of damming rivers started in the early 20<sup>th</sup> century, rising and globalising steadily in the post-war period, peaking in the 1970s and continuing until the 1990s. By the end of the 20<sup>th</sup> century, 45,000 dams had been built in 140 countries (WCD 2000). The way dam plans entered the Mekong Region reflect how the 20<sup>th</sup> century damming of rivers evolved in many parts of the global South. An imagined geography of the Mekong as a 'basin' and its fluvial waters as a 'resource' with exploitable potential and in need of improvements through hydraulic infrastructuring started to take shape intensively at the end of the 1950s, with the decisive involvement of US experts and foreign policymakers (Bakker 1999, Sneddon 2015). The Tennessee Valley Authority (TVA), which epitomised the unified river basin development rationale and technologies developed in the 1930s, evolved into a kind of flagship 'export model' of US post-war development aid and a template on the basis of which thousands of river basins were developed in the global South, the Mekong being one of them (Scott 1998: 170, Molle 2009, Sneddon 2015). In TVA-influenced schemes, large dams formed the key technology for bringing rivers under 'total control' (Molle 2009; 2017) serving not only the production of hydroelectricity but also flood control and irrigation, thus fuelling agricultural modernisation, industrialisation and economic growth. The exported North American technoscientific expertise got deeply enmeshed with US foreign policy pursuits of extending and territorialising the US geopolitical power, perhaps nowhere as intensively as in the Mekong Region. There the American engineers and their riparian colleagues planned massive dam schemes with the aim of taming both the unruly fluvial waters of the monsoon climate and the unruly rural populations feared for their deemed potential to fuel the spread of communism.

Technopolitical interventions, however, steadily evolved into more military ones, the region devolved into a series of wars and conflicts, and most projects got derailed. Until the 1990s the Mekong actually remained one of the least dammed large river basins in the world. From the 1960s to the 1980s only one major tributary dam, Nam Ngum in Laos, was built, along with some smaller scale tributary dams in Thailand. Other rivers in Thailand and Vietnam, however, were developed. Characteristic of the 20<sup>th</sup> century dams in the global South, they were supported by United States (in Thailand), Soviet Union (in Vietnam) or the World Bank (Pak Mun dam in Thailand), and they formed public assets in



the sense of being built and operated by host country state agencies (Hirsch 2010, Ahlers et al. 2017).

While plans to turn Mekong into a regulated and fully controlled river system through a cascade of dams got shelved, the legacies of perceiving the Mekong as a basin that could be integrally managed and planned have been powerful. As discussed in Article I, the ‘full control’ idea materialised to the fullest sense in the Mekong Delta, although in a downscaled form without the upstream dams, through integrated systems of high dikes for flood control and saline water prevention. The image of the Mekong as ‘ripe for development and improvement if only the appropriate technologies and knowledge could be applied’ (Sneddon 2015: 122) has also partially persisted in a morphed, eco-modern form in the work of the current Mekong River Commission, as discussed in Article II. Furthermore, seeing the free-flowing Mekong tributaries and mainstream as untapped opportunities for hydroelectricity production and wealth creation could be seen as leaving a legacy to the current Mekong dam rush.

In the 1990s, the global scene of dam development changed drastically as the result of the social movements of the 1980s all around the world, mobilising large and steadily converging campaigns against them. Large dams were no longer just emblems of progress; instead they became increasingly synonymous with destroyed riverine ecologies, development-induced displacements, impoverishment, corruption and people’s struggles for social and environmental justice (McCully 2001, Khagram 2004, Goldman 2005). One of the most prolific anti-dam campaigns was the Narmada movement against the Sardar Sardovar dam in India, which eventually forced its key supporter, the World Bank, to withdraw from the project. The contestations over dams culminated in the establishment of the World Commission on Dams (WCD). With the Commission’s influential report (WCD 2000), many of the problems related to large dams shifted from matters of counter-expertise to widely acknowledged facts (Khagram 2004). The WCD estimated that 40-80 million persons from 1960 to 1990 were displaced and famously noted that ‘In too many cases an unacceptable and often unnecessary price has been paid... especially in social and environmental terms, by people displaced, by communities downstream, by taxpayers and by the natural environment’ (WCD 2000: xxviii). Later research has complemented the figures showing that by 2010 nearly 500 million people had suffered from effects detrimental to river-based livelihoods, especially in terms of fisheries, that the WCD had partially overlooked (Richter et al. 2010). After the establishment of the Commission not only the World Bank but also other multilateral development banks that had been important supporters of dam development withdrew from many projects and the funding for dams dropped dramatically (Richter et al. 2010). It looked like the era of

damming rivers was coming to an end. The last project World Bank funded before its temporary exit from hydropower was the Pak Mun dam on a Mekong tributary in Thailand (Middleton 2018). It aroused one of the, thus far, most intensive anti-dam struggles in the Mekong region, with strong local mobilisation that perpetually transnationalised and was included in the projects that the WCD reviewed (Foran and Manorum 2009).

### **The second wave of hydropower and the Mekong dam rush**

Now large-scale dams are making a come-back at a rapidly accelerating rate. Plans for large dams are proliferating, especially in the Amazon Basin, in various African river basins and in the Mekong Basin (Zarfl et al. 2015). If all the plans go forward, global hydropower capacity will be increased, rather strikingly, by over 70 percent (Zarfl et al. 2015), the planet's river volume affected by dams would increase from the current 48 to 93 percent (Grill et al. 2015) while the damming of the three most biodiverse river basins – Mekong, Amazon and Congo – will put one-third of the world's freshwater fisheries at risk (Winemiller et al. 2016).

Map 1 illustrates the state of large dams in the mainstream and tributaries of the Mekong Basin. Almost all the constructed dams have been finished within the past ten years and the next decade is set to be marked by intensive further development. What is different now is that, firstly, the dam developers and financiers are more diverse; the private sector is more engaged and new countries, most importantly China, have moved to the centre stage. Secondly, the rationales, justificatory discourses and techno-scientific practices are also more diverse (Sneddon 2015, Ahlers et al. 2017). In an attempt to re-legitimise hydropower, dam proponents have discursively repurposed dams to serve poverty alleviation, environmental sustainability and climate change mitigation. At the same time, however, the era of multipurpose dams seems to be gone. The increasing private sector involvement gears the projects more forcefully towards optimisation of hydroelectricity sales. The multi-purposing of single purpose dams is contradictory, as will become evident through the analysis of this study.

The changes in 21<sup>st</sup> century dams are not only intensively present in the Mekong but also partially created there. This is especially so of the new sustainability standards and mechanisms created in response to earlier condemnations of dams. The World Bank, together with other heavily criticised key proponents of hydropower like the International Hydropower Association, did not want to comply entirely with the recommendations of the World Commission on Dams nor give up on hydropower. Instead, they have attempted to make the development of hydropower consensual by developing their own more pro-corporate approaches, partially incorporating the pro-poor and environmentalist

objectives of their previous adversaries. The Bank re-entered hydropower with the Nam Theun 2 project in Laos, as examined in Article III. Two years after the inauguration of the dam, a World Bank representative announced that moving away from large hydropower was a mistake, boldly summarising: ‘That was then. This is now. We are back.’ (Schneider 2013). Nam Theun 2 has come to symbolise the revival of the hydropower industry globally. It has also become a key reference point for attempts to authorise claims that large dams can be built sustainably (Middleton 2018). Nam Theun 2 has thus been central not only in the creation of a new justificatory discourse of ‘sustainable hydropower’ but also in the attempts of various hydropower proponents to validate the claims of sustainable hydropower. Resonating with the thesis of Boltanski and Chiapello (2007: 27) that the survival and robustness of capitalism rest on its continuous capacity to discover ‘routes to its survival in critiques of it’, the World Bank, a kind of ‘cadre organisation’ of capitalist order, was not decisively weakened by the attacks against it but instead managed to renew itself through associations it built with its opposition and through a partial incorporation of the environmentalist agenda (Goldman 2005).

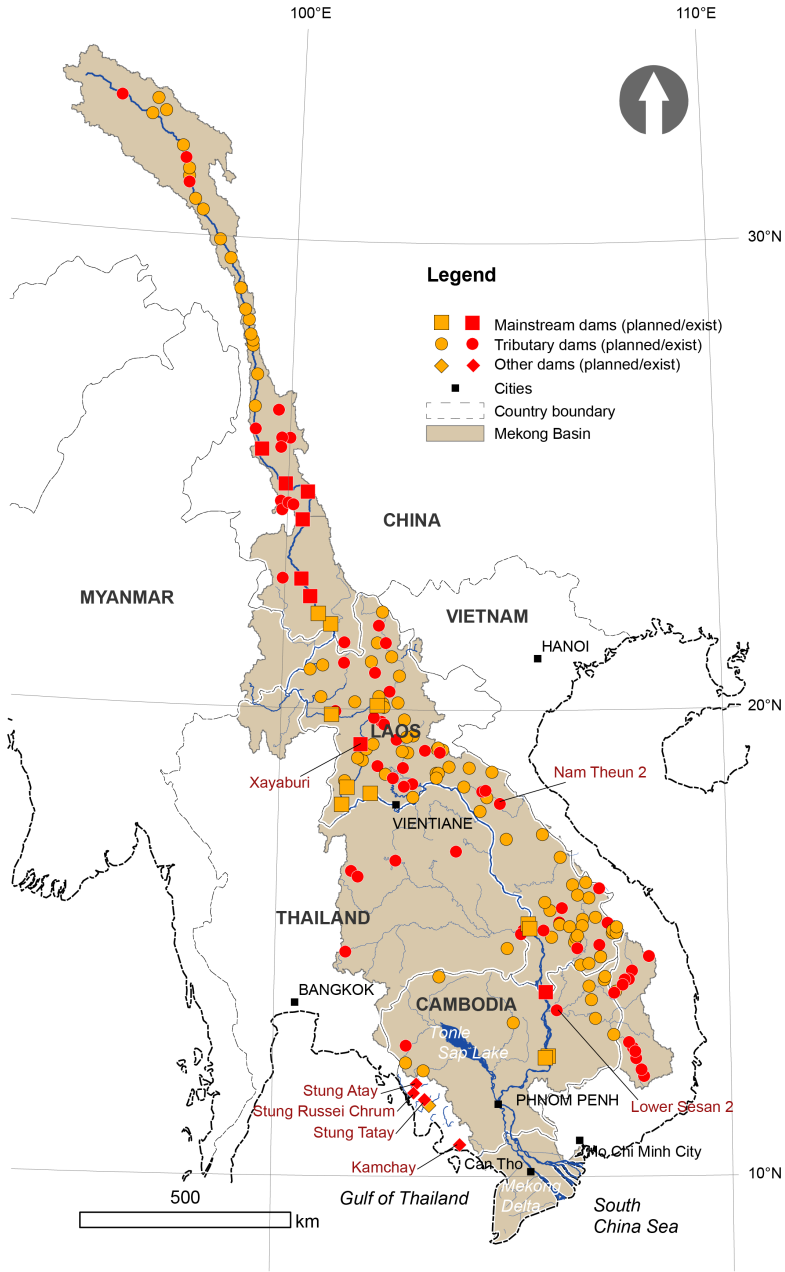
The second factor contributing to the building momentum for the large dam come-back is climate change. It figures centrally in attempts to move hydropower beyond disputes. Articles III and IV demonstrate how the ways climate change is rendered governable relate to the consensualisation of large dams and other large-scale hydraulic infrastructuring. On the one hand, the attempts to portray dams as key technologies for the climate change combat seem conditioned by the ability of dam proponents to demonstrate that large dams can be fixed; on the other, climate frames tend to override and governance mechanisms obfuscate the adverse social and environmental effects of dams that were so central in the 1990s dam debate. The climate change mitigation efforts materialising in the Clean Development Mechanism (CDM) dams have turned dams into producers of tradable emission reductions. By the end of 2019, 2,185 hydropower CDM projects had been registered producing the mechanism’s highest share of emission reductions (UNEP DTU 2019). In the Mekong, the relation between hydroelectricity and emission reduction production is equally tight. For example, in Cambodia and Laos most of the CDM projects are hydropower projects and they produce the highest emission reduction share, and concomitantly, a high share of the recently built hydropower projects are CDM projects.

Thirdly, 21<sup>st</sup> century dams are increasingly private assets (Merme et al. 2014, Ahlers 2020). The World Bank and other development banks have promoted their own decentering through the neoliberal privatisation and investor-friendly policies they have advanced. With the promotion of Public Private Partnership-based concessionary contracts, they

have aimed to make infrastructure, including hydropower dams, an attractive asset class for private investors (Romero 2015, Hildyard 2016). In the hydropower sector this concessionary approach most commonly materialises in the Build-Operate-Transfer (BOT) model. In Laos and Cambodia all of the post-1990s, second-wave large dams are BOT projects. It practically means that rivers are made investable by concessioning them for 25-45 years for different types of business consortiums motivated by maximisation of revenues from electricity sales. With the rise of investor friendly concessionary dams, it seems that the 20<sup>th</sup> century amalgamation of river basin planning and the large dam development, eloquently examined by Sneddon (2015), is increasingly disjointed. The individual hydropower projects going ahead do not have much to do with integrated basin management plans which are still promoted by the Mekong River Commission. Instead they are separate enclavistic projects and their operation mode is determined by the motivations of their concessionaires.

Fourthly, the capacities and resources to build dams are now differently distributed, as well as newly concentrated. In Brazil and India, dam development has become a more domestic affair. China, which dammed its rivers at the highest rate globally during the 1970s and 1980s (WCD 2000), has evolved into a global powerhouse for hydropower development. In fact, hydropower is one of the key sectors in which the ‘rise of China’ has very concretely materialised in the Mekong Region as well as globally. Dams have formed a central part of China’s ‘Going Out’ strategy and the ‘Belt and Road Initiative’. Currently Chinese companies and banks are the biggest builders and financiers of hydropower dams in the global South while the largest share of the projects is concentrated in Southeast Asia, particularly in the Mekong Region (Urban et al. 2018, Siciliano et al. 2019). At least 40 percent of the on-going or proposed tributary and mainstream Lower Mekong dam projects are to be carried out by Chinese state-owned companies (Hirsch 2011, IR 2014). In Cambodia, which has become China’s closest ally in Southeast Asia, all the large dams have been, thus far at least, concessioned to Chinese companies. The projects have, in fact, presented a formative experience for the Chinese hydropower industry in undertaking large, long-term overseas BOT hydropower projects (Urban et al. 2018, Mohan and Tan-Mullins 2019). In Laos the dam concessionaires are diverse, importantly including private Thai and state-owned Vietnamese companies, and in a lesser quantity of other Asian and European companies. Also Chinese investors and developers are increasingly involved in the Lao hydropower sector (Matthews and Motta 2015, Tan 2015). While the Chinese investors and developers make use of the neoliberal, private-sector-oriented concessionary mode of developing dams, they effectively also blur public/private boundaries through the dominating role of state-owned enterprises and export credit agencies. Article V demonstrates how concessionary deals get entangled with

bilateral Sino-Cambodian relations, showing that concessionary dams do not only concentrate corporate powers but also end up furthering new concentrations of China's geopolitical and Cambodia's state power.



Map 1: Existing and planned large dams in the Mekong Basin in 2019. In Laos all the dam projects are within the basin. In Cambodia there are also 5 large dam projects situated in rivers outside of the Basin. These are marked in the map as 'Other dams'. The dam projects in Thailand and Vietnam outside of the Basin are not marked here as they are not examined in this study. The dam projects examined or mentioned in this study are labelled with their name. (The map is created by Matti Kummu)

### 1.3 WHAT IS AT STAKE?

The 4,763-km-long Mekong is the 8<sup>th</sup> largest (by flow) and 12<sup>th</sup> longest river in the world (MRC 2019). It starts its course in the Tibetan Plateau and meets the South China Sea in the Mekong Delta of Vietnam. The river gives its name not only to the Mekong Basin (Map 1), but also to the broader Mekong Region, often considered to consist of Yunnan province in China, and the whole territories of Myanmar/Burma, Thailand, Laos, Cambodia and Vietnam through which the river runs through<sup>1</sup>. The basin, especially the parts in Laos and Cambodia, has recently emerged as a frontier for intensive water resourcification and hydraulic infrastructuring. New large-scale irrigation schemes are being planned in both countries (Blake and Barney 2018, Blake 2019), but even more consequential are the massive damming efforts (MRC 2019). Around 200 large-scale (>15 MW) dam projects are in various stages of development (78 commissioned, 33 under construction and 89 proposed), most of which are situated in Laos (Geheb and Suhardiman 2019, WLE 2018). The way the affordances of the Mekong are increasingly reduced to hydroelectricity production puts at stake its sustenance of one of the world's richest, if not the richest, inland fisheries, and one of the richest rice production areas in the world, and thus the ways the Mekong sustains the livelihoods of the Basin's riverine people and the food security of the whole region (Sabo et al. 2017).

The Basin is often divided into two parts: the Upper and Lower Mekong Basins. The mountainous Upper Mekong Basin or Lancang is situated in China with a small part shared with Myanmar. It comprises a third of the Basin and contributes 6 percent of its wet season and 24 percent of its dry season flows. Of the total hydropower potential of the Mekong Basin, estimated at 53,000 MW (MRC 2010) or 60,000 MW (T. Räsänen et al. 2018), around 23 000 MW is in the upper section. A major part of that potential has been recently realised by a cascade of 11 mainstream, and 8 more are likely to be accomplished in the near future. The Lower Mekong Basin, comprising the main share of the Basin and characterised more by lowlands and floodplains, hosts around 60 million people in Thailand, Laos, Cambodia and Vietnam.

The Thai portion in the northeast of the country contains mainly rural areas and has been targeted by ambitious but only partially realised irrigation schemes (Floch and Molle 2013). Laos is almost completely within the Basin. Its rugged topography provides the highest hydropower potential of the Lower Basin, with estimates ranging from 18,000

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<sup>1</sup> The Mekong Region does not have very strict definition but its use has become common through the more specific 'geo-economic' (Hirsch 2016) construction of Greater Mekong Subregion (GMS) which, in addition to Yunnan includes also the province of Guangxi. It is a program of economic regionalisation fostered and supported by the Asian Development Bank and the World Bank, materialising especially in different infrastructural projects that advance regional connectivity.

MW up to 27,000 MW of which 5,308 MW had been developed by 2018 (IHA 2019). From the perspective of the Thai energy sector and investors, the high affordances of these riverine flows if converted into electricity are not only conveniently close-by but also expediently situated in a strictly controlled political environment where mass mobilisations against dams, as previously experienced in Thailand, are far less unlikely. The largest hydropower projects in Laos have thus far been developed by Thai investors and companies and they mainly feed the Thai electricity grid. In some cases, the Lao grid has been bypassed entirely. By 2025 Laos expects to export 9,000 MW of electricity (mainly hydroelectricity) annually to Thailand and 5,000 MW to Vietnam, and by 2030 the government estimates the export to amount to 20,000 MW (Vientiane Times/ANN 2020). At the same time, the Mekong and its tributaries in many ways sustain the agriculture and fisheries-based livelihoods of the country's predominantly rural, riverine residents.

Cambodia also lies almost entirely within the Basin. It is here that the Mekong fisheries are of highest relative importance, both in terms of subsistence and commercially, with an 18 percent contribution to the GDP, which is higher than contribution from rice production (MRC 2018). The flood-pulse based ecology of the Tonle Sap Lake and its flooded forests sustain remarkably rich fisheries, making the Mekong's inland fisheries the largest in the world estimated to account for 40 percent of world's total inland fisheries (MRC 2018). Cambodian hydropower potential within the Basin amounts to up to 9,000 MW (ADB 2018), of which 400 MW is now built through the Lower Sesan II tributary dam. Most of the potential outside of the basin has already been built (1,380 MW), as the Kamchay and the Tatay, Atay and Russei Churum dams analysed in Article V, have been accomplished. The remaining pressure for future hydropower is, thus, mainly on the Mekong, including the highly controversial mainstream dam, Sambor (2,600 MW) that is at least temporarily suspended. In Vietnam, part of the Basin resides on the highlands, where tributary dams have been built, but the Vietnamese part mostly consists of the Mekong Delta, the main rice growing and aquaculture area of the country and of the whole Basin.

While the affordances of the Mekong are diverse in different parts of the Basin, and also somewhat differently valued by the riparian states, Cambodia and especially Vietnam being most concerned on upstream dam developments, on a certain level the developmental aspirations of the riparian states seem to converge in how they are geared towards large-scale infrastructuring that optimises only very limited affordances of water either to hydroelectricity or industrial agriculture while disallowing or doing away many other affordances capable of sustaining various livelihoods by complex fluvial



relationalities, most importantly in the form of fisheries. As explained in Article II, at times agencies such as the Mekong River Commission conceived that the maximisation of hydroelectricity and industrial agriculture could be made mutually supportive or compatible but now even the Commission's assessments (MRC 2017) indicate that the maximisation of hydroelectricity excludes almost all other affordances of riverine flows.

The mosaics of livelihoods of the 60 million predominantly rural riverine people in the Lower Mekong Basin are those most threatened by the hydropower development. The tens of thousands of people adjacent to planned dams are at risk of being displaced with little prospects of getting their livelihoods restored. People further away from the actual dam sites, in turn, are affected with the cascading effects of the dams especially accumulating in Cambodia and Vietnam. The dams, particularly the tributary dams with largest water detention capacities, cumulatively produce drastic water flow alterations (Lauri et al. 2012, Cochrane et al. 2014, Räsänen et al. 2017) which, for example, threaten to unsettle the Tonle Sap hydro-ecologies and damage its exceptionally rich fisheries (Ziv et al. 2012, Arias et al. 2014). Moreover, the dams hold back not only water but also sediment and fish migrations and thus disrupt fluvial relationalities in fundamental ways. Together the flow-altering and fish-migration-blocking effects of the mainstream and tributary dams pose a serious threat to the fisheries (Baran and Myschowoda 2009, Ziv et al. 2012, Stone 2016). If they go ahead unabated, the result may amount to a 40 percent loss of the Basin's fisheries by 2030 (ICEM 2010) and 40-80 percent by 2040, seriously injuring the lives of the 40 million people involved in fisheries (MRC 2017), as well as the food security in Laos and Cambodia where most of the protein comes from Mekong fish (Orr et al. 2012).

The way the dams trap sediment is, in turn, most consequential for the Mekong Delta (Kummu et al. 2010, Kondolf et al. 2014, T. Räsänen et al. 2018), the world's third largest delta, which sustains around 20 million people, produces half of Vietnam's food and forms one of the world's most productive rice growing areas. Currently most of Vietnam's rice is produced there, of which a large part is exported to Southeast Asia (Anthony et al. 2015). By separating fluvial waters from sediments, the dams threaten to weaken the delta-building powers of fluvial waters drastically, especially in relation to oceanic waters empowered by climate change (Chapman et al. 2016). The dams thus amplify the effects of climate change (MRC 2017) and further vulnerabilise an area often ranked among the top ten most vulnerable to climate change (Germanwatch 2019). In addition to dams, the increasing sand mining in different parts of the river, including within the delta, also starve fluvial waters of sediment (Kondolf et al. 2018). This resonates with how, on a smaller scale, another highly climate-vulnerable coastal area of the Mekong Region, the

Cambodian southwestern coast, is further vulnerabilised by a combination of dams and sand mining, as explained in Article V. In the Mekong Delta of Vietnam the picture is further complicated by the powers of the existing large-scale hydraulic infrastructure, as discussed in Article I, which exert their own effects on how upstream impacts, and climatic change co-produce, new deltaic vulnerabilities.

At stake is also the autonomy of riverine people to decide on their own modes of using the rivers, organising livelihoods and relating and living with the rivers. Large-scale dams, and often other large-scale hydraulic infrastructures as well, are almost by definition dispossessory as they radically alter riverine ecologies, diminish the possibilities of diverse and decentralised river use and re-scale power relations, tending toward more centralised control of riverine resources (Boelens et al. 2016, Ahlers et al. 2017).

#### 1.4 RESEARCH QUESTIONS AND OUTLINE OF THE (SYN)THESIS

The main objective of this thesis has been the tracing and analysis of different aspects and consequences of water resourcification and hydro-social ordering efforts in the Mekong Region. My overarching question – ‘How are water resources made and governed in the Mekong Region and with what effects?’ – implies, on the one hand, attention to how changing relations of power, including power/knowledge relations, shape the development of hydraulic infrastructures. This entails analysis of the changing governmental assemblages that shape hydraulic development. One of the key arguments of the thesis is that there is no single rationale that could explain the current dynamics but, rather, an interplay of different rationales, practices and techniques in which the legacies of past plans, decisions and endeavours also play a role, as do pre-existing water infrastructures and the powers of fluvial waters. On the other hand, the question implies attention to how, in turn, the new hydraulic schemes rearrange relations of power and change the lives of riverine people. Sub-questions that contribute to the overarching question of the thesis are addressed in separate articles and are as follows:

- 1) How have the hydrosocial relations in the Mekong Delta of Vietnam been ordered and rendered governable, and with what effects? (Article I)
- 2) How is the Mekong Basin assembled and rendered knowable, and with what effects? (Article II)
- 3) How is the new model of sustainable hydropower produced, in what kinds of projects does it materialise and how does it enable new hydropower development? (Article III)
- 4) How does climate change figure in and enable the development of hydraulic infrastructure, including hydropower dams? (Articles III, IV and V)

- 5) What kinds of governing logics shape the turning of rivers into producers of hydroelectricity in Cambodia, how do hydropower projects get entangled with other processes of resource-making, and with what effects? (Article V)

I examine the first sub-question in Article I by looking at how the Delta's hydrosocial relations have been ordered by different rounds of hydraulic infrastructuring efforts, often planned from afar and with aspirations not only limited to land reclamation and the optimisation of the water's affordances to rice mono-cropping, but also at taming the Delta's residents who are often perceived as unruly. I look at how attempts to establish simplified hydrological and social governability from a distance have resulted instead in increased socio-ecological complexity. I also discuss how the initially bracketed 'side-effects' have accumulated to the point that they problematise the successfulness of attempted terrestrialisation and acclimatisation of agriculture through large-scale hydraulic control schemes. I am also attentive to the powers of techno-scientific inscriptions, as well as those of infrastructures and fluvial waters. Moreover, I highlight how hydraulic infrastructuring schemes can be re-purposed to serve differing socio-political aims.

The second sub-question is addressed in Article II in which I examine the Mekong River Commission's (MRC) knowledge production. I analyse how assessments based on hydrological models enact the Basin as an object of governing and turn riverine flows into a(n orderly) manageable resource. Article II looks at how Basin development is rendered technical via expert knowledge and participation which together have attempted to produce and guarantee a realm for Basin-wide development planning beyond disputes. Overall, it explains how the MRC has contributed in constituting the Mekong as a frontier for 'sustainable' water resourcification via establishing facts on its development potential.

The third sub-question is addressed in Article III by looking at how a model of 'sustainable hydropower' has been constructed in the project of Nam Theun 2, the largest Mekong tributary dam situated in Laos. I especially examine the role of the World Bank and its will to improve and fix hydropower with new techniques of assessments, monitoring and compensation in order to contain previous critique and to consensualise hydropower. I show how the Nam Theun 2 has at the same time succeeded in resulting in a more 'benign' project than most of its predecessors while failing to deliver on the promises that would make the project qualify as sustainable and pro-poor. I argue that, in Laos, Nam Theun 2 has remained a 'sustainability enclave' (Whittington 2012) but also paved the way for the current dam rush of projects with much less sustainable safeguard mechanisms. Nam Theun 2 has also contributed to the resurgence of hydropower globally (Middleton 2018). While the Nam Theun 2 has failed in delivering the 'sustainability' it promised and continues to be contested, it has been sustainable enough to be used in

potent re-legitimation attempts by hydropower proponents to validate the new justificatory discourse of ‘sustainable hydropower’.

The fourth sub-question is addressed in Articles III, IV and V. Article III looks at how the re-legitimation efforts of hydropower entangle with the rise of climate change agendas and how the World Bank has tried to consensualise its energy work, large dams in particular, by framing it as climate-friendly. Article IV, in turn, focuses on Cambodia and looks at how climate change approaches themselves are rendered technical and consensual in ways that create space for large-scale hydraulic infrastructure projects: irrigation schemes in adaptation and large-scale hydropower in mitigation. The analysis of how climate change governance connects with hydropower development through Clean Development Mechanisms begins in Article VI and is further elaborated in Article V through an examination of three CDM hydropower projects in the Southwest Cambodia. Articles IV and V both problematise the carbon reductionism of global carbon markets. Article V in particular shows how traded carbon commodities conceal the socio-ecological relations of their production, which in this case included histories of unconsulted and dispossessed fishers, exploited and maltreated construction workers, violent logging tycoons and intimidated forest communities.

The fifth sub-question is addressed in Article V by looking at the interplay of different governing logics that shape hydropower projects in Cambodia and by examining how hydropower projects get entangled with other processes of resource-making and how these intersections are constitutive of new power formations. Article V explains how the concessionary mode of developing large hydropower dams materialises in enclaves of heightened corporate powers in which the de facto authority is concessioned to Chinese state-owned hydropower companies; it also shows how concessionary dams may contribute to state power consolidation, which in this case importantly happens through the ways the dams form part of broader Sino-Cambodian relations and how they interact with other schemes of resource control. The conceptualisation of overlapping zones of exclusion developed in Article V, enables to come to grips with the interactions between heterogeneous schemes of resource control that are often present and consequential in Southeast Asian resource-rich frontier sites but easily remain invisible.

The outline for the rest of this synthesis is the following. The key concepts and theoretical approaches that organise the thinking and analysis throughout the thesis, especially in this summarising synthesis, are discussed in **Chapter 2**. The conceptualisations are discussed in a context-specific way, bringing forth the shaping of resource-making processes in the Mekong Region. The research materials and the methods of assembling and analysing them are presented in **Chapter 3**. **Chapter 4** presents the key findings of the composite

articles while also containing contextualising elements which assist in situating each article within the broader dynamics of resource-making in the Mekong Region. **Chapter 5** puts the findings in closer dialogue with each other and further develops the connections between them. **Chapter 6** concludes the thesis.

## 2. KEY CONCEPTS AND RELATED THEORETICAL DISCUSSIONS

As I have already introduced key concepts that are directly linked to the analysis of hydrosocial relations—fluvial relationalities, hydrosocial ordering, water resourcification and hydraulic infrastructuring—this chapter moves on to the concepts and conceptualisations I use and develop to make sense of socio-ecological changes in the Mekong Region, addressing conceptual work which has relevance for analysis of recursive or co-constitutive relations between resources and power formations. The discussions here are not limited to water, although I concretise the arguments most explicitly in relation to rivers. At focus are the concepts of resource-making, governing rationales and techniques, frontiers, assemblages, and power effects: the analytical work they enable, how I understand the relations between them, and how this understanding is informed and inspired by related theoretical discussions.

Early debates in political ecology revolved around questions of access to and control over resources (Watts 2000; 2015, Paulson et al. 2003), questions which are also significant in this study. More importantly, however, I am interested in complicating the question of resources by asking how riverine waters are produced as resources to be governed or exploited in the first place, and how the processes of water resourcification relate to changing regimes of exclusion from, access to and control over fluvial waters, fisheries and watery, riverine lands. In this way I take part in more recent political-ecological discussions that have increasingly expanded the meaning of the political in political ecology, a shift that is partly influenced by Foucauldian modes of inquiry drawing attention to knowledge-making processes and how they shape and enable certain modes of governing the environment while foreclosing on others (Fairhead and Leach 2003, Forsyth 2003, Rutherford 2007, Li 2007a). Resource-making is a pre-condition for commodification but it is also about the production of orderability and governability, which involves power/knowledge relations as well as material technologies and infrastructures that make ordering or governing ‘at a distance’ possible. This is what makes the Foucault and Latour-influenced analytics of governing (e.g. Rose and Miller 1992) helpful in attempts to understand resource-making processes.

In certain ways, my attempt of opening resourcification processes to closer examination is also connected to the recent ontological turn in political-ecological debates (Blaser 2009, Escobar 2010). The making of water resources creates conditions of possibility for very

specific human-water relations while excluding others (Linton 2010), thus also diminishing the space for other water ontologies (Yates et al. 2017). For example, some of the governing rationalisations and accounting and assessment techniques shaping resource-making depoliticise and enable abstractions and commensurations in ways that obscure that at stake are not only questions of access to, and control over the same riverine resources but also differences in understanding, viewing, experiencing and enacting what rivers are. My analysis challenges the production of fixity in approaches that enact riverine waters rather exclusively as resources; it thus contributes to creating space for more fluid, diverse, situated, less over-riding and exclusive—as well as constantly evolving—worldings and meaning-making processes connected with rivers and fluvial environments.

## 2.1 RESOURCE-MAKING AND POWER FORMATIONS

I start by focusing on resources and their making—that is, resourcification—highlighting and differentiating between the following key aspects: the production of resources as externalised nature; the production of orderable and governable resources (amenable to state control); the production of commodifiable and investable resources; and the making of exclusionary regimes that (hydro)territorially organise relations between people and resources. By discussing the ways they relate to each other I bring into focus the relationalities between technoscience, state and capital in resource-making processes. I also draw attention to relevant governing rationales and techniques, as well as modalities of power, that relate to or may accompany each of these aspects. Finally I elaborate more explicitly on the conceptualisation of recursive resources and power formations. The conceptual work in this section draws from and also establishes connections between scholarly discussions on the co-production of nature and society (Latour 1993) or science and social order (Fairhead and Leach 2003, Jasanoff 2004), of governmental rationalities and techniques (Rose and Miller 1992) and of resources and states (Bridge 2014, Lund 2016).

Resources are not entities or substances that just exist in the world, waiting to become utilised; they need to be made and brought into being (Bakker and Bridge 2006, Linton 2010, Richardson and Weszkalnys 2014). At its core, resource-making entails an activity that could be termed the externalisation of nature, resulting in the modern bifurcation of the natural and social worlds, the object and subject, and science and politics (Latour 1993; 2004). This externalisation takes place through forms of knowledge and technologies that reveal nature as a mechanical order of fixed laws and predictabilities: in Spinoza's terms as fixed 'natura naturata' as opposed to 'natura naturans' consisting of

animate matter and beings that ceaselessly generate new forms and continuous occurrence through their entanglements (Bennet 2010: 117). Externalisation also allows a position of working upon 'nature' as opposed to working on socio-natural relations from within them. In terms of resourcification of fluvial waters, the science of hydrology and technologies such as hydrological models have been essential in carving out rivers as water flows purified of, and excluded and abstracted from, their multispecies entanglements (Haraway 2016) representing them as assessable and orderable fields of reality in which interventions can be planned (Linton 2010). This is how the complexity of fluvial relationalities gets reduced and simplified to manageable/orderable dimensions while enabling more or less limited modes of engaging with the enacted resources that range from extraction to conservation. The produced legibility of 'nature' or rivers is what makes ordering 'at a distance' possible. The ways in which rivers reveal themselves as orderable also affect ordering aspirations, creating positions for planners, engineers and administrators as ordering subjects. The technoscientific dimensions of resource-making establish pre-conditions for producing 'nature' that both the state (Scott 1998) and capital (Ferguson 2005) can see, and are formative of a range of assumptions about the possibilities and limits of resource controllability. The aspiration to produce controllable and orderable resources enabled by tools of simplification (Scott 1998) could be termed the technoscientific modernist rationality.

In the most material terms, water resources come to exist through hydraulic infrastructuring, which also fixes and solidifies their orderability or, in other words, assists in stabilising particular orderings. Engineering and infrastructuring schemes enable and call for new ways of organising power relations: the larger the scale of the ordering and infrastructuring schemes, the more that centralised coordination and control are called upon and on offer. Yet it is important to note that hydraulic infrastructures do not imply any automatic or straightforward change in power formations as, for example, suggested by Wittfogel (1957) in his thesis on 'hydraulic despotism' and 'total power' (Banister 2014, Ley and Krause 2019).

In the heyday of the Cold War, technoscientific modernist rationality took the form of high-modernism with an amended credo of rationally planned societal improvement schemes (Scott 1998). Embodiments of this includes the model of full river-basin control which was enabled and made plausible by advances in hydrological knowledge and infrastructural technologies (Linton 2010, Sneddon 2015). It was thus co-produced by high-modernist rationality and new techniques of governing rivers. As noted earlier, in the Mekong Basin this model of river basin development pursued terrestrialisation and acclimatisation of riverine modes of production. Technoscientific water resourcification,



especially in its high-modernist forms (Scott 1998), lends itself to expert power formations and hydraulic statecraft (Molle et al. 2009) if or when the concentrated abilities to control from a distance accrue to hydraulic planners within state bureaucracies in the form of new ordering competences. When technoscientific capacities are mobilised for hydraulic statecraft, the task of hydraulic knowledge production may become geared to the production of a river that ‘the state can see’ and thus govern (Scott 1998, Sneddon 2015). Large-scale hydraulic infrastructures, such as large dams, also provide the ‘means to demonstrate the strength of the modern state as a techno-economic power’ (Mitchell 2002: 21) and provide the state with the appearance of a separate realm that orders nature and society (Harris 2012).

Another aspect of resource-making relates to the creation of marketable entities or commodities. Resourcification is a pre-requirement for turning things into ‘capitalist assets’. For certain (socio)natural affordances to become tradeable entities they need to be turned into ‘stand-alone objects’ alienated from their ‘living-space entanglements’ and detached from their situated social relations (Tsing 2015: 5). In terms of technoscientific knowledge production, the metrics of simplification need to be tuned to producing externalised nature that ‘capital can see’ (Robertson 2006: 368, Ferguson 2005; 2006) by reducing the ‘grids’ of legibility and orderability to measurable and calculable qualities that make sense in terms of profitability. This entails assessment techniques and feasibility studies that estimate the economic value of the resources, such as those carried out on hydropower dams in the course of fluvial commodification. Efforts to commodify riverine flows often focus on only one riverine affordance at a time, as in the case of commercial hydropower dams which radically simplify rivers into a single commodity: hydroelectricity. The processes tuned to producing commodifiable resources are often less concerned about the broader orderability of riverine flows to different uses unless they threaten to diminish the affordances of the commodified resource.

To become a commodity the economically valuable resource needs to be rendered investable, which, in addition to technoscientific tools of simplification, requires a property regime that enables and secures privatised forms of resource control (Li 2014). In the recent past the commodification of resources has been most forcefully advanced by the neoliberal governing rationale manifested in legislative and regulatory reforms that facilitate privatisation and corporate access to resources in market-based, investor-friendly ways (Castree 2003; 2008, Mansfield 2004, Bakker 2005). In many contexts, however, advancements in resource-based wealth creation are also mobilised through illiberal governing rationales. In Southeast Asia, and particularly in the Mekong Region, the formation of resources as wealth creating assets can be less market-based and more guided

or sanctioned by authoritarian or neopatrimonial rulings, for example (Nevins and Peluso 2008, Barney 2017). The commodification processes often give birth not only to new concentrations of private wealth, but also to spaces of rule within which de facto authority is exercised by corporates (Ferguson 2006, Ong 2006).

An example of a riverine property arrangement advanced through neoliberal reasoning, and also central to this study, is the concessionary BOT contract model for hydropower dams which is designed to turn the construction and operation of dam infrastructure into a profitable investment asset (Bakker 1999, Johns 2015). In this arrangement, conditions for profitability include an optimal concession period (often 25-45 years) so that the concessionaire is provided with a considerable number of profitable dam-operation years after the loan pay-back period (which often amounts to 10 years), while handing the dam over to state authority takes place before dam productivity decreases and maintenance costs of decaying infrastructure increase. Another condition is high autonomy in terms of altering riverine flows to create a flow regime that is optimal for maximised electricity sales. The contracts also frequently include clauses to exclude or pre-empt other riverine uses and changes in regulations that could threaten the profitability of the dam operations. In the case of the concessionary dams, the centralised nodes of ordering that the large infrastructures provide, lend to strengthened corporate powers over riverine flows and hydrosocial relations.

Both the technoscientific modernist rationality of producing orderable resources and the neoliberal rationale advancing production of commodified resources have morphed into different variants of a consensualising eco-modern rationale as a result of earlier contestations. The variant of eco-modernism which entails continuation of the technoscientific modernist rationality has been termed by some as 'green governmentality' (Bäckstrand and Lövbrand 2006; 2016). This equals with a technomanagerial approach to solving environmental (including climate) problems with more precise and comprehensive knowledge production and standardised expertise-based control, accompanied by the strengthened ordering capacities of technical experts and administrative state or international organisations. Technomanagerial ecomodernism thus entails an assumption of a linear science-policy model (Keeley and Scoones 2003) and is co-produced by new techniques of governing such as advanced impact assessment techniques and modeling technologies (e.g. hydrological models or the climate change related general circulation model). An example of this in riverine resourcification is the rationale of Integrated Water Resource Management (IWRM) which, compared to the high-modern rationale of united or total river basin management, attempts to render calculable and orderable previously

excluded aspects of, for example, river ecology, and is exercised through national or intergovernmental river basin organisations (Molle 2008; 2009; 2017).

Another variant of eco-modernism is a more market-oriented rationale entailing the continuation of neoliberal reasoning, which has been termed ‘market environmentalism’ (Bakker 2004), ‘green neoliberalism’ (Goldman 2005) or a ‘weak version of ecological modernisation’ (Bäckstrand and Lövbrand 2006). This variant builds on projected synergies between wealth accumulation and environmental (including climate) protection, drawing on corporate-friendly mechanisms of internalising externalities or further commodifying nature by creating ecosystem services, biodiversity offsets and carbon credits designed to replace or flexibilise direct regulation of administrative organisations (Robertson 2006, Castree 2008, Bakker 2009, Fletcher and Büscher 2017, Dunlap and Sullivan 2019). These are exemplified in riverine resourcification by corporate-friendly sustainability standards for hydropower that aim for the internalisation of externalities without altering the core mode of riverine engagement, which is to extract and maximise profits from hydroelectricity. The riverine commodification may also intersect with the production of new environmental commodities, for example, when the dam’s upstream watershed is attempted to be conserved through payment for ecosystem services (PES) schemes or when hydropower companies look for or are offered new opportunities to sell not only hydroelectricity but also carbon credits through the CDM.

Common to both variants of eco-modernism is that the detrimental socioenvironmental effects and related contestations that have arisen from previous resourcification attempts are addressed with further resourcification. This is done by treating the encountered problems as externalities that can be internalised either with more comprehensive assessments and fixed ordering technologies—as in the technoscientific variant—or through corporate-friendly sustainability standards (that also entail more comprehensive assessment processes) and new market mechanisms that are co-produced by or dependent on new measurement techniques and calculations of commensuration, as in the neoliberal variant of eco-modernism (Rutherford 1999, Goldman 2005, Robertson 2006, MacKenzie 2009, Sullivan 2018).

As mentioned above, the making of commodified resources is dependent on a secured property regime. This brings us to the final aspect of resource-making discussed here, which is related to but still separable from technoscientific ordering<sup>2</sup> and the pursuit of commodification, as well as from their eco-modern variants: the making of spatial regimes of exclusion from and access to resources (Hall et al. 2011, Li 2014, Lund 2016). This is

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<sup>2</sup> Technoscientific tools of legibility most importantly in the form of mapping exercises often co-constitute or form relevant pre-conditions for spatially exclusive resource-ordering schemes (Vandergeest and Peluso 1995).

constitutive of both the resources and the authorities deciding on their control. Here modalities of power are tied to the logics of sovereignty (Lund 2016) but also to ‘practices of government’ (Rose and Miller 1992, Li 2007a: 10-12; 2014) when the exclusionary processes are attempted to be rendered consensual and governable without coercion. Claims to have exclusive rights to use certain resources invoke questions of who has the ‘ability to create and enforce collectively binding rules’ on resource use and, thus, exercise sovereign political authority (Lund 2011: 886). In the case of large-scale resource control schemes, the usual agency expected to inhere in these abilities is that of the state. Foreign investors and companies, for example, are often unwilling to negotiate with multiple parties and thus expect the state to guarantee resource availability and, when required, to execute and secure the necessary resource appropriations and evictions (Emel et al. 2011, Levien 2012).

It could perhaps be said that the more intensively commodified a resource, the more evidently necessary it becomes for the state to decide on and guarantee property rights (Vandergeest and Peluso 1995). Customary arrangements are often deemed as too fluid, especially for large-scale, fixed capital investments. The ways that resource appropriations are constitutive of laws and state sovereignty are acute questions in many resource-making processes.<sup>3</sup> The state may not have the requisite sovereign qualities prior to the making and enforcement of an exclusionary regime, especially in the contexts of postcolonial institutional pluralism and/or post-conflict situations; consequently, the processes of creating resource availability protected by exclusive rights (for extraction or conservation) often demand the (re)organisation of the state and legislation and are thus formative of state sovereign (and administrative) powers (Peluso and Lund 2011, Lund 2016). The sovereignty is also relational here in the sense that state sovereignty is enacted through recognition. People whose previous socionatural relations and access arrangements are dismantled (willingly or unwillingly) as a result of state-enforced appropriations, are made to recognise the state as authoritative in organising relations between people and resources, and themselves as subject to state power (Lund 2011; 2016). For example, in the case of large dams, the state’s authority to decide over hydrosocial relations is actualised in the lives of riverine people when the state grants permission for the dam to be built. In addition to state, there are often also transnational regulative entities that try to intervene in how relations between people and the formed resources are organised through exclusionary regimes (Li 2014). For example, the World Bank has promoted the BOT template in many countries and frequently tried to intervene in how possible

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<sup>3</sup> This continuing relevance of appropriations is something not easily grasped by Foucauldian power conceptualisations which enact ‘a liberal forgetting of appropriation’ (Dean 2007: 246) and the Schmittian notion of arbitrary violence as a basis of order. As Dean (2013: 132) notes ‘no form of governmentality is elaborated in relation to processes of appropriation’ and Foucault does not seriously engage with the sovereign modalities of power (Dean 2013: 132).

evictions and resettlements should be arranged and how those whose ways of using the river are excluded by the dam should be compensated.

The aspects and rationales of resource-making discussed above are often interrelated but should not be conflated; they may align with each other in mutually supportive ways but can also be in tension. The tension arising between the modernist technoscientific rationale and the advancement of commodification, for example, is illustrated by how the high-modernist, river-basin management model partially originates in attempts to control disparate and accelerating commercial extractive activities (Linton 2006). As I argue in this thesis, a similar tension can currently be observed between the rationalist, eco-modern, river-basin management approach and the (more or less) green neoliberal or post-neoliberal concessionary modes of governing hydropower dams, as the latter has increasingly uncoupled dam development from river basin planning. The (neo)liberal rationale, on the other hand, embodies a certain suspicion towards modernism's credo of rationalist planning (especially of high-modernism's 'total planning') and the rendering of uncertainties calculable (O'Malley 2015), while the highmodernist rationale may align more readily with authoritarian modes of governing (Scott 1998, Blake and Barney 2018). In some cases the technoscientific knowledge production can at the same time be formative to commodification while retaining uneasy relations with it, as exemplified by the making of carbon credits (MacKenzie 2009) and wetland banking (Robertson 2006) when the market requirements for commensurate commodity values overwhelm the capacities of technoscientific knowledge production.

The argument in the making here is that the key dimensions of resourcification—1) technoscientific attempts to create orderable nature with the will to master it; 2) attempts to commodify resources with the will to facilitate profit extraction and capital accumulation; and 3) the creation of exclusionary property or resource control regimes with the will to territorially organise people/resources relations—while often co-constitutive or aligned, are not entirely reducible to each other.

Another important point is that while resource-making is shaped by shifting and effective assemblages of powerful agencies, rationales and techniques, resource-making processes are concurrently constitutive of new power formations and they may strengthen or weaken the agents involved. Here I expand the conceptual lens provided by the notion of the co-production of resources and states (Bridge 2014, Lund 2016) to subsume the co-production of resources and power formations more broadly. Resources and states are, as Robbins (2008) and Bridge (2014: 119; emphasis added) have noted, both 'products *and* tools of socionatural ordering' (or, in the case of water resourcification, of hydrosocial ordering) and can thus be seen both as shapers as well as effects of processes in which

socionatural relations are re-organised. This reciprocity and emergence has remained somewhat un-articulated in Scott's (1998) approach in which the state is viewed as a powerful organiser of socionatural relations, as well as in accounts of state territorialisation (Vandergeest and Peluso 1995) where the state appears as a rather ready-made constituent in terms of organising spatial relations between people and resources. At the same time, this mutually recursive relationship is not only limited to resources and state powers but also at work between resources and other power formations. For example, the power of experts does not simply exist prior to resource-making but is formed in the course of the process (Mitchell 2002, Carroll 2012); the same could be said of corporate power (Welker 2014). Moreover, different aspects of resource-making may strengthen different aspects of state power: large-scale resource-ordering schemes that employ experts from state bureaucracies may strengthen the socioenvironmental engineering competences and administrative capacities of the involved agencies and thus foster technoscientific state formation (Carroll 2012); intensified commodification (depending on ownership and royalty arrangements) may accumulate state fiscal wealth and thus strengthen governing capacities not limited to socionatural (or in case of water resourcification, hydrosocial) relations; and resource schemes or investments requiring exclusionary property rights may invoke and consolidate sovereign and territorial state powers (Lund 2011; 2016).

In addition to the expert, state and corporate powers explicitly discussed in the above characterisation of resource-making, resourcification processes may also invoke power effects more loosely tied to a specific institutional ordering agency. For example, power formations may be embedded in the materiality of the infrastructures so that, after the construction is accomplished, they continue to order externalised 'nature' and socionatural (or hydrosocial) relations in ways that are no longer entirely malleable by future (human) ordering decisions (Biggs 2010, Li 2018; 2019). In addition to infrastructural powers, engineering blueprints as technoscientific inscription devices may also carry potency that is effective independently of the original ordering agencies (Sneddon 2015). The same goes for the discursive powers that, for example, are assembled to justify and consensualise certain resource-making processes and the accompanying new exclusionary regimes (Li 2014).

Resource materialities simultaneously shape and may resist<sup>4</sup> resourcification and commodification processes (Bakker and Bridge 2006, Braun 2008, Richardson and Weszkalnys 2014), while also bearing on the exclusionary spatial and temporal dimensions

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<sup>4</sup> For example, it has been argued that the fluid properties of water resist attempts to commodify water supply and sewerage systems (Bakker 2005).

of the property regimes.<sup>5</sup> Different material qualities call upon different kinds of technologies, expertise, investment regimes and exclusionary arrangements. They thus also bear on the possible power effects. For example, in Laos and Cambodia, domestic constituencies may more readily have the capacities required for certain forms of riverine resource-making and extraction, like river sand mining (Lamb et al. 2019), while other forms, such as the large-scale production of hydroelectricity, are more dependent on external expertise and finances and are thus likely to entangle differently with transnational power formations.

The concept of ordering that I use in this work, as in hydrosocial ordering, refers to both the constituent and constitutive powers of resourcification. As mentioned earlier, I find the concept of ordering useful and potent because it covers the various modes of power at stake, from sovereign acts of ordering to more governmentalised modes of power (Dean 2013); it also encompasses discursive and material aspects as well as their entwining in technoscientific or sociotechnical modes of ordering (Law 2003).

In this study, (eco-)modernist technoscientific resource-making together with expert power formations and the powers of technoscientific inscriptions have most interpretive valence in the basin and delta-wide ordering schemes discussed in Articles I and II. Hydraulic infrastructuring efforts in the Vietnamese Mekong Delta after the unification of the country are also discussed as examples of an alignment, or rather entanglement, of state territorialisation and hydraulic/technoscientific state formation. The neoliberal rationale of advancing resource commodification and the neoliberal variant of eco-modernism are particularly relevant for understanding the Nam Theun 2 case of ‘sustainable hydropower’ (Article III). Article IV discusses how climate change is rendered governable. In much the same way as resources are made by producing externalised nature, the premises of dominant climate governance initiatives are set by climate science that constructs climate as a realm that is external to human society (Swyngedouw 2010, Hulme 2011). The technoscientific approach primarily attributes climate risk to shocks caused by climate-induced bio-physical changes, thus provoking preventive adjustments principally in the form of technofixes and infrastructural solutions (Ribot 2014, Taylor 2015). Externalising climate change thus makes it plausible to think that climate measures do not require alterations in the development status quo, even if its associated political-

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<sup>5</sup> Transforming fluvial affordances into hydroelectricity, for example, requires significant expert and financial capacities and invokes a highly concentrated and exclusionary resource regime (compared, for example, with logging, which is much less capital-intensive and less readily exclusive, as discussed in Article V). But while the dam itself is easily ‘fenced off’ and the dams with reservoirs may themselves entail immediate evictions and definite displacements of previous land and water uses, the exclusion of other riverine uses in downstream areas, such as fisheries or agriculture-related livelihoods, are less immediate and occur over longer periods of time in the form of diminished opportunities. The differences in intensities and temporalities of exclusions may in turn mean differing intensities and patterns of resistance.

economic and political-ecological processes produce climate vulnerabilities. This also enhances the plausibility of rationalising climate measures in terms of synergies between prevalent economic growth pursuits and climate mitigation instead of recognising their antagonisms (Swyngedouw 2010). Together, externalising climate and eco-modernist reasoning result in a kind of anti-politics of climate change that creates space for situating large hydraulic infrastructures as central elements in climate responses.

In order to make sense of the concessionary CDM Cardamom dams and how they interact with other schemes of resource control (Article V) all of the different aspects of resource-making discussed above are pertinent.

## 2.2 MEKONG FRONTIER CONSTELLATIONS

In this section I elaborate on the above discussion on resources, governing rationales and power formations in a more context-specific manner, invoking the concept of frontier, one that is relevant to this study as frontiers can be understood as sites or spaces where resources (and thus technoscientific assessments and inventories, resource management schemes and property regimes) are being worked out in the contemporary moment. It thus draws attention to the situated resourcification dynamics in particular places and times, thereby also calling for attentiveness to the various socio-spatial configurations that emerge from resource-making processes. I focus here on the more recent frontier developments in Laos and Cambodia. These assist in situating the ‘dam rush’ as part of the broader ‘opening up’ of these countries to foreign investors which, since the 1990s, has entailed intensive resource-making processes of various kinds: from conservation to mines and tree and agro-industrial plantations. Many ‘resource-rich’ sites, including those with rivers to be dammed, form complex frontier constellations for various, overlapping resource control and extraction efforts (Barney 2009, Baird and Barney 2017), as well as for state-making efforts (Lund 2011, Dwyer 2014). To make sense of these dynamics I begin by discussing relevant frontier studies (e.g. Tsing 2005, Barney 2009, Eilenberg 2014, Rasmussen and Lund 2018) which I then connect with studies of enclaved spaces of governing (Ong 2006, Sidaway 2007, Nyíri 2012, Whittington 2012; 2019) due to their relevance in making sense of emergent socio-spatial formations in contemporary Lao and Cambodian frontiers.

Frontiers are often approached as sites of new opportunities for commodity markets and may thus experience rushes in logging, mining or conversion of land to cash-cropping (Nevins and Peluso 2008), generating violent looting, dispossession and degradation as previous social and territorial orders get dissolved (Tsing 2005). Yet they are also locations



where new arrangements, regulations and legal reforms governing resource use and property rights are attempted. Thus, while the frontier dynamics can be dramatically dispossessive and disordering, frontiers are also spaces for new ordering efforts (Barney 2009) as well as sites where the violence embodied by property laws (Blomely 2003) often becomes evident. Resource and commodity frontiers also entail active making: investors are attracted by depictions of untapped potentialities which may either erase from sight already existing uses or frame them as inefficient or even destructive (as for example swidden agriculture is often framed), thereby providing legitimacy for the new ventures (Barney 2009, Li 2014).

In commodity frontier studies the focus is often on the advances of the capitalist order, but frontiers have also been approached as political borderlands at the margins of state control that are intended for inclusion in the space of state sovereign rule (Hagmann and Korf 2012, Watts 2018). Some recent studies (Eilenberg 2014, Korf et al. 2015, Kelly and Peluso 2015, Rasmussen and Lund 2018) have attempted to capture explicitly the concomitant expansion of resource commodification and the formation of state authority in frontier spaces. Eilenberg (2014), for example, highlights how, in the resource-rich borderlands of Indonesian Kalimantan, both capitalist agrarian encroachment and the territorial expansion of state authority and its securitisation are taking place simultaneously. Rasmussen and Lund (2018) suggest that frontiers are liminal spaces where new opportunities for commodification dismantle previous socionatural and resource control relations invoking (re-)territorialisation and new relations of authority, including state formation.

The frontier studies discussed above have all been formative for my analysis. In this work I also approach and cast frontiers as sites at the edge of (eco)modernisation with unfulfilled promises of mastering and administering externalised 'nature', and the potential for rationally planned improvement schemes. The technoscientific aspects of resourcification are also important in terms of inscription devices (inventories, maps, statistics, models) that may enable legibility for expanding wealth creation and/or power consolidation efforts. In fact, all the key aspects of resource-making outlined in the previous section are often contemporaneous and at least partially co-constitutive. For example, in the Cold War period before the Vietnam War, the Mekong was perceived as a frontier for river modernisation and American technopolitics; these were seen as facilitating more commodified forms of production and as opening up commercial dam construction opportunities, particularly for American firms, while the hydraulic infrastructuring schemes in the Mekong Delta were to enable territorialisation of the political authority of the Saigon regime (Biggs 2010, Sneddon 2015). In this work the

various Mekong frontier constellations at stake thus involve not only commodification and changes in relations of (hydro)territorial authority but also technoscientific (hydraulic) modernisation, which is particularly relevant for the first wave of water resourcification, as discussed in Article I. The second wave, in turn, has been partially enabled and shaped by eco-modernist knowledge schemes in its technocratic and neoliberal variants, as argued in Articles II, III and IV. Something that seems generic to all kinds of resource frontiers within and beyond this work is that they are emergent spaces confronting a new encoding regime which provokes both de- and re-territorialisation of pre-existing socionatural orderings. Thus, in the broadest sense, frontiers are, as Milne and Mahanty (2015: 6) put it, sites of transformation ‘where change processes are particularly intensive’.

Compared with much commodity frontier literature my own approach builds somewhat more on Foucauldian studies, not only in the sense of highlighting the role of knowledge-making processes but also in that I do not necessarily analyse capitalist dynamics as such but, rather, the different governing rationales (and techniques) that make capitalist, political-economic formations possible. Thus, when trying to make sense of the second wave of water resourcification in Mekong, particularly in Laos and Cambodia, both marked by a combined post-conflict and post-socialist predicament, two differing governing rationales are particularly important for understanding the frontier dynamics at stake: the securing of global circulation and territorial fixation (Foucault 2007; 2008). The latter can be understood to include the rationales of both establishing the sovereign territorial authority of the state and its exclusivity, and strengthening state capacities to control resources and people within this territory. The liberal rationale of securing global circulation, in contrast, includes the establishment of ‘conditions for the organization of world market’ (Foucault 2008: 56) and, thus, the globalising operations of capital, which in recent times has taken the form of the neoliberal governing rationale. Their key difference lies in sociospatial orientation. The rationale of territorial fixation is about the centripetal logics of spatial ordering geared towards the state, with unlimited ‘reason of state’, which may easily align with authoritarian modes of governing.<sup>6</sup> The rationale of securing global circulation, on the other hand, is about centrifugal logics of spatial ordering geared towards enabling global circulation and the formation and expansion of global systems, accompanied by the liberal ‘reason of least state’ (Foucault 2007: 44–45; 2008: 52, also Sassen 2006), which currently manifests in neoliberal governing modes. At the same time, however, the circulation is dependent on various kinds of territorially fixed spaces of connection, such as corporate enclaves (Ferguson 2006), infrastructure corridors or special

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<sup>6</sup> Foucault’s own work, however, is more oriented towards the analysis of (neo)liberal arts of governing while the rendering of contemporary illiberal modes of governing (as well as sovereign modalities of power) intelligible are left on the sidelines (Dean 2013).

economic zones (Ong 2006, Bach 2011) and other forms of global territoriality (Opitz and Tellman 2012), as well on territorially fixed sovereign state powers (Emel et al. 2011).

Although advancements of global circulation may invoke images of fluidity in contrast to territorial fixation, this is somewhat problematic as ‘flows’ of capital are preconditioned by constructed connectivities that require substantial informational, infrastructural, regulatory and institutional fixation; nor would they be possible without forms of global territoriality (Opitz and Tellman 2012). In the Mekong Region the advancements of markets and the opening up of Laos and Cambodia to global circuits of capital is, therefore, perhaps not so well captured by ‘all that is solid melts into air’ (Marx and Engels 1998[1848]: 38), and rather better, to put it bluntly, by ‘all that was fluid is disrupted and newly fixed’ to allow for capital and new commodities (such as hydroelectricity) to circulate. The thesis title ‘fixing the fluid’ thus also connotes, not only hydrosocial ordering efforts, but also broader fixing efforts directed at the ‘opened up’, ‘unfixed’ frontier spaces.

The opening up of Laos and Cambodia—particularly their ‘resource-rich’ upland or hinterland areas—as resource frontiers, has been facilitated by transnational governing entities such as the ADB and the World Bank. Guided by neoliberal governing rationales, since the 1990s such entities have aimed to transition the Mekong Region ‘battlefield to marketplace’ and (re-)connect Laos and Cambodia to global circuits of capital after years of wars, insurgencies and socialist experiments (Goldman 2005, Barney 2009, Glassman 2010). The proliferation of large dams, mines, forestry schemes and agro-industrial plantations have been foregrounded by numerous resource inventories, forest classification and feasibility studies, and legislative and regulatory reforms concerning property rights, including the facilitation of Economic Land Concessions and BOT dam contracts. (Re-)connecting to global circuits of capital has also generated the Greater Mekong Subregion Programme, with its schemes for regional infrastructure corridors, including roads and electricity transmission lines, that have opened up the possibilities of developing hydropower projects in previously remote areas. Most of the preparatory work for intensive resource extraction and commodification has been funded and guided by the development banks as well as by other development donors. Most recently, Chinese investors and developers have made use of the established property and concessionary investment arrangements to elicit reconfigured spatial patterns of global and regional connectivity with China’s own infrastructural initiatives (Sidaway and Woon 2017, Nyíri and Tan 2017); furthermore, also the GMS corridors are now increasingly geared to China’s ‘orbit’ (Dwyer 2020).

Not all the fixing efforts are, however, merely about facilitating foreign capital; post-conflict, state consolidation efforts also entail their own territorial fixing logics. As Dwyer

notes (2011), both sides of the equation battlefield-to-marketplace are important: the 'marketplace' for opening up resources for wealth accumulation and the 'battlefield' for consolidating fragmented sovereign powers and territorial state control (Lund 2011). The civil wars and insurgencies left legacies of different 'unruly' areas in both countries up until very recent times, as well as several fractions competing for political authority, including ruling party leaders, the military, provincial strongmen and business tycoons. At the same time, the multiplicity of rule is not only a result of the 'battlefield' period but also characteristic of the early modern political history that preceded it (for Laos, see Evans 2002). In Laos, particularly, there has also been a longer-term, persistent suspicion on the part of lowland state authorities vis-à-vis upland, semi-nomadic, swidden agriculturalists which dates back to pre-colonial and colonial times (Evrard and Goudineau 2004, Scott 2009). Thus, as the countries, and especially their 'resource-rich' peripheral areas, have been opened up to investors (or conservationists), the state authorities have concomitantly tried to establish their rule over areas they have perceived as unruly or ungovernable simultaneously taking over or undermining pre-existing customary arrangements and more autonomous modes of deciding over socio-natural relations. The forming and territorialising of Lao and Cambodian state power has mostly been pursued through a combination of authoritarian and neopatrimonial modes of governing while the persuasive elements have consisted of promises of stability, progress and modernity (Blake and Barney 2018). Central for power consolidation has thus been the governing through fear and rule of force amalgamated with the assembling of networks of loyalty and reciprocal favours which importantly have centred on resource deals and concessions, particularly involving timber and land (Singh 2012, Creak and Barney 2018 for Laos; Le Billon 2002; Hughes 2009; Hughes and Un 2011; Verver and Dahles 2015; Milne 2015, Mahanty 2019 for Cambodia). In fact, the capacity of the Lao and Cambodian party-states to act from a distance is in part built around reciprocal exchange of political loyalty and access to key resources, the centralising of which strengthens the sovereign powers of the party-states in both countries. These centralised powers are also a precondition for arranging resource availability for foreign or domestic investors, particularly if forceful evictions are required. At the same time, illiberal state consolidation and territorialisation have also been advanced through the more transnational spaces of neoliberal governing.

The predicament of the co-presence of the heterogeneous territorialisation of global capital and the regulations of transnational governing entities, together with centralising party-states actively engaged in attracting—and in certain resource-developments, such as large hydropower, dependent on—foreign investors, render the frontier constellations particularly complex. Indeed, the multiplicity of agencies, resource agendas and governing rationales means that there are diverse frontiers at work at the same time. Furthermore,

neither resource-based, wealth-creation efforts nor territorialising state powers are advanced by encompassing or covering space contiguously but rather in a form of ‘patchworked’ frontiers (Barney 2009: 152). Importantly, this is because the key socio-spatial formation through which resources are extracted and governed in contemporary Laos and Cambodia is the enclave (Nyíri 2012, Diepart and Schoenberger 2017, Whittington 2019). In both countries in addition to Special Economic Zones (SEZ) also resource-extraction arrangements for industrial plantations, mines and dams tend to form exceptional spaces of governing, carved out from national terrain and disembedded from surrounding society, often entailing exemptions from state regulatory oversight. In some cases the exemptions may result in the enclaves’ surpassing the regulatory norms—as in the ‘sustainability enclaves’ (Whittington 2012; 2019) manifested by the Nam Theun 2, discussed in Article III—while in other cases exemptions entail falling short of them, as in the case of the Cardamom dams discussed in Article V. Conservation zones have also, albeit often only initially, formed partially exceptional spaces of rule because of co-governing arrangements with international conservation organisations. The ‘patchworked’ frontiers thus materialise in a ‘chequered geography’ resonating with Ong’s (2006) notion of ‘postdevelopmental’ governing. Unlike the developmentalist mode, this geography does not treat state ‘territory as a uniform political space’ but instead induces coordination with investors and their demands for corporate-friendliness, so that developmental decisions favour fragmentation of the national space into various non-contiguous zones (Ong 2006: 77).

Unlike the extractive enclaves Ferguson (2005; 2006) discusses, which principally manifest territorialisation of global capital, the enclaves in Cambodia and Laos are also embedded in state consolidation efforts. While enclavistic resource geography implies state subordination to the demands of foreign investors and the neoliberal prescriptions of transnational regulatory agencies, the state’s role is not necessarily limited to the exercise of its sovereign authority to grant concessions, as in the extractive enclaves Ferguson (2006) or Emel et al. (2011) discuss in Africa. The Lao and Cambodian states have also managed to leverage the concessions to consolidate their hold over previously inaccessible areas and ungovernable people (Dwyer 2014, Tan 2017 for Laos), or managed to use the concessions, particularly those granted to Chinese corporations, to strengthen state patronage relations (Milne 2015, Nyíri 2017, Verver 2019 for Cambodia). This resonates with how the state authorities have attempted, or managed, to gear various donor-supported efforts to serve their ends. In Laos, for example, foreign-funded land titling programs and forest policies in the 1990s were aligned with the state objectives to sedentarise upland people through forced resettlements and to gain control over ethnic groups, especially those with insurgent pasts or previous alliances with the US during the

war (Vandergest 2003, Evrard and Goudineau 2004, Baird and Shoemaker 2007, Lund 2011). In this, as in enclavistic resource schemes, the consolidation of state sovereign powers and their territoriality is advanced through ‘borrowed means’ and through conditions that are not of the states’ own choosing. What is particular to the enclavistic resource schemes is that state consolidation takes place through allowing ambiguous and heterogeneous spaces of graduated sovereignty (Ong 2006).

Interestingly, it seems that the Chinese agencies which are increasingly engaged in enclavistic investment projects in Cambodia and Laos are turning their own past experiences with special economic zones (see Ong 2006) into export models (Bach 2016). They seem to be eliciting acceptance for this approach by referring to their own development path that entailed socioenvironmental sacrifices and exceptional spaces of rule (including not only SEZs but also BOT projects) with rules imposed from outside. This is claimed to have resulted eventually in progress without undermining the centralising of state authority (Nyíri 2012; 2013, Bach 2016; 2019). Scepticism about the repeat of this trajectory in Cambodia (Yamada 2019) or Laos (Laungaramsri 2019) prevails, however. While the Lao and Cambodian state authorities are far from ‘passive victims’, highly selectively deploying neoliberal governing techniques introduced earlier and current post-neoliberal resource arrangements with the Chinese, the power asymmetries at stake seem more than provisional or temporal, while the dispossessive effects of the extractive enclaves problematise notions of progress. Certainly, the new opportunities and adversities are differentially distributed. In Cambodia, for example, the chequered geography of resource concessions is accompanied by ‘graduated citizenship’ (Ong 2006) in which *okebnyas* – business tycoons with state guarantees for preferential treatment – enjoy special privileges and state protection in resource deals, while workers within the concessions or those adversely affected by them often get denied state protection (Milne 2015, Schoenberger and Beban 2018, Verver 2019, also Article V).

The different conceptualisations of frontiers together with enclaved spaces discussed in this section have been particularly important for my analysis in Article V, in which I advance understanding of the consequential intersecting and interacting of hydropower enclaves with various other distinct resource control schemes. I also attempt to add new perspectives to the multi-dimensionality of sociospatial organisation by highlighting interaction between the governing rationales of territorial fixation and global circulation, thus contributing to the literature on complex frontier constellations.

## 2.3 ASSEMBLAGES AND EFFECTS

The concept or analytic of assemblage draws attention to ordering arrangements as complex and unstable entities that are composed of heterogeneous elements and forces whose coming together in relationship with each other renders their ensuing gathering newly capable of producing effects. It is relevant to the analysis in this thesis in at least two senses: firstly, in how governability is attempted through pulling together various distinct elements (arrays of agents, objectives, discourses, practices) and by bringing them more or less deliberately into alignment with each other, as in Tania Li's concept of governmental assemblage (Li 2007b); and secondly, in how disparate elements, such as divergent governing rationales and techniques, come to intersect and interact consequentially in ways that are less deliberately intended or planned.

The concept of governmental assemblage is particularly relevant when trying to understand the role and modes of operating of development actors and donors, particularly from Western contexts, as well as of more donor-supported organisations. Their presence in Laos and Cambodia has been intensive, especially in the 1990s and up until the mid-2000s (Hughes 2009, Phraxayavong 2009, Sato et al. 2011, Ear 2013), and they are still relevant when trying to understand how resource-making processes or climate-change measures are rationalised, particularly in the public transcripts of different environmental governance and development strategies. These development actors bring the liberal arts of governing (Rose and Mille 1993) to bear on the ordering attempts of Mekong hydrosocial relations. Their modalities of power almost by definition exclude coercion, oppression and use of force, as well as 'practices of politics' and thus must attempt to govern through 'rendering technical' and a fixing mentality (Li 2007a). The rendering technical evolves through co-constitutive relations between governing rationales and technologies (Rose and Miller 1992, Miller 1993, Rose 1999, Rose et al. 2006) and as Li (2007a; b) suggests entails practices of government that aim at closing down opened fronts of contestation by containing previous critique, by recouring to expert knowledge and by problem framings that match with apolitical or technical solutions and through which the proposed action seems synergetic for all parties involved. To achieve this, often rather unlikely components are assembled together and their holding together requires continuous work (Li 2007b). The governmental assemblage importantly emerges from constitutive exclusions of contentious elements, processes requiring political resolution and anything else that would upset the possibility of the assembled win-win propositions. One of the relevant governmental assemblages in this study is the model of 'sustainable hydropower' of which the Nam Theun 2 project in Laos has been constitutive.

Assemblage in the sense of a less intentional, more contingent but still consequential ensemble of heterogeneous elements (Ong and Collier 2005, Sassen 2006) has drawn my attention to the interplay of divergent governing rationales and techniques in resource-making. Ong and Collier (2005) discuss global assemblages as results of interacting global forms, such as neoliberal logics and more ‘situated political regimes’ (Ong 2007: 8). This led me to approach the concessionary governing mode of resources, including the dam concessions in Cambodia and Laos, as assemblages that result from the interacting of global neoliberal and locally situated authoritarian and neopatrimonial governing logics (together with colonial legacies). In the context of Laos and Cambodia I find that overall, some important analyses of resource-making processes have overtly encoded, or somewhat over-coded, these processes either as being about neoliberalisation (Goldman 2005, Springer 2009, Johns 2015) or about strengthening authoritarianism (Blake 2019). The optics of ordering assemblages as products of ‘multiple determinations that are not reducible to one single logic’ (Collier and Ong 2006: 12), in turn, allows for analysis that looks at how these and other divergent projects may interactively shape resource-making processes without collapsing them into one another.

Moreover, the assemblage, perhaps in its most Deleuzian or Latourian sense, highlights not only the effective gatherings of divergent human projects but also their coming together with non-human or more-than-human entities and processes. In this sense the produced ‘resourceness’ (Li 2014, Richardson and Weszkalnys 2014) of fluvial affordances or hydraulic infrastructures such as large dams (Sneddon 2015) (or infrastructured waterscapes), can themselves be understood as assemblages and thus composed of heterogeneous human and non-human, discursive and material elements. These also bind together and gather around them interacting forces, determinations and inclinations of knowledge, technologies, capital, state authorities and biophysical processes among others. Approaching hydraulic infrastructures as assemblages assists in recognising not only the richness but also the variance in the arrays of elements and agents that gather around different efforts made to fix fluvial flows. Attuning to this richness assists in understanding why the outcomes of hydraulic infrastructuring often differ from those intended by each of the composite agencies, and how they are only partially coordinated by human determinations. The acknowledgement of diffused agency, however, does not exclude attentiveness to distributed responsibilities that assists in identifying those parties that could be held accountable for detrimental and unjust effects. Attuning to the forcefulness of the non-human elements in the case of large-scale hydraulic infrastructures, such as large dams, however, does facilitate enhanced understanding of how the properties of the material elements provide the dam assemblages with a certain stability. Despite the great variation in the composition and effects of large dams, they



seem to bring about similar disruptions of fluvial relationalities as well as (multivalent) concentrations of hydrosocial ordering powers.

Overall, the concept of assemblage facilitates a mode of inquiry that takes note of the possibilities that things external to each other may open up new capacities ‘not inherent in the original things’ by coming into relations with each other (Rabinow 2011: 123). It aligns with what Foucault (2008:42) has called a strategic logic, that is ‘to establish connections between disparate terms which remain disparate’ and thus ‘the logic of connections between the heterogeneous and not the logic of homogenization of the contradictory’. Importantly, assemblage guides an inquiry that is attentive to relationalities, emergence and indeterminacy. This also means that the intersecting and interacting human and non-human entities, governing rationales and devices can bring about *effects* that are not entirely intended by any of the involved parties. The concept of assemblage is thus also interrelated with my attention to the effects of the water resourcification processes.

The Foucauldian optics of ‘effects’ also allows entities such as the state, often taken as pre-given, to be approached as relational and continuously in the making. Foucault’s prime interest was not so much the state itself but, rather, the governing processes that produce it. As he noted, ‘[t]he state is not a universal nor in itself an autonomous source of power. The state is nothing else but the effect, the profile, the mobile shape of a perpetual statification (étatisation) or statifications’ (Foucault 2008: 77). While this study is not essentially about state formation it still draws from studies that approach state formation as an on-going process (Mitchell 1991, Hansen and Stepputat 2006, Lund 2011; 2016) and highlight the state as ‘emergent effects of multiple projects, practices, and attempts to institutionalise power relations’ (Jessop 2007). Common to the concepts of assemblage and effects is how they steer the mode of inquiry into a processual approach that also aligns with my symmetrical interest in looking at, on the one hand, how power relations shape resource-making processes, and, on the other, how new relations of power are formed around, in and through these processes.

### 3. FIELDWORK, ASSEMBLED MATERIALS AND MODE OF ANALYSIS

My approach to assembling research materials and analysing findings is grounded in an interpretive research tradition in the social sciences, or in other words in tradition of ‘interpretive analytics’ as Rabinow (2011: 209) terms it<sup>7</sup>. The decisions on methods have been guided by a commitment to understanding nature-society relations in specific contexts, which implies qualitative and field-based research methods. This means that the modes of acquiring materials have been fieldwork intensive. In this chapter I first clarify what kinds of spatial areas the composite articles cover and then explain more in detail how the fieldwork for each article was carried out and how the materials were gathered. This also means opening up the ways my research has evolved along and through the different research projects for which I have worked. I then explain briefly how I have analysed the materials, especially the policy documents and expert interviews, after which I explicate how I have synthesised the findings of the composite articles in ways that make them cohere with each other conceptually, while also allowing for abstractions that were not possible before carrying out research for each of them. Finally, I briefly reflect on the ethics of my research work.

#### 3.1 THE GEOGRAPHY OF THE CASES

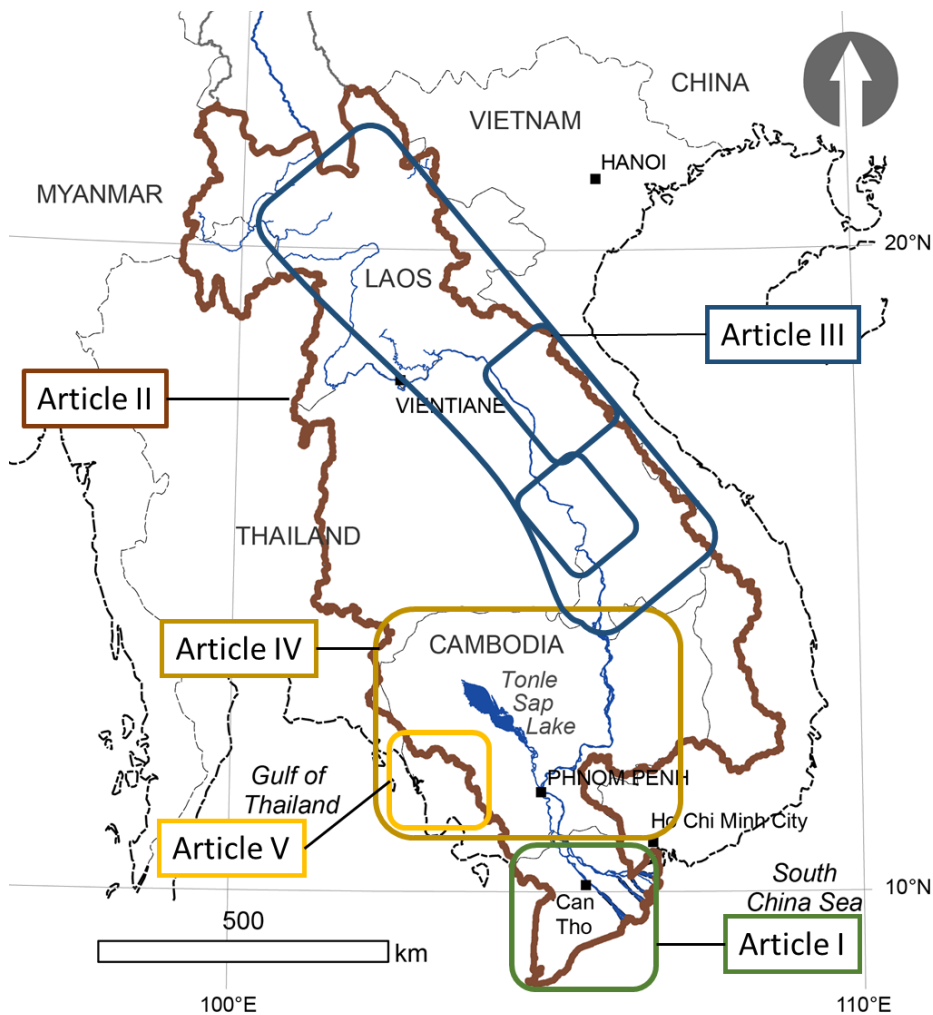
The cases on which I have based the composite articles of this thesis cover hydrosocial ordering and infrastructuring efforts on different spatial and temporal scales and also in different parts of the Mekong Region (Map 2). Most of the case areas are within the Lower Mekong Basin. The focus of Article I is the Mekong Delta of Vietnam. It covers key hydraulic infrastructuring efforts that have made the Delta one of the most engineered deltaic waterscapes globally. Article II looks at the role of the Mekong River Commission and the assessment work of its Secretariat, which covers the whole of the Lower Mekong Basin. Article III shifts focus to another important organisation, the World Bank, and its energy support in Laos. In a sense Article III covers the whole of Laos but it is especially focused on the country’s frontal dam project, the Nam Theun 2, situated in the Nakai

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<sup>77</sup> Rabinow prefers ‘interpretive analytics’ because the term ‘social sciences’ carries an unproblematized take on the concept of ‘social’. The same applies to the meaning of ‘human’ in the term ‘human sciences’. This is an appropriate note especially for studies trying to highlight the limitations and problems of being too human-centered and parting from the position that the ‘social’ in social sciences has long been excessively social.

Plateau in Khammouane province in Central Laos. Article III also examines the World Bank-supported solar home systems project, again in Khammouane province but also in Champasak province, Southern Laos.

Article IV shifts focus from Laos to Cambodia. It analyses how climate change has been rendered governable in Cambodia in ways that make hydraulic infrastructuring in the form of large dams and irrigation schemes seem desirable. Article V keeps the focus on Cambodia while zooming into three CDM hydropower projects situated in the Cardamom Mountains, Southwestern Cambodia. The Cardamom Mountains are partly within the Mekong Basin. They form an important watershed area for the tributary rivers that flow into the Tonle Sap Lake. At the same time it is also a watershed area for rivers flowing in the opposite direction, to coastal Cambodia, and meeting the sea in the Gulf of Thailand. Two of these latter rivers are now dammed by the studied Atay, Russei Chrum and Tatay hydropower projects (see Map 1). Although these dams do not influence the Mekong Basin directly, their concessionary governing mode is representative of the other two large dams in Cambodia, one of which, the Lower Sesan 2, is within the Basin. The concessionary governing mode also applies to large dams in Laos, all of which are within the Basin. In addition, the dynamics related to the CDM are likely to be similar for the more recent Lao CDM dams, of which the most controversial projects form a cascade of dams on the Mekong tributary of Nam Ou in northern Laos. Furthermore, the way the Cardamom dams triggered timber logging has relevance not only to the Cambodian Lower Sesan 2 but also, to some extent, to many Lao dam projects, including the Nam Theun 2 (Barney and Canby 2011, Singh 2012, Robichaud 2018, Dwyer pers. comm. 2018).



Map 2: The geographical areas covered by each of the composite articles.

### 3.2 ASSEMBLED RESEARCH MATERIALS

The fieldwork periods have consisted of intensive and open-ended methods of querying data through observing, listening to and interviewing various experts, policy-makers, ministry, provincial, district and village officials, development practitioners, consultants and NGO staff members, as well as different groups of farmers and fishers. Fieldwork has also involved the collection of different policy and project documents that would be difficult to acquire from afar. Importantly, fieldwork and the collection of research material for the dissertation’s articles are entwined with various research projects in which

I have worked during the past. My involvement with these projects has meant that my PhD journey, including data collection and analysis, has not always been as straightforward as one might wish, but it has provided me with valuable opportunities, formative experiences and engagements with multiple actors from farmers and fishers to experts on hydrological models that I would not have easily gained otherwise. My time spent in the Mekong Region consists of several separate trips that often lasted 1-2 months but also includes two longer stays of 7 months in Vietnam and 6 months in Cambodia. In total the various trips add up to 7 months in Vietnam, 9-10 months in Cambodia, 4-5 months in Laos and 1-2 months in Thailand. I describe below in more detail the fieldwork periods and timings that have been most important for the thesis.

The first project that took me to the Mekong Region was the 'Lower Mekong Modelling Project' (WUP-FIN2), a consultancy project undertaken by the Helsinki University of Technology and the Finnish Environment Institute that developed hydrological, environmental and socio-economic assessment tools for the Mekong River Commission. During that project I carried out research in the Mekong Delta of Vietnam and the primary research material collected during 7 months in 2004-2005 also served as data for **Article I**. The fieldwork covered three case study areas: high dyke systems in the upper delta of An Giang province, coastal salinity protection systems in Tien Giang province and the Plain of Reeds floodplains in Long An province. The research material included interviews with key officials at the province, district, commune and hamlet level as well as 16 group discussions and 20 household interviews with farmers. Our research team from Can Tho University was always escorted by someone from the province and/or local police staff, which evidently curbed most direct criticism of government policies, but in the more relaxed moments there was space to share more critical reflections. The primary materials are not analysed in detail in Article I but they inform the overall analysis and interpretation. In its final form, Article I draws mainly from secondary sources, including reports and research literature, but it would have been impossible to grasp what is going on in the delta without the intensive fieldwork period. By visiting different villages and observing daily routines I experienced how fluvial waters are part of people's everyday life in the Delta. The guiding interest was to trace the continuities and changes in water control efforts and to understand how hydraulic and social ordering relate to each other.

Through the WUP-FIN2 project I also familiarised myself with the work of the Mekong River Commission, its experts, assessment work and hydrological models. This laid the ground for the dissertation's **Article II**. The project enabled me to identify the key experts, to gain insights into the various knowledge-production processes and to observe how different programs in the Commission's Secretariat work. Moreover, it facilitated

interview access to some of the key experts. During 2006 and 2008 I carried out 18 interviews with experts in the secretariat of the Mekong River Commission, including interviews with hydrologists and modellers. The most important policy documents and technical reports analysed include the World Bank modelling report (World Bank 2004), the strategy paper of the World Bank and Asian Development Bank, (World Bank and ADB 2006), and the various responses to these reports by different research and civil society networks.

Material for **Article III** was collected as part of the University of Turku project, 'Why Renewable Energy Projects Fail? Design and Implementation of Energy Assistance Projects in Cambodia and Lao PDR (DREAM)', funded by the Academy of Finland. Key research materials included various policy, strategy and project documents, most importantly from the World Bank as well as reports produced by advocacy groups critical of the World Bank. The fieldwork was mainly carried out in January and February 2010. It included interviews with informants from the World Bank and the Laotian Ministry of Energy and Mines, as well as with consultants that have worked for the Nam Theun 2 project. Background interviews in Vientiane were also carried out with representatives from various development organisations and NGOs. The interviews in Champasak province with village heads and staff from the Provincial Department of Energy and Mines focused solely on the World Bank funded solar panel program; there were also six focus group discussions in the villages. In the district of Nakai, Khammouane province, we collected materials regarding both the Nam Theun 2 hydropower project and the solar panel program and interviewed representatives from the Nam Theun 2 Watershed Management and Protection Authority (WMPA), as well as district authorities. An interview with the village head and seven focus group interviews were carried out in the villages situated along the Nam Theun River, upstream from the reservoir, as well as in a resettlement village situated on the shore of the reservoir. We were not able to do detailed work in the Xe Bang Fai downstream areas as our research permits did not allow it. A chance to do research in these areas emerged much later through fieldwork for University of Helsinki project, 'Environmental vulnerability, social resilience and multi-scale governance' in 2015 and 2016. This time the research was framed by flood related vulnerabilities. While impacts of Nam Theun 2 are highly sensitive, the flood dynamics are less so even though they are closely related to alterations in flow regimes, caused by Nam Theun 2. In the actual field interviews and discussions we were able to address dam related changes also more broadly. This provided me with updates and I was also enabled to develop more in-depth insights on the Nam Theun 2 dam and its effects in terms of downstream hydrosocial changes. This, in turn, has given me perspective to elaborate the findings of Article III further in the broader discussions of the thesis synthesis.

The fieldwork for **Article IV** was carried out within two University of Turku projects: a commissioned study to the Ministry for Foreign Affairs, ‘Adequacy of Climate Change Mitigation Initiatives in Laos and Cambodia: Comparing Options and Analysing Obstacles in Local Context’ and an Academy of Finland-funded, ‘Redefining Energy and Climate Policy in the Least Developed Countries: Analysing Institutions and Initiatives in the Mekong Region (RECLAIM)’. The material consists of policy documents and 23 key informant interviews that I carried out mostly in Phnom Penh in 2011 and 2013. The documents analysed included the Cambodian Climate Change Strategic Plan (RGC 2013), CDM project development documents, adaptation-related project documents and assessments related to vulnerability and adaptation. The interviewees included officials from the Ministry of Environment as well as representatives from the donor community and civil society organisations. In addition I made use of field visits carried out in May-June 2011 to five different CDM projects which included interviews with staff of the CDM projects when possible, and six group interviews in host or adjacent communities. At the beginning of 2013 I made follow-up visits to three of these projects: Angkor Bio Cogen, Siang Phong biogas and Kamchay hydropower projects.

I collected the materials for Article IV partly before the Cardamom dams in the southwest of Cambodia gained CDM status and without the possibility to visit these sites. These projects thus remained without detailed analysis in Article IV. The Atay, Tatay and Russei Chrum dams gained CDM status rather rapidly and perhaps also surprisingly. I became increasingly interested in them and eventually these dams became the focus of the **Article V**. Unlike the much studied Nam Theun 2, these dams were strikingly under-researched. The more I tried to grasp what was going on with these dams, the more evident it became that my interest would not be limited only to the ways hydropower and carbon trade are connected but would extend to the ways climate mitigation initiatives and hydropower projects get entangled with other resource control schemes. The research materials I gathered formed a kind of a factual assemblage that enabled me to establish connections between the conservation and logging zones and how they were related to the three hydropower projects. This factual assemblage consisted of elements from policy and project documents, newspaper articles and fieldwork interviews carried out mainly in March 2013 and February-March 2014. The interviews also provided more detailed understanding of the different perceptions, experiences and ways of making sense of the key events and dynamics that the different projects had set in motion. The informants of the 23 thematic interviews included relevant ministry officials (especially those with connections to the CDM projects) and journalists, as well as NGO staff and activists engaged in conservation and human rights. Most of these interviews were carried out in Phnom Penh and Khemara Phoumin, the capital of Koh Kong province. Despite various

attempts we could not gain interview access to representatives of the hydropower companies. During the two and half months of fieldwork, in total around eight days were spent in dam-affected villages. The community-level group discussions with villagers and interviews with local ex-workers in dam construction and village chiefs (38 interviewees in total) were carried out in two communes in the province of Koh Kong where most of the dams' downstream impacts are experienced. Ultimately, the article by Milne (2015) and the report of Global Witness (2015) were important in confirming many of the connections in my speculations about which I would otherwise had doubts.

### 3.3 MODE OF ANALYSIS

My mode of analysis has been 'eclectic' in the sense that it has been oriented towards understanding particular sets of dynamics in specific places. Thus, I have drawn on several theoretical frameworks that speak to the dynamics I have observed (Bridge et al. 2015: 5). This is related to my intention of not letting a theoretical approach over-code and over-determine empirical findings but, rather, using it to assist in revealing and learning something new. Ideally, I think, fieldwork should allow for a co-constitutive relationship between the more theoretical conceptualisations and the empirical findings. The last article (Article V), in particular, puts considerable effort into working with and elaborating conceptualisations, along with making sense of the empirical findings. Similarly, when synthesising findings from the composite articles, I have tried to re-work the conceptualisations in order to develop lines of arguments that make the connections and complementarities between the empirical cases visible.

In my analysis I have also tried to avoid overt determinism by following a Foucauldian approach to the analysed processes as open-ended, in which something new is in the making and something fluid is being coagulated and turned into something solid (Foucault 2007: 248). While I have looked at how certain power formations shape resource-making processes, I have also been interested how these processes have in turn been formative of new power constellations. This has meant paying attention to the effects of the analysed processes, especially the power effects, in a way that is attentive to the heterogeneous elements that might interact in unintentional and yet consequential ways. This is also consistent with the Latourian proposal to study power effects (Latour 1987, Mitchell 2002). The openness to seeing the observed solidifications as effects of processes that may be shaped by multiple forces, rationalities and practices is what has made the concept of assemblage relevant to the analysis. But assemblage also has another meaning in relation to my work and the mode of analysis. The thesis is composed of articles in a manner that



makes the thesis itself resemble an assemblage. The articles are interrelated but they also remain external to each. At the same time, their coming together produces something new. Not all lines of arguments in the synthesis were entirely predictable when working on the composite cases. The establishment of interrelations has also required re-worked conceptualisations. This goes back to the co-constitutive relationship between the more theoretical conceptualisations and the empirical findings.

### **Analysis of the research materials**

In my analysis of the research materials I have drawn most importantly on the analytical strategies that are in line or in complementary relation with Foucauldian inspired research on political ecology. The concord with governmentality studies has been most evident in the analysis for Articles II, III and IV and in the ways I have analysed both policy documents and the interviews of experts, officials, managers and practitioners involved in policy-making processes. The development actors and transnational regulatory agencies such as the World Bank operate through the arts of liberal governing and their powers of governing are deeply entwined with how successfully the fields they attempt to govern are rendered technical (Li 2007a). In these cases I have approached the policy documents as part of the intellectual machinery through which abstract ideas and rationales of government are translated into a domain of calculability and implementation (Foucault 1991, Rose and Miller 1992, Gottweiss 2003). In terms of the expert interviews, I have paid attention to the kind of truth claims certain experts advance. I have also tried to trace the rationales that have guided their attention and the ways they interpret results from certain knowledge-making processes and assessments (Anderssen 2003).

When analysing the documents and interviews (especially for Articles III and IV), I have paid special attention to attempts to render contradictive and antagonistic objectives synergistic through different win-win storylines and to other similar discursive work aimed at consensualisation. I have tried to understand the role of these efforts in attempts to close down spaces of contestation, and thus in the production of governability. At the same time, the production of resources and their governability is not only about discursive ordering devices and rationales but also about different techniques, practices and very material technologies. Thus my analysis is equally attentive to the ordering capacities of hydraulic infrastructures (such as dams and different systems of embankments, sluice gates and canals), Basin-wide and Delta-wide Master Plans (Article I), technical inscription devices like hydrological models (Article II), impact assessments (Articles II, IV and V) carbon accounting techniques (Articles IV and V) and climate vulnerability assessments (Article IV).

Governing, at least in its liberal form, is ‘a problematizing activity’ (Rose and Miller 1992: 181). To understand how governability is produced and its effects is to understand how certain problematisations are constituted and how they work, what do they do, the kind of governing mechanisms and technologies they elicit, what they enable and what they simultaneously exclude and foreclose. In order to understand how certain problematisations and problem spaces are bounded and constituted I have paid attention to framing. Framing, in turn, involves choices about which elements, relationships, linkages and dynamics are included and accounted for and which are to be excluded from consideration and hence rendered more invisible. The ways in which problems are bounded and constituted through framing are closely related to particular policy narratives, as different framings produce very different narratives about what is to be solved, how and by whom (Leach et al. 2010). Hence, especially in Article IV, I have traced certain discursive policy story-lines and tried to analyse the specific interventions they justify, the kinds of experts, mechanisms and technologies they call upon or enable and the options they simultaneously side-line, obscure or render invisible (Hajer 1995: 56-50, Fairhead and Leach 2003, Leach 2008).

Again, however, attention to different techniques and practices of governing has been equally central. They too shape and frame problem domains and create boundaries for fields of vision, and are, overall, central in making certain kinds of governing and reasoning possible. When analysing techniques such as hydrological models, environmental impact assessments, vulnerability assessments and carbon accounting techniques I have paid attention to what is being accounted for and what is simultaneously excluded from consideration and the field of vision. In regard to, for example, carbon accounting techniques, I have further reflected on how the practices and techniques of accounting create and result in certain relations of accountabilities and responsibilities while pre-empting and precluding others. This attention to both discursive and technical ordering and framing attempts means that I have tried to understand how certain governing rationales and techniques mutually support each other, how they are co-constitutively formative of certain problem domains and how certain problem domains, in turn, call upon them for certain reasonings, policies, expertise, techniques and technologies (Rose and Miller 1992).

My motivation for this kind of analysis has stemmed from the wish to unsettle some of the dominant assumptions and problem closures by bringing visibility to what has been excluded or obscured from the constituted fields of vision. If governing is centrally a problematising activity, then analytics of governing is centrally about problematising problematisations. The intention behind this mode of analysis is thus to pave the way for

new openings, understandings and problematisations. While the analysis has partly evolved through identifying and dissecting key policy documents and technical reports, the value of combining this kind of analysis with fieldwork and interviews and the empirical research or reports of others lies especially in how this combination enables the tracing of 'disjunctures between the programmatic statements of policy and the messiness of actuality' (Barry 2001:21). Examining and revealing what is actually going on when certain policies are implemented or certain techniques applied has also allowed me to explore and question potentially powerful consensualisation attempts by, for example, highlighting how elements presented as synergistic in policy discourses actually appear antagonistic.

### **Mode of synthesising**

Herein I briefly explicate how I have synthesised the findings from the composite articles, which represent distinct empirical cases, in this thesis summary. Analysis of the cases for this synthesis is influenced by Flyvbjerg's (2006) and Lund's (2014) encouragement to think carefully and systematically 'of what is this a case'. After I assembled the cases they resonated in ways that I was not necessarily fully anticipating at the time of writing each of the separate articles. I needed to re-think the kind of conceptualisations and framings that would allow me to articulate this resonance most meaningfully. I needed, once again, to go through the 'analytical movements' (Lund 2014: 225) between the specific and general as well as the concrete and abstract of each of the cases. Ultimately, in this synthesis the work for each of the articles is a case of something slightly different than what I have made of it in the published articles. The synthesising work has been in some ways my own attempt at fixing the fluid, in the sense of trying to reduce heterogeneities, contingencies and fluidities between and within the cases, while trying to make them legible in ways that conceptualise resonating patterns between them. This process has enabled and solidified more general arguments and allowed for generalisation. At the same time, I have tried to remain congruent with my critical take on the analysed fixing attempts and to avoid overtly deterministic conceptual fixations.

Through these analytical movements I have synthesised my research by highlighting how each of the cases brings forth different aspects of water resourcification and hydrosocial ordering processes in the Mekong Region in ways that allow generalisations on the co-constitutive relations between resources and power formations. Again, this has meant that not all of the arguments central to the separate articles are quite so central when synthesising their findings and highlighting their interconnections and complementarities. Some observations or findings, in turn, that remained rather implicit or under-conceptualised in the published articles began to take shape as more explicit arguments or

were somewhat differently conceptualised when bringing the findings from the composite articles together. For example, some of the resonance between the Nam Theun 2 (Article III) and the Cardamom dams (Article V) became evident only when taking a new look at Nam Theun 2, after writing Article V. Consequently, I discuss Nam Theun 2 more forcefully as a concessionary and enclavistic project in this synthesis than I did in Article III. The framework I developed in Article V, on the other hand, provided me with conceptual lenses that helped me in making findings from earlier articles cohere meaningfully in terms of viewing them as different cases of frontier dynamics shaped by multiple interacting rationales and techniques of governing.

### 3.4 ETHICAL REFLECTIONS

I have followed the ethical principles common to empirical social science research. The interviews are based on informed consent and I have sought to protect the informants' anonymity. This is pronouncedly relevant in the contexts of Vietnam, Laos and Cambodia, where criticism of state policies is restricted and can also be sanctioned. Especially in Laos, hydropower dams are one of the most restricted topics in public discussion, but it seems to be increasingly so also in Cambodia. Likewise, the logging and the connections between timber tycoons and party-state authorities touched upon in Article V is sensitive. I have not, however, kept the sites of field work anonymous as that allows better evaluation of the relevance of the study. At the same time, I have been careful not to use the information of informants in such detailed ways that they could be identified, or in ways that could bring them harm.

A pertinent question for Northern researchers working in the so-called global South, especially on topics related to resource extractivism, is how to avoid being extractivist in one's own knowledge-making practices. With this in mind, I have at least tried to share the 'results' in meaningful ways, presenting findings not only in academic forums, but also in those of policy-makers and activists, some of which I have taken part in organising. In relation to policy-makers, the challenge, of course is that my analysis does not provide any immediate, alternative solutions to the problems or challenges exposed. In terms of activism, my analysis is more focused on practices of producing closures than on practices of contestations, more on processes that lead to, rather than challenge, the centralising of resource control, so perhaps not always immediately helpful or relevant. But at the same time, I believe analysis that problematises attempts at closures or highlights the multiple actors and rationales involved, and the complex ways responsibilities are distributed – for example, in the damming of Mekong – is supportive of those directly involved in creating

space to configure the current river-society relations and power formations differently (Li 2019: 31). I have also carried out more activist-oriented work in parallel with the research work, for example, in raising public debate about the role of Finnish actors in the Mekong's resource politics or supporting the complaint process against the Finnish engineering company, Pöyry Group, which was alleged to have violated OECD guidelines for multinational companies in how it advanced the Xayaburi project, the first mainstream dam project in the Lower Mekong.

## 4. MAIN FINDINGS: THE MAKING OF ORDERABLE AND INVESTABLE WATERSCAPES

This chapter presents the main arguments and findings from the five composite articles. The analysis addresses attempts to produce controllable and investable waterscapes as well as their effects, paying special attention to the continuities and ruptures in these efforts. It starts from the Mekong Delta, the early frontier for the colonial, export-oriented, rice plantation economy and for colonial state rule. After the Indochina Wars it evolved into a frontier of agro-hydraulic modernisation firstly advanced by American Cold War technopolitics and subsequently by the North Vietnamese socialist government (Article I, discussed in Section 5.1). It was in the Mekong Delta that the basin-wide plans of ‘full control’ acclimatisation materialised to the fullest extent, although in a downscaled form.

Attention then shifts to the more recent intensification of water resourcification in Laos and Cambodia and to key elements enabling this development in terms of techno-scientific knowledge production and new sustainability standards. Both the MRC-produced, Basin-wide knowledge (addressed in Article II and discussed in Section 5.2), and sustainability mechanisms produced by the World Bank through the Nam Theun 2 (addressed in Article III and discussed in Section 5.3) have supported the re-legitimation of hydropower by holding out hopes that with adequate expertise and techniques the old problems related to large dams can be fixed and the externalities internalised. Thus they have both contributed to efforts to transform the Mekong into a frontier of eco-modernisation.

The analysis then moves on to elaborate connections between water resourcification and the rationales and techniques of governing climate change, synthesising key findings from Articles III, IV and V (Section 5.4). Findings from Article V are further presented in Section 5.5. which highlights how the concessionary governing mode through which dams in the Mekong Region are advanced, is shaped by neoliberal and authoritarian governing rationales, and how it furthers ‘postneoliberal’ corporate power formations over riverine hydrosocial relations. It also highlights how the projects entangle with multipurpose Sino-Cambodian dealings as well as with other schemes of resource governing.

#### 4.1 ASSEMBLING AN ACCLIMATISED AND CONTROLLABLE MEKONG DELTA

Article I sketches out the main continuities and ruptures in the Mekong Delta's intensive hydro-social and agro-hydraulic ordering efforts, outlines their major effects in ecological and social terms and finally scopes the possibilities for alternative approaches. The Vietnamese part of the Delta is one of Mekong's most engineered and infrastructured waterscapes, whose water resourcification entails attempts to enhance and optimise water control for agricultural purposes, especially in the form of rice monocultures: first in the form of a web of canals to drain the wetlands, and secondly in the form of irrigation and flood and salinity prevention systems to intensify agricultural production on the drained lands. One of the important continuities in hydrosocial ordering efforts relates to how the Delta has been perceived simultaneously as a frontier for water resourcification and political control for changing regimes of planners and rulers from afar. Efforts to enhance the controllability of the Delta's waters have thus often coalesced with efforts to enhance the controllability of the Delta's residents. Another continuity relates to the acclimatisation aspirations embedded in the Mekong's hydrosocial ordering efforts. It was in the Delta that the Basin-wide scheme of modernising and acclimatising hydroagricultural production modes, got translated into its most actualisable forms – albeit without the large-scale upstream dams, decades later than initially intended and with the transposed political-economic purposes of the North Vietnamese socialist government. Based on Article I, I synthesise below how water has been resourcified and hydrosocial relations ordered in the Mekong Delta, and with what effects. The resultant power formations of the various hydraulic efforts remained somewhat implicit or underanalysed in the original version of Article I and thus I augment it, giving more consideration to these aspects with the help of more recent literature.

Article I describes how major water-works in the Mekong Delta started in precolonial times in the form of canal excavations. These made it accessible for Chinese merchants and the Vietnamese Nguyen Empire, which then extended its reach over most parts of the loosely Khmer-ruled swampy and forested delta. During colonial times the French administration continued to open up the marshes and wetland forests with a network of canals but more intensively, with the help of new steam-powered dredging techniques. This was one of the world's largest hydraulic endeavours at the time, resulting in thousands of kilometres of canals (Biggs 2010), a fourfold increase in rice-growing areas and threefold increase in population (Miller 2003: 176). During this time the Delta was a land frontier being transformed into an export-oriented rice plantation economy that accrued profits to the colonial landlords. The water works also provided the main transport system and rendered previously inaccessible marshy areas accessible to the

colonial rulers and their political ordering and taxation efforts. Water and waterworks were clearly made as state domain which they continue to be today. Most water management decisions apart from canal dredging, however, remained at the farm level (Miller 2003), using techniques that were amphibious in the sense of being attuned to tidal and seasonal changes in the confluence of the fluvial and marine waters.

A qualitatively different round of hydraulic infrastructuring commenced in the 1950s and 1960s. This time water was resourcified in order to intensify agricultural production on the drained lands by optimising water's affordances to year-round, intensive, multicropping rice monocultures. The seasonal changes in water flows were from this perspective a hindrance to be mitigated by creating year-round separation between water and agricultural lands, and conditions to controllably water the lands when needed. The hydraulic infrastructuring was a way to make the fluid depend on the solid. The previous floodplains of the Upper Delta were to be protected from flood waters and coastal areas from salinity intrusion. These new efforts, aiming at the acclimatisation (Frewer 2016) and terrestrialsation of agriculture (Morita 2016), evolved first techno-scientifically under the auspices of the Mekong Committee at the Basin scale, with the guidance of the American experts (Miller 2003, Biggs 2008, Sneddon 2015).<sup>8</sup> The Basin-wide schemes were, however, deemed unfeasible for various reasons including financial barriers and escalating conflicts. At the same time the focus of American aid programs shifted from the whole of Lower Mekong Basin to South Vietnam, materialising importantly in the Mekong Delta Program (1968) drafted by the Tennessee Valley Architect David Lilienthal and his team together with Vietnamese officials. The Basin-wide scheme of acclimatisation was thus downscaled to the Mekong Delta of Vietnam without the colossal and costly upstream Mekong dams.

In addition to rehabilitating and enlarging existing but badly silted canals, the water works were to consist of integrated systems of high dikes, sluice gates and canals for flood and salinity control in order to 'close off' (Miller 2003: 187) the Delta from their influence. Again, the hydrosocial ordering efforts also entailed aspirations to enhance socio-political controllability from a distance. The water works formed an essential part of the American strategy to win the hearts and minds of the revolutionary peasants and they became entangled with the anti-insurgency measures of the Saigon regime (Biggs 2010). Even the Delta-scale master plans were, however, eventually shelved when the area developed into a full war zone. Yet, as emphasised in Article I, the assessments, mappings and calculations in the Delta-wide plans have proved to be powerful techno-scientific inscriptions in the

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<sup>8</sup> There were in the Delta, however, already plans and experiments on a smaller scale of enclosed dike systems during the Indochina Wars (Biggs et al. 2009), but the schemes of acclimatisation at Basin and Delta-scale got initiated during this time.



sense of informing the new governing regimes of what could be possible, and have thus been persistent in invoking the desire to produce hydrosocial orderability ‘freed’ from seasonally changing water conditions on a Delta scale via large-scale hydraulic infrastructuring.

After the unification of the country, the Mekong Delta was again perceived as a hydraulic development frontier for planners of a regime with ambitions to produce hydrosocial governability from a distance. The new reunified Socialist Republic of Vietnam led by the Communist Party was de facto dominated by the North Vietnamese who saw Mekong Delta as lagging behind the Northern Red River Delta, at the time much more regulated (Benedikter 2014). The war damage, dilapidated hydraulic structures due to lack of maintenance, the remaining marshes and forests, and hydroagricultural systems that were still largely amphibious and attuned to the seasonal and tidal flow variations all seemed to lack the hydraulic improvements and modernisation that the new regime was ready to provide. The resources to undertake major water-works, however, remained scarce for the next decades. The hydraulic mission led by Northern engineers and bureaucrats – their ‘tunnel vision’ (Scott 1998: 11) set on rice-production maximisation – was first advanced through the mass mobilisation of people to dig canals manually, although gradually more mechanical works were conducted to both reclaim new lands, and to establish isolated flood and salinity prevention systems (Miller 2003, Benedikter 2014). As explained in Article I, it was only after the 1986 *doi moi* policy and the increased availability of foreign funds that the plans of ‘closing off’ the Delta started to materialise in more integrated ways. The continuity of the large-scale acclimatisation plans can be interpreted as a demonstration of the latent power of technoscientific inscriptions (Sneddon 2015: 126), as they may become actualisable much later than initially planned and as part of a governmental assemblage quite different from the original one.

What needed more attention in Article I, is that the ‘closing off’ efforts that eventually materialised were not simply the application of a model inherited from the US advisors of the Saigon regime; they were also shaped by the experiences of the North Vietnamese hydraulic planners and engineers from the Red River Delta a decade earlier. Benedikter (2014), who also uses Article I (Käkönen 2008), has developed this line of inquiry demonstrating how the Northern engineers read the Southern waterscape based on their experience from very different hydro-ecological-agricultural-social conditions of the Red River Delta and perceived the Mekong Delta floods as an adversity to combat.<sup>9</sup> The same engineers and experts that had been developing dike-enclosed systems a decade earlier in

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<sup>9</sup> Unlike the calmer and more slowly rising Mekong Delta floods that are disastrous only exceptionally (Ehlert 2012), the Northern flash floods are associated with disasters, and perceived as something to fight against (Benedikter 2014).

the Red River Delta could easily find an alignment between their approach and the previous Mekong Delta Master Plans of full control. They also shared a similar position of planning and controlling from afar through schemes developed in other contexts, overlooking the local specificities and differences. Another element copied from North Vietnam was the centralised organisational format that was to carry out the water-works. There was an already existing ‘socialist hydraulic bureaucracy’ (Benedikter 2014), an administrative grid consisting of tightly connected state planning and management agencies as well as state-owned companies that now extended their operations to the South.

As noted in Article I, the move towards larger-scale hydraulic control structures, first in the form of more isolated, enclosed dike systems and then in the larger, more integrated flood and salinity control systems, re-scaled water-related decision-making; sluice gate operation and pumping stations, for example, required new authoritative coordination ‘above’ the farm scale. This elucidates the potential of water works to re-scale power relations and thus to produce power effects. When combined with the study of Benedikter (2014) it becomes possible to construct a more explicit argument on how this re-scaling of power relations gets entwined with the efforts of the Northern regime to establish and consolidate its rule in the South in a manner that resembles a process that I would call as state ‘hydro-territorialisation’. For the Northern state officials and hydraulic experts, the Mekong Delta was not only a frontier for agricultural modernisation that required water resourcification via hydraulic infrastructuring, but also a political frontier with suspicious and potentially disloyal anti-communists that needed to be brought under the control of the Northern regime. During the post-unification period, all authoritative posts in the emerging organisational infrastructure were staffed by Northern officials and engineers known to be loyal to the socialist government (Benedikter 2014). It was, importantly, the water-works through which the Delta’s watery terrains and people were incorporated into the administrative grid of the new socialist regime. As noted in Article I, land collectivisation was fiercely and successfully resisted, but hydraulic infrastructuring and the accompanying re-scaled powers to decide water management were not. Thus it seems that state territorialisation was more successful through hydro-social ordering efforts than through the ordering of land tenure relations. Yet the Northern state regime should not be seen simply as an already powerful authority that extended its reach via water-works. Instead hydraulic infrastructuring enabled new power constellations that built and strengthened state capacities to do this. In sum, when augmenting the analysis in Article I with that of Benedikter (2014), and the broader discussions in this thesis, Mekong Delta forms an interesting case of the co-production of resources and states (Bridge 2014) in which the technoscientific statecraft is entangled with the territorialisation of sovereign

and administrative state powers. It also exemplifies how resourcified waters and hydraulic state formations are both the tools of hydrosocial ordering, and the effects of formative processes in which hydrosocial relations are rearranged.

The efforts to radically simplify the Delta's seasonally varying hydro-ecological conditions and agricultural patterns into acclimatised and terrestrialised rice monocropping areas were not at least an immediate failure. Article I highlights how the hydraulic infrastructuring efforts that increased the orderability of water were an important element (together with the new *doi moi* policies) in facilitating the astounding increase in the Delta's agricultural productivity through which Vietnam was not only able to achieve its own national food security targets but also became one of the leading rice exporters globally. The bracketed side-effects of hydraulic infrastructuring, in the form of new water-related risks, vulnerabilities and environmental degradation, have, however, started to haunt the success story. Furthermore, while the efforts to produce governability from a distance and secure rule over the Delta's watery lands and people through hydraulic works had the goal of simplified legibility and controllability (Scott 1998) they have, rather, resulted in increasing socio-ecological complexity (Robbins 2008), and the ruled waters in one place have created unruly waters in another.

Article I outlines many of the bracketed side-effects and newly created complexities resulting from the terrestrialising project of producing year-round multicropping monocultures, and more recent studies have further elaborated and underlined their relevance. The flood protection systems have shifted flood waters to unprotected areas that were previously flood-free (Dang et al. 2016); the reduced water detention capacity because of the flood prevention systems together with the increased irrigation in the dry season has strengthened the saline water intrusion (Tran et al. 2018a); the intensive cropping systems require greater quantities of agrochemicals which deteriorate water quality and land fertility; previous fluvial multispecies entanglements have been disconnected and disturbed as the high dike systems have, for example, created barriers for fisheries and diminished floodplain and brackish fish habitats; more biodiverse agrarian ecologies have been displaced. Meanwhile, the increased separation of water and land in the Upper Delta means that fluvial sediments are no longer swept onto previous floodplains. The soils are thus deprived of the nutrients bound to the sediments and of the flushing out of agro-chemical induced toxins and pests (Chapman et al. 2016). There is increasing evidence (Tran and Weger 2018, Tran et al. 2018b) that in the long term this will mean rising production costs and reduced economic returns for the farmers even to the point that triple rice cropping will mean lower earnings compared to more flood-based and diversified agricultural production. As underlined in Article I, the landless and land

poor whose livelihoods were most tuned to the rhythms of the amphibious Delta have suffered the most as they have often found it difficult to find replacements for previously easily accessed water, plants, fisheries and nutrient sediments of which they have now been deprived or excluded. Article I also highlights that the more the bracketed effects negatively affect the productionist goals themselves, the more attention they gain.

Some of the produced socio-ecological complexities relate to the persistently destabilising effects on the ordering attempts by water. The fluid is constantly escaping and un-making the fixed; the canals are continuously silted up, the dykes continuously eroded. To maintain an infrastructurally controlled waterscape means a lot of on-going work against forces that incessantly threaten to un-make the engineered system (Biggs 2010). The attempts to counter this un-making of the terrestrialised delta have invited ever-extending engineering solutions, thereby creating new forms of fluid unruliness as well as new patterns of water-risk distribution and water-related vulnerabilities.<sup>10</sup> Climate change is adding unpredictability to the powers of fluvial and marine waters and how they meet in the Delta, further complicating future hydrosocial ordering efforts. This constant unruliness underlines that hydrosocial relations are only partially controlled by humans; fluvial waters have a certain agency in the sense of bringing about effects independent of the intentionality of the designers and promoters of hydro-social ordering (Latour 1999, Mitchell 2002, Biggs 2010, Sneddon 2015). The powers of water are constantly shaping as well as undermining new attempts to fix the fluid.<sup>11</sup>

There are also increasing concerns that maintaining the acclimatised and terrestrialised monocropping may become cost-prohibitive because of mounting maintenance and repair costs, the high price of compensating for the reductions in soil fertility (due to the inhibiting of the entanglements of soil and alluvial waters that result in soil fertility for agriculture) and the inflexibility of the centralised structures with regard to livelihood diversification. Article I noted alternative initiatives that I then called ‘adaptive approaches’ but from the perspective of hydrosocial ordering and hydraulic infrastructuring I now refer to as ‘amphibious approaches’ (Morita 2016, Krause 2017). In contrast to previous terrestrial infrastructuring that aimed to close off the Delta, such approaches are more appreciative of fluvial temporalities and tuned into making use of

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<sup>10</sup> The opening up of the Delta via a massive web of canals introduced floods and saline intrusion to new areas, which the high dikes aimed to fix, resulting, in turn, in the shifting of floods and saline waters to new areas. \_And the more flood prevention dikes are built the stronger the eroding power of the accelerated water flows and the costlier the maintenance.

<sup>11</sup> Article I also notes that the Delta’s residents have continuously resisted many of the hydrosocial ordering efforts from afar. What was not so carefully articulated is that often this resistance was aided by the powers of water and the watery landscape. For example, the reach of the French and the subsequent Saigon regime was mostly limited to the major canals they dredged whereas the complex, ‘illegible’ networks of smaller waterways and tidal creeks, as well as the remaining ‘wilder’ waterscapes of marshes or forests formed bases for the revolutionary and counterinsurgent peasants (Biggs 2010, Scott 2012).

seasonal variation in the affordances of fluvial and marine waters and their confluence.<sup>12</sup> Recently, these have gained increasing traction (Smajgl et al. 2015, Tran et al 2018b, T.A. Tran and Tuan 2020), with even some of the newer Delta-wide development plans, like the Dutch and Vietnamese-funded Mekong Delta Plan (2013), no longer insisting on full flood or salinity prevention, rather fostering flood-based agriculture in the Upper Delta and brackish water-based livelihoods in the coastal areas (Seijger et al. 2019, Hasan et al. 2019). More amphibious hydrosocial ordering could potentially make room for more biodiverse agrarian ecologies, but not necessarily; the Mekong Delta Plan, for example, advocates further agroindustrialisation which, instead of questioning, promotes the environmentally destructive shrimp industry in coastal areas.

Shifting from terrestrial to more amphibious approaches is, however, difficult for various reasons. Present and future infrastructuring efforts are not only challenged by the powers of water but also by those built into the infrastructures themselves, potentially constraining present and future decisions and limiting the realm of the possible (Biggs 2008, Sneddon 2015: 126). In other words, the decades of intensive waterworks have resulted in power formations embedded in the materiality of the built environment (Li 2019), which are not easily altered by the changing rationales of hydrosocial ordering. Even if more amphibious approaches were increasingly desired by different groups of people there is no easy way to unmake the already made 'Delta machine' (Biggs et al. 2009): firstly, the partial unmaking of a complex infrastructural system may produce new, unpredictable and undesired effects, especially when the new threats and uncertainties related to climate change are factored in (Smajgl et al. 2015); secondly, the infrastructure has enabled new modes of terrestrial living which cannot be easily made amphibious again. This is especially so in the Upper Delta where flood prevention schemes have turned 'high-incidence, low consequence' floods into 'low-incidence, high consequence' floods (Warner et al. 2018). It is not easy to make people who now have more flood-vulnerable 'assets' to become again 'friends with the floods' (Biggs et al. 2009:221); yet, due to climate change, it will be increasingly difficult to keep flood water at bay as exceptionally strong floods likely to exceed the dikes may increase. Lastly, past hydraulic efforts have produced effects in the form of entangled infrastructural and bureaucratic power formations. The grandiose hydraulic schemes have been conducive to producing

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<sup>12</sup> I now find the concept of adaptation problematic as it invokes teleological system-thinking (Watts 2015) and an image of passively adjusting to an already existing environment, thus undermining the creativity of human (and non-human) actors as constant environment makers (Moore 2015:44-50, Latour 2017: 98-101). Thus, in contrast to control-oriented terrestrial infrastructuring and environment-making, the amphibious approach is about making an environment in tune with the fluctuating waters, thereby making use of the ebbs and flows of water, and not simply adjusting to them. The concept of adaptation has also become problematic in the current climate change lexicon. It enacts externalisation of climate change and provokes techno-scientific status-quo responses instead of status-quo-altering, socio-ecological and political-economic responses (Ribot 2014, Taylor 2015).

tightly connected and powerful groups of hydraulic planners and companies (military, state-owned or privatised) who have vested interests in keeping up large-scale infrastructuring efforts and have thus far rather successfully resisted more amphibious and less infrastructure-intensive approaches (Biggs et al. 2009, Evers and Benedikter 2009, Hasan et al. 2019).

Overall, Article I lays out significant changes and continuities in the Delta's hydrosocial ordering efforts. Insurgencies and wars including World War II, the First and Second Indochina Wars and the American Wars have all meant ruptures to these hydrosocial ordering efforts, while changing ruling regimes have altered the rationales and purposes of hydrosocial ordering. In colonial times canal excavations aimed to open the Delta to the world economy by draining and reclaiming watery lands for export-oriented, agricultural plantations, meanwhile making the Delta accessible to colonial state rule. In postcolonial times the waterworks have not only aimed at land reclamation but also at the intensification of agricultural production on the drained lands. This has marked a shift towards acclimatising and terrestrial infrastructuring. During the American-backed Saigon regime, hydraulic schemes aimed not only to prevent floods and salinity but also rebellions, as part of counterinsurgency strategies and the geopolitical goal of taming communists. After the unification of the country, plans for hydrosocial ordering remained geared towards acclimatisation and terrestrialisation of agriculture but the political and economic purposes shifted. The hydraulic works were to assist the country to achieve food security and the new Northern socialist government to establish its rule in the Southern Delta. The residents now deemed unruly and in need of taming consisted of anticommunists. The continuities and changes in this latest turn also bring forth the lingering power effects of hydraulic technoscientific inscriptions and a certain multivalence of hydraulic infrastructures in the sense of the hydrosocial ordering potential of the schemes, which is, to some extent, transposable in relation to changing political-economic rationales.

Despite ruptures caused by conflicts and wars, and changes in political and economic purposes, there have been no reversals in the attempts to intensify the resourcification of water through hydraulic infrastructuring in the region. The hydrosocial ordering schemes have been rather consistently planned from afar and based on templates developed in other contexts (Tennessee Valley, Dutch Delta, Red River Delta) that overlook the fluvial relationalities unique to the Mekong Delta. The large-scale waterworks have been conducive to governing at a distance and also lent themselves to state-making processes. In this case the centralising water control has had centralising power effects. Yet the powers of water and often also those of riverine people have continuously undermined or

exerted their own effects on the ordering schemes. Meanwhile, water's powers and the legacies of previous water works have locked hydraulic infrastructuring into the high-cost work of fixing the effects of unruly, fluid waters that is increasingly cost-prohibitive (Biggs et al. 2009), and the unintended effects of disrupting previous fluvial relationalities in the form of new or shifted water risks and lost fisheries, soil fertility and clean water have started to problematise the success of terrestrialised agriculture. Although there are now attempts to shift to more amphibious approaches more appreciative to the monsoon rhythms of Mekong, the infrastructural power formations of previous hydraulic work has thus far slowed down these shifts. Furthermore, the changing climate - the likelihood of more devastating floods and increased salinity due to rising sea levels - invokes newly assembled support for acclimatising infrastructures. Water resourcification in the sense of making a manageable and agriculturally productive water system subject to the will of human agency is still pursued, although the limitations on human agency posed by the powers of water and infrastructure are increasingly recognised.

#### 4.2 THE MAKING OF AN ASSESSABLE AND 'SUSTAINABLY' GOVERNABLE BASIN

Article II looks at the techno-scientific aspects of water resourcification. By highlighting the co-production of knowledge and governing it brings forth how the very act of knowledge making enacts the Basin as an object of planning susceptible to interventions. Instead of analysing material hydraulic infrastructures, the focus is on the establishment of a certain kind of information infrastructure (Blok et al. 2016) that precedes more concrete infrastructuring. The geographic focus in Article II is at the scale of the Lower Mekong Basin. In fact, the article details how, within the auspices of the Mekong River Commission (MRC), the Basin scale is conjured up via certain techniques and practices of knowledge production as an object for technical hydro-social ordering which includes large-scale hydraulic projects. The MRC and especially its Secretariat (MRCS) is where information on fluvial flows, and tools and expertise for transboundary and cumulative assessments are accumulated. Efforts to strengthening the Secretariat could be interpreted as attempts to form a centre of calculation (Latour 1987, Rose and Miller 1992) which would enable hydrosocial ordering 'at a distance' and at a Basin scale.

Under the Mekong Committee (1957-1975), the predecessor of the MRC and the main agent for resourcifying Mekong flows at the time, high-modern, Basin-wide hydraulic development schemes were planned and eventually largely shelved without materialisation in major hydraulic works. So when the MRC was founded in 1995 the Mekong Basin was

still one of the world's least engineered major rivers. At that time the Mekong was produced and perceived by many national and international development actors and investors as a frontier of hydraulic development with significant untapped potential. This was, however, also when high-modernist hydraulic schemes, especially in the form of large-scale dams, were being seriously questioned internationally. A major task for the MRC has thus been to help determine how the Mekong's underused potential could be exploited 'sustainably', and is thus a central agent in constituting the Mekong as a frontier for 'sustainable' development of water resources.

The MRC is an intergovernmental organisation which derives its rules and procedures of cooperation from the UN Watercourse Convention. From this derives a certain kind of state-centric envisioning of the river with focus on the quantities of water that should be equitably allocated between the member states (Sneddon and Fox 2006). A key objective of the MRC has been to plan how water can be optimally allocated to different water uses as prioritised by the member states. As with the Mekong Committee the Basin continues to be seen as the main unit for integrated management, and the scale at which water resource development should be planned and optimised. But unlike before the procuring of finances and developing of projects are no longer under the MRC mandate. The rationale of united river basin management has evolved to Integrated Water Resources Management (IWRM) and the new role is centred on knowledge production without materialisation in concrete hydraulic infrastructures. The technical arm of the Commission is its Secretariat where most of the actual activities are carried out and funds spent. As explained in Article II, the task of the Secretariat is to produce knowledge, tools and capacities required to inform negotiations over projects with transboundary impacts, to evaluate the cumulative impacts of different development projects and scenarios, to provide the knowledge base for the development of a Basin-wide development plan, and to establish the 'limits' or 'acceptable changes' for sustainable development.

Up until recent times the MRC was heavily donor-funded. Thus its objectives and practices have not only been shaped by its member countries and their developmental aspirations but also by donors such as the national development agencies of Denmark, Australia, Germany, Japan, France, Belgium, Sweden and Finland, as well as development banks. Hence the public transcripts (Scott 1990) were guided by liberal rationales of governing and aligned with the international development discourse of sustainability. Accordingly, many elements previously excluded from the TVA-influenced Mekong Committee assessment and ordering schemes have to be now accounted for and rendered calculable, entailing more attention to environmental and social impact assessments and, for example, to the fisheries. The MRC has been described as a holding out the promise



of sustainable development and ecological modernisation in the developing world (Sonnenfeld and Mol 2002), and, indeed, the efforts of the MRC's main donors could be perceived as attempts to institutionalise sustainable development and ecological modernisation as the governing rationales of water management in the Lower Mekong Basin. This does not occur only through shaping the public transcripts but by supporting the development of technical devices and capacities that enable the operationalisation of these governing rationales (and may in turn also reinforce them). At the same time, the Basin-wide planning and impact assessment techniques and the capabilities for data collection and analysis on a Basin scale have been given institutional durability.

Article II demonstrates that the attempts of rendering the Basin governable involve two forms of anti-politics: developing expert knowledge about the Mekong's development potential and opening part of the knowledge production and planning to participation. As Rose (1993: 292) has stated, there are two sources of authority that promise indisputability and legitimacy within liberal arts of governing: scientific expertise and democracy. The role of the MRC's knowledge production has been, on the one hand, to provide expertise that can turn the detrimental effects of hydraulic development questioning the legitimacy of large-scale dams into calculable impacts and risks that can be efficiently managed. Via its expertise in modelling and impact assessments, the MRC has aimed to produce closures over the development potential of the Mekong that can be harnessed 'sustainably'. On the other hand, the MRC has attempted to close down critique of exclusionary, unaccountable and undemocratic expertise and planning. The more it is recognised that assessment agendas and processes are shaped by values and power relations, the more expertise needs to take recourse in democratisation of knowledge production to gain legitimacy. This is often, as in the case of the MRC, enacted by enhancing participation. Article II thus analyses the making of a sort of anti-politics machine via expert knowledge and participation to produce and guarantee a realm for Basin-wide development planning beyond disputes, closed-off from controversies and thus rendered technical.

The attempted depoliticisation through expertise is examined in Article II by looking at the processes involved in assessments of Basin-wide development scenarios developed within the Commission's Decision Support Framework (DSF). The article analyses the first instance that these assessments produced results and studies how these results were brought to the public domain and how they were used and debated by different actors. This time period importantly coincided with increasing discussions about the MRCS being too donor-driven and too focused on knowledge production and environmental sustainability. There was impatience over getting closures on the sustainable development

potential of the Mekong and the results from the hydrological models were interpreted as delivering this. The work on linking the hydrological information with ecological and fisheries assessments had not yet been attempted, and yet the models were interpreted by many as sufficient to estimate the scope of relevant environmental and livelihood-related impacts. Within the MRC the results were received with a certain kind of relief, as now, for the first time, there was evidence that most water-use interests of member states did not necessarily conflict as anticipated. The hydropower plants with reservoirs seemed to level the peak flow in the wet season and provide ‘excess’ water in dry season. For long there had been fears that, for example, Thailand’s massive water diversion plans for irrigation combined with the irrigation aspirations in Laos and Cambodia would mean serious saline water intrusion in the Vietnamese Delta, but now it seemed that hydropower development could bring new synergies for the countries: increased opportunities for irrigation and navigation in the dry season and flood mitigation in the wet season. The implications for fisheries received less consideration.

According to the MRC, the hydrological assessments helped to define a ‘development space’ (MRC 2005), a concept that later evolved into a ‘development opportunity space’, both of which terms have been reiterated many times since. The World Bank and ADB used the modelling results as evidence of the ‘potential’ and ‘tolerance’ of the Mekong to accommodate major hydraulic interventions, such as large dams and irrigation schemes, without major risks or detrimental impacts. Several civil society groups, however, contested these interpretations in which narrowly hydrological results were used to back up bold estimations of development potential, and significant environmental and social effects were underestimated. Article II examines this political shaping of interpretations and also highlights how the experts closer to policy-making tended to be more eager to downplay the uncertainties related to the models, if the results served their agenda; the appreciation of uncertainties increased with the motivation to explore the basis of knowledge claims critically. Even later, when other assessments, more appreciative of complex fluvial relationalities, have found the impacts and risks of major hydraulic development interventions much more serious – also paying more attention to the losses in fisheries – these have not become powerful facts within the MRC in the sense of enrolling or mobilising (Callon 1986) powerful policy-influencing or policy-making constituencies around them (Keskinen et al. 2012) that would disrupt or curb the accelerating large-scale damming and infrastructuring of the Mekong.

The initial plan for the knowledge-making framework was not unproblematic either. This remained somewhat implicit in the Article II, but it is worth explicating here as it is a relevant aspect of the technoscientific resource-making at stake. The targeted, integrated

approach was to consist of separate assessments of water flows, river ecology, fisheries and livelihoods, compartmentalising the river system into separate units. Although it was intended they would eventually be connected, this was to be done mainly through rigid causal chains, only accounting for commensurable numeric values. This approach also entailed a certain hierarchical and temporal order of the physical over natural and social assessments,<sup>13</sup> which explains why the first significant findings were related to hydrology. Hydrological assessments are more capable of delivering the results expected by hydraulic planners and developers because of the superior capacity of hydrological models for decontextualisation and abstractability.<sup>14</sup> Hydrological models use as inputs certain measurement data but they are, importantly, based on universal mathematical equations related to hydrology. This means that compared with more context-specific ecological and fisheries-related assessments, they are able to code and inscribe rather quickly, and with a limited amount of empirical data, divergent river basins with their particular fluvial hydrosocial environments in terms that are legible to river planners and developers and amenable to interventions, regulation and control. The compartmentalising approach to knowledge making, the unrealistic expectations of integrative assessments, the inability of ecological and fisheries assessments to produce fast results and the impatience of policy-makers to get expert facts on 'sustainable' development potential together formed the preconditions for the dominance of hydrological knowledge examined in Article II.

The article illuminates hydrological models as critical tools for water resourcification. Through their use the river is reduced to flows of H<sub>2</sub>O, and the water flows are derelationalised, that is to say, stripped of their formative relationalities with sediments, algae, fisheries and the livelihoods of riverine people. The models produce hydrographs that are effective simplifications of fluvial environments that assist in organising the Basin in powerful ways, enacting it as an object of governing, and its water flows as a resource that can be managed and allocated to different uses. In this sense the models have also been effectively generative. The hydrographs strengthened the imaginary of a Mekong consisting primarily of regimes of water flows and reinforced the prevailing allocation paradigm of the Commission, according to which the member states should be enabled to allocate water to their prioritised uses. The modelled results in the form of hydrographs also provided powerful visualisations of the 'robustness' of the flow regimes that are not easily altered by hydraulic interventions, at least, if they are developed in a coordinated way. As a result, a certain number of hydropower projects shifted from risks into desirable

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<sup>13</sup> This hierarchy of the physical sciences over natural and social has been common in integration endeavors globally (Taylor 1997).

<sup>14</sup> These are key qualities of 'immutable mobiles' (Latour 1990) and of 'global forms' (Collier and Ong 2005).

ingredients of responsible river Basin development and were thus normalised as part of eco-modern river basin control.

Article II demonstrates that, in addition to the production of expert knowledge and fact-based closures, the establishment of a realm for apolitical hydrosocial ordering beyond disputes has been advanced in the MRC through the so-called participatory turn. This has been the response to pressure raised by civil society organisations for MRC to open up its expertise by diversifying and broadening the groups of people shaping the development plans and related knowledge-production processes. This response has been especially promoted by the donor agencies, and is a path common for institutions in the development domain (Cooke and Kothari 2001, Mosse 2005). The article shows that the programme in the MRCS that had taken the most significant steps towards more inclusive knowledge production was the Fisheries Programme which, however, was eventually sidelined from the core activities of the Commission; in other programmes participation was little more than ‘tokenism’. Participation was found to be at best partial, and marginal in practices but still importantly present in the Commission’s public transcripts. Article II also looks beyond the ‘failures’ to foster participation in MRCS practices, examining the broader rationale of ‘the participatory turn’ and how it has become a way of securing the Commission’s mechanisms of governing. It argues that as long as the fostering of participation is situated within the conventional science-policy order in which science is expected to provide an indisputable guide for policy making, attempts to enhance participation supports the anti-politics of knowledge production and forms an additional technique for rendering the Basin apolitically governable.

The main effects of the processes analysed in Article II could be summarised as follows. The first results of the DSF-scenario assessments contributed to constituting a field fit for depoliticised hydro-social ordering and thus produced and supported apolitical governmental power formations. Although the results were contested and thus were not entirely successful in producing a closure, they were effective enough to perform as a justification for MRC’s own strategical shift from mere knowledge production to investment facilitation, along with the World Bank and ADB’s new assistance strategies supportive of new initiatives in large-scale hydraulic infrastructuring. In other words, a ‘development space’ for the Lower Mekong Basin was constituted, which has contributed to constructing the Mekong as a frontier for ‘sustainable’ hydraulic projects that could sustainably accommodate projects such as the Nam Then 2 discussed in the next section. The hydrological models were identified as powerful tools of water resourcification by enabling the planning and optimisation of fluvial flows at a Basin scale with the aim of

enhancing the affordances of water to selected uses of which electricity production and agriculture have been prioritised.

At the same time the basin scale has been enacted into being. According to authoritative interpretations within the Commission, the balancing effects of different infrastructuring efforts are only achievable through integrated planning at a Basin scale. This is one of the important ways that the MRC has upheld the notion that large-scale dams and river-basin development should be intimately linked, and also a new variation in the continuum of making acclimatised water uses possible. This, in turn, adds to the continuum of overlooking the importance of seasonal flow fluctuations, and especially the flood-pulse-based hydroecology of the Tonle Sap and the rich fisheries it sustains. Another important exclusion from this Basin-scale field of vision in which 'acceptable changes' are evaluated through aggregate calculations according to which large-scale dams seem to engineer out the main flow alterations caused by potential irrigation schemes, are the more local effects – for example, on the scale of the dammed tributaries – that may not be at all 'accepted' by those most adversely affected. Many unpredictabilities regarding dam operations are also downplayed.

A key power effect relates to how the very problematisation of impacts driving MRC knowledge production, including in its more participatory forms, leaves unchallenged the governing rationales and developmentalist aspirations shaping hydraulic infrastructuring and damming. The main point here is that an overtly focus on 'downstream' risks and 'impacts' problematically diverts the discussion away from the purposes and reasons that are driving the development with its adverse effects in the first place. If discussion gets narrowed down to endless debates on the scientific validity of the estimated impacts, or to issues of remediation and mitigation of negative impacts, the 'upstream' energy plans remain unchallenged, the governing rationales fostering damming and alternative ways of relating with rivers remain undebated, and the possibilities of social choice get obscured. At the same time, 'acceptable changes' and sustainability are constructed and reinforced as objects of scientific discovery rather than epistemologically, ethically, and one could also say ontologically, multisided and indeterminate – and hence inherently political – concepts of sense making (Swyngedouw 2010, Wynne 2010). This strengthens the plausibility of governing water according to an eco-modern rationale as one of its core assumptions is that with sufficient knowledge many of the risks previously externalised can be successfully internalised.

It is important to note that, during the time focus of Article II, even the scenario of 'high development' did not include mainstream dams in the Lower Mekong or all of the tributary dams that are now under planning or consideration. So the MRC as well as the

World Bank and ADB did retain caution with regard to many of the projects with higher environmental and social imprint that are now moving forward. Furthermore, the enclavistic way in which the hydropower projects have eventually been pushed through, examined in the following sections, has increasingly marginalised the rationale of integrated water resourcification held up by the MRC. The Commission continues to lack mechanisms through which its policies would be transposed into riparian national legislation aggravating its disconnectedness from actual dam development (Suhardiman, Giordano and Molle 2012). Even in the case of mainstream dams, which should be at the core of the MRC's relevance and authority, the notification and consultation processes required by the MRC ultimately did not really influence the projects; Laos moved forward with the Xayabury and Don Sahong mainstream dams unilaterally (Biba 2018) and has continued to do so with Pak Beng, Pak Lay and possibly also with the Luang Prabang dam that is now under the consultation process. Thus, while the MRC has been successful in opening up possibilities for new hydraulic infrastructuring it has been unsuccessful in its attempts to uphold the approach of integrating hydropower projects into coordinated and broader Basin-wide planning of development schemes and in preventing the most harmful projects.

Another timely note is that the most recent assessments of MRC such as the Council Study (2017) now account more thoroughly for the fisheries and sediment losses at stake with the current dam development and articulate more clearly how seriously they may harm the riverine ecologies, riverine people and the economies of the Lower Mekong countries. But even the Council Study has been accused for understatements and also for not recognising the unjustly differential distribution of adversities (IR 2019). There is also a continuation from the past in that the critical findings are still not well reflected in the MRC core programmes nor have they mobilised decision-making that would curb the current development. Also the 'downstream' focus seems to continue keeping attention away from challenging the 'upstream' of the energy plans and from forming alternate ways of relating with rivers and visioning riverine relationalities.

#### **4.3 THE WILL TO FIX LARGE DAMS: THE MAKING OF INVESTABLE AND 'SUSTAINABLE' HYDROPOWER IN LAOS**

After examining water resourcification on the Mekong Basin scale through the lens of techno-scientific knowledge production I now shift attention to efforts aimed at rendering rivers investable in Laos. As discussed, the Mekong River Commission has contributed to constituting the Mekong as a frontier for ecomodernisation and 'sustainable' water

resourcification via establishing facts on the development potential of Mekong; here I demonstrate how the World Bank has accelerated the dam rush in Laos by its support of the Nam Theun 2 (NT2) hydropower project and the inventory assessments and legislative reforms that preceded it. In the latter case a concern for sustainability is not articulated as a matter of integrated river basin management but as one of making individual hydropower projects simultaneously investable and sustainable via architecting new financial, social and environmental safeguards on project-scale. At the same time, NT2 was meant to be much more than just a single element of infrastructure; it was also a vehicle for facilitating new investment projects and for intervening in how new hydropower and other extractive investments are governed in Laos. Furthermore, it was supposed to provide a model for how hydropower projects should be governed elsewhere in the world; thus, Nam Theun 2 has facilitated not only the opening of hydropower frontier in Laos but also opened new opportunities for 'sustainable hydropower' globally.

Large dams were fiercely opposed in the 1980s and 1990s in different parts of the world. The mounting critique, culminating in the work of the World Commission on Dams, made the World Bank temporarily cease its support for hydropower. However, instead of giving up on large dams or following recommendations by the World Commission on Dams for avoiding dam-induced adversities, the Bank chose to try and contain the critique in its own, more pro-corporate way. It decided to re-enter the world of hydropower production by supporting the Nam Theun 2 project, which can be conceived of as an attempted anti-politics device designed to close down debate on the unjust distribution of benefits and adversity caused by dams. In fact, it has been formative of a new governmental assemblage (Li 2007b) of 'sustainable hydropower' that consists not only of discursive elements but, importantly, also of very material practices and techniques, such as newly designed assessment, consultation, revenue management and environmental and social compensation techniques. Its central proposition is that damages caused by hydropower can be either prevented or fixed with the right kind of expertise and techniques. Laos offered an expedient environment for testing and validating the new hydropower model, as the formation of strong domestic constituencies to oppose the project was likely to be effectively pre-empted or suppressed by the authoritarian one-party government.

The efforts to re-legitimise hydropower overlap with the rise of the climate change agenda. Article III discusses the World Bank's broader energy support in Laos, demonstrating that it has responded to the critique of its energy support for its anti-poor, environmentally destructive and climate-change accelerating aspects with a new stabilising policy discourse of pro-poor and climate friendly renewable energy, as well as with new

model projects such as the Nam Theun 2. Here I discuss the Bank's efforts to prove that pro-poor 'sustainable hydropower' is possible and credible through the example of the Nam Theun 2 project. I also examine more retrospectively how the project has enabled hydropower development in Laos and globally. The climate change-related aspects of Nam Theun 2 and the World Bank's energy-related support in Laos are discussed in the next section.

The World Bank had considered involvement in Nam Theun 2 project since the beginning of 1990s but final funding approval was only made in 2005. The project aligns with the World Bank's long-term commitment to advance physical infrastructures that further regional connectivity and markets, especially in energy, as well as juridico-institutional infrastructures that are conducive to foreign investors and their access to the country's resources. Closer to funding approval these objectives were amended. Nam Theun 2 was not only supposed to open the country to investors, it was also supposed to make such investments green and sustainable. The NT2-imposed changes in the country's legal and regulatory framework were designed to establish a rule of law that would be both favourable to private profit-seeking investors and restrictive in the sense of constraining the most harmful effects of the investments in extractive projects (Goldman 2005). Nam Theun 2 was thus accompanied, for example, by a Decree on Compensation and Resettlement of the Development Project and a National Policy on the Environmental and Social Sustainability of the Hydropower Sector (Middleton et al. 2009).

The Nam Theun 2 project itself pulled together a remarkably vast array of investors, developers, experts, consultants, legislative reforms, knowledge-making processes and assessments, monitoring procedures, and compensatory mechanisms, as well as different goals, such as investment returns, state foreign currency earnings, poverty alleviation, the greening of extractive infrastructure projects and climate change mitigation. It brought not only state officials, international experts, conservationists and consultants but also transnational advocacy groups and media to the Nakai Plateau, making this previously remote area one of the most transnationally exposed in Laos. The project is shaped by various governing rationales and techniques but I would argue that most importantly the form the project eventually took is as result of shapings by an amalgamation of neoliberal and eco-modern rationales of governing: the neoliberal manifesting in the concessionary governing mode with financial safeguards that secure profits for the investors, the eco-modern in the social and environmental safeguards and compensatory mechanisms aiming at internalising externalities.

World Bank involvement meant that the Nam Theun 2 Power Company (NTPC), to whom the project was concessioned, was obliged to mitigate and compensate for losses



on a scale not seen in previous hydropower projects in the global South. The company itself is formed by shareholders from France and Thailand together with a state-owned Lao company holding 25 per cent of the shares, and its financiers consist of 27 distinct parties including multiple Thai and OECD commercial banks; it was the latter group for whom the World Bank provided political risk guarantees (Merme et al. 2014). It was not only that greater effort was put into resettlement but, for the first time, those experiencing downstream impacts were also programmed to receive compensation - probably because of the pressure transnational advocacy groups had brought to bear in this respect on the preceding ADB-funded and nearby Theun Hinboun project (Whittington 2012, Baird et al. 2018). In addition, the World Bank provided not only its expertise but also additional funds for the compensatory programs.<sup>15</sup> It also succeeded in incorporating previously critical development and conservation organisations into the consultation process and when establishing the watershed conservation area (Goldman 2005). Other novelties included new monitoring and revenue management mechanisms. Consequently, as Article III notes, NT2 resulted in a more benign and sustainable dam than those preceding it. Nonetheless, it remains highly contested whether it can actually be called a sustainable dam.

Article III points out some of the main gaps between what was promised and what was actually delivered. Firstly, Nam Theun 2 is not primarily about the alleviation of energy poverty, which could have helped the project to qualify more readily as pro-poor. Instead, the project exports 95% of its electricity to Thailand. In fact, it seems evident now that Nam Theun 2 serves as a supplier of variable peak power largely caused by the daily, weekly and seasonally heightening demand for air-conditioning in the affluent parts of Thailand (Greacen and Greacen 2012, MEE-Net 2012, Baird and Quastel 2015). While in some instances the World Bank has attempted, as demonstrated in Article III, to frame its support for a regional power trade and Nam Theun 2 as being about increasing electricity access for the poor and thus about (energy) poverty alleviation, a closer look proves it to be more about furthering consumption among the already highest electricity consumers. The pro-poor claims thus rest on how well the project performs in generating revenues for nationwide poverty reduction in Laos, as well as in provision of 'net benefits' for those adversely affected by the project. The second gap Article III highlights relates to problems in tracking how the revenues have been allocated and used, problems which seem to persist (Shoemaker 2018). In addition, the total revenues of the Government of Laos

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<sup>15</sup> The World Bank provided a grant of 20 million for compensatory programs. Other donor agencies, such as Agence Française de Développement, have supported the livelihood activities of the affected people in the Nakai Plateau. In the downstream areas of Xe Bang Fai Basin, the Asian Development Bank and the World Bank have supported irrigation and rural development programs have been interpreted as supplemental to compensatory activities (Baird et al. 2015).

seem much lower than was expected.<sup>16</sup> The third gap discussed is that prospects seemed low for the Resettlement and Downstream Compensation Programs to succeed in generating ‘net benefits’ that would qualify the Nam Theun 2 as a sustainable pro-poor project.

Article III shows that the unprecedented resources and efforts put into resettlement resulted in new housing, connected to electricity, along orderly lined roads, as well as schools, health centres and related infrastructure, but attempts to restore the livelihoods of the resettled seemed much more elusive and disappointing. More recent follow-up studies and assessments affirm that the ‘livelihood pillars’ of the resettlement program have indeed failed to restore the livelihoods and enhance the income-earning capacities of those resettled (Hunt et al. 2018). In fact, to earn an income and sustain their lives, the resettled people have ended up resorting to highly unsustainable logging and poaching activities triggered by the dam project.<sup>17</sup> Moreover, the doubts raised in Article III regarding the capability of the Downstream Compensation Program to compensate for the livelihood losses for the 155,000 riverine people living in the Xe Bang Fai Basin have been proved well-grounded. Ultimately, around 100,000 people have been targeted by different efforts to compensate them for the loss of riverbank gardening, access to fisheries and harvests of wet season rice, due to the changed flood regime that manifests in prolonged inundation periods. While the NT2 project can be credited for at least trying to address the downstream effects, recent research (Baird et al. 2015, Manorom et al. 2017) as well as my own field visits in 2015 and 2016, confirm the compensatory program was not only insufficient but also largely inappropriate in terms of meeting its objectives. The micro-credit schemes that the program included seem in some cases to have furthered indebtedness, thus exacerbating the losses caused by the dam rather than mitigating them (Johns 2015, Baird et al. 2015).

Ultimately important is the fact that Nam Theun 2 is simultaneously more ‘benign’ than its predecessors while *still* falling short of its promises. Because the credentials of the dam’s compensatory mechanisms are not entirely deniable, the project has lent the World Bank and other hydropower promoters a certain credibility when claiming that lessons from the past have been learnt and that dams can be made sustainable with tested,

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<sup>16</sup> A persistently circulated figure, also presented in the Article III, has been for a long time as high as \$2 billion for the 25 years of the concession period (annually \$80 million on average). Critics estimated quite early that \$250 million for the 25 years (\$10 million annually on average) would be closer to reality (Watershed 2004, Shoemaker 2018). Recently, the World Bank (2019) itself announced that between 2010 and 2017 NT2 has generated \$180 million (annually \$25 million on average) for the Government of Laos.

<sup>17</sup> Thus, any increases in resettlers’ incomes are most likely attributable to their involvement in the illegal trade of valuable timber (such as rosewood) and poaching, rather than to the livelihood activities the resettlement program has supported. This is ironic, as these are activities which were supposed to be prevented by the Watershed Management Protection Authority (WMPA).

corrective, technical mechanisms. Nam Theun 2 has been thus central not only with regard to its construction but also in the attempted validation of a new justificatory discourse of ‘sustainable hydropower’ (Middleton 2018). Resonating with Boltanski’s and Chiapello’s (2007) take on the relationship between tests and critique, the fact that the Nam Theun 2 has been made a test case supposedly revealing the capabilities of ‘sustainable hydropower’ has also made it vulnerable to critique, and Nam Theun 2 remains contested.<sup>18</sup> A lot remains to be at stake with the project. The more Nam Theun 2 is perceived as ‘passing’ the test of proving sustainable hydropower possible, the more effectively previous critiques of hydropower are contained and the more constitutive the project becomes of the emergent discursive power formation of ‘sustainable hydropower’. The ‘passing’ of the test would make Nam Theun 2 effective in discursively rendering the unavoidable, unjust distributive effects of large dams technically manageable and hence apolitical. Furthermore, as suggested by Article III, it would allow the World Bank to position itself as a key provider of the proper expertise and techniques to divest dams of their unjust distributive effects. Yet the gaps between what the project promised and what it has actually delivered identified by Article III and other studies remain relevant when exposing the emergent power formations enabled by an unchallenged validation of the justificatory discourse of ‘sustainable hydropower’.

Thus far, however, the Nam Theun 2 seems to have lent substantial credibility to the notion of ‘sustainable hydropower’, while the partial incorporation of previous adversaries and their goals has enabled the World Bank to close down contestation – not entirely but enough to go forward with its re-entry to the field of global hydropower. This is one of the key power effects of the project thus far. Nam Theun 2 continues to be used as a justificatory reference point for new hydropower projects in Myanmar, Nepal and, more globally, by the Bank itself and its sister organisation, the International Financial Corporation, by the International Hydropower Association and by other hydropower proponents, including those in key international water forums (Middleton 2018). The Bank has claimed that the shortcomings they have acknowledged are fixable in future projects (Shoemaker and Robichaud 2018); thus, the new discursive storyline presents the Nam Theun 2 as potent to ‘succeed forward’. In other words, although it is admitted that the Nam Theun 2 is not entirely successful, the new governmental assemblage of sustainable hydropower is kept together by presenting the deficiencies as rectifiable (Li 2007b). Yet this is far from evident.

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<sup>18</sup> One of the Bank’s key PR efforts, the publication, ‘Doing a Dam Better’ (Porter and Shivakumar 2011), has been challenged almost argument by scholars and activists in a recent publication, ‘Dead in the Water’ (Shoemaker and Robichaud 2018).

From the new projects in Laos, only the recent ADB-funded Nam Ngiep 1 project has applied similar, although now arguably improved, safeguard mechanisms, yet similar shortcomings to Nam Theun 2 have already been reported (Shoemaker and Robichaud 2018). Overall, instead of succeeding forward the Nam Theun 2 has more evidently failed forward (Johns 2015, Boer et al. 2016, Peck 2010). It has certainly paved the way for new hydropower projects by building up investor confidence in Laos, demonstrating that the Government of Laos is capable of handling complex concessionary agreements, providing encouraging formative experience for EGAT and Thai investors and proving that, with the right kind of concessionary agreements, dams in Laos can be profitable to their developers and investors. This facilitation of future projects is perhaps the most significant effect of Nam Theun 2 in Laos. Yet, except for the aforementioned Nam Ngiep 1, all of the ensuing concessionary agreements have been stripped of Nam Theun 2's extensive compensatory obligations. The new Thai, Vietnamese and Chinese investors, who are less exposed to reputational risks, seem to have considered the additional costs of extensive compensation too profit inhibitive. For its part, the Government of Laos seems reluctant to risk curbing its increased investor attractiveness. Illustratively, out of the legislative reforms that the World Bank supported while making conditions for Nam Theun 2, the elements supposedly guaranteeing more sustainable projects have lacked enforcement or been watered down since its completion (Singh 2018), while the investor-friendly elements have remained effective. Unlike the sustainability mechanisms, the discursive elements of sustainable hydropower have, however, been embraced by the Government of Laos and used in attempts to justify the new, mostly more exploitative dams (Olson and Gareau 2018). At the same time, restricting sustainability considerations to individual dams risks losing sight of the cascading effects of the dams the World Bank and Nam Theun 2 have helped to set in motion.

What the failure to set sustainability standards for new dams in Laos means is that Nam Theun 2 ended up forming a distinct and exceptional space of hydrosocial governing, a sustainability enclave (Whittington 2012) with higher sustainability standards and more effective regulatory mechanisms than other preceding or ensuing projects, except for those with direct World Bank or ADB involvement, like Theun Hinboun and Nam Ngiep 1. It was also, notably, the World Bank that acted as the environmental regulator of the project not the Lao State (Merme et al. 2014) which also underlines its regulatory exceptionality or enclivity. This is perhaps not surprising, as the mobilisations and processes of condemnation that animated and were formative of Nam Theun 2 did not, for the most part<sup>19</sup>, take place in connection with dams in Laos in general, or even Nam

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<sup>19</sup> The Theun Hinboun contestations did influence the Nam Theun 2 project, but in both cases the sustainability standards were raised because of pressure from transnational activist groups, not from local mobilisations (Whittington 2012).

Theun 2, but with dams in other parts of the world and through transnational advocacy networks. From the beginning of the Nam Theun 2 project, the World Bank prioritised international public relations over serious engagement in the Lao context, rather addressing the transnational than the Lao public debate, which, in any case, has been severely suppressed (Singh 2018: 221). In a way, Nam Theun 2 was enclavistic from the onset, forming a zone of transnationalised accountability primarily addressing the concerns of a transnational public rather than those of the adjacent or other riverine people in Laos. The majority of the later dam projects in Laos, especially if situated in the tributaries, are progressing without such transnational exposure, with much less ambitious safeguard policies.

Thus, the case of Nam Theun 2 does not validate the feasibility of sustainable hydropower but quite the contrary. As Article III highlights even the Nam Theun 2 with its higher sustainability standards and compensatory budgets, augmented by additional public funds was still dispossessionary, only partially succeeding in internalising externalities. The more retrospective analysis, in turn, reveals that the subsequent hydropower investors and developers have deemed even this kind of partial internalisation too profit inhibitive. These findings prove the fixability of large dams as highly questionable. More specifically, the case of the forward failing Nam Theun 2 suggests that the governing mode assembled around Nam Theun 2, which amalgamates investor-friendly concessionary agreements with the internalisation of externalities, is highly problematic and inherently too contradictory to reach the sustainability it supposedly seeks. It seems to form yet another example that proves that the neoliberal eco-modern rationale proposing the internalisation of externalities is unlikely without more profound change in the key governing logic geared at profit maximisation (Wanner 2015, Fletcher and Rammelt 2017). Furthermore, even if dam projects were less profit-driven and the compensatory schemes more comprehensive, it would still remain questionable whether all losses and forced changes in riverine modes of living are compensationable (Green and Baird 2016). Overall, it is relevant to challenge the World Bank not only for the shortcomings of the compensatory mechanisms as such, but also for the systemic character of these failures (Johns 2015). While the World Bank has been successful in Laos in setting juridico-institutional infrastructure *for* extractive investments it has failed in establishing the governing infrastructure *of* these investments (also Kaisti and Käkönen 2012). An important explanation for this is the very modestly constrained (and greened) World Bank core governing rationale of continuous expansion in the making of investable resources, creating conditions conducive for profit-seeking investors and securing the circulation and accumulation of capital.

In terms of the overall power effects the concessionary governing mode of dams the Nam Theun 2 has most importantly furthered corporate power formations over fluvial relationalities. But it should also be noted that the concessionary projects like Nam Theun 2 have also opened avenues for rather illiberal state power formations (Blake and Barney 2018, Creak and Barney 2018), something that partially resonates with the findings of Article V for dams in Cambodia. In the case of Nam Theun 2, it seems that state authorities have succeeded in gearing the dam's watershed management (Enfield 2018) and resettlement schemes to serve state policies of forming more consolidated and governable settlements and thus strengthened territorial state powers.

#### 4.4 CLIMATE CHANGE ENABLING HYDRAULIC INFRASTRUCTURE DEVELOPMENT?

In this section I synthesise findings from Articles III, IV and V with respect to how the hydraulic infrastructuring and the governing of climate change shape and enable one another. I showcase how large dams are being increasingly justified by recourse to climate change, how the ways climate change governability is being produced make large scale hydraulic infrastructuring seem plausible and desirable, necessary even, and how large dams have formed a key technology in climate mitigation in the Mekong Region, just as they have in many other parts of the global South. Firstly, I discuss the findings from Article III, which reveal that the World Bank has tried to consensualise large dams by framing them as climate-friendly, also noting that this has influenced how hydropower is justified by the government of Laos. Secondly, based on Article IV but in connection with Articles III and V, I show that, in Cambodia, climate change approaches are themselves rendered technical and consensual in a way that creates space for large-scale hydraulic infrastructure projects. Lastly, I continue with a closer examination of the connection between climate change mitigation initiatives and hydropower development through the Clean Development Mechanism (CDM) dams in Cambodia, drawing mostly from Article V, but also from Article IV.

##### **Framing hydropower as climate-friendly energy**

The increasing importance of the climate change agenda has created an opportunity for the resurgence of hydropower. Article III points out that the mobilisation of climate change concerns in support of hydropower has been particularly important for the World Bank's return to dams. The Nam Theun 2 has provoked a number of studies, but Article III is one of the few to examine the project as an illustrative case of the World Bank's broader energy policy, in which rationalising hydropower as climate-friendly has been central. It

shows how the World Bank deploys the Nam Theun 2 to respond to three lines of condemnation: the anti-dam movement culminating in the World Commission on Dams report (2000); the critique of the Bank's anti-poor privatisation policies in the power sector; and the anti-extractivist movement that put the Bank's support of fossil fuel and mining projects in the spotlight – and which it countered by commissioning a review process of its work in the extractive sector. The findings from Article III on how the World Bank has tried to contain the critique of the anti-dam movement through the governmental assemblage of 'sustainable hydropower' – constituted essentially through the Nam Theun 2 – were discussed in the previous section. Here I highlight findings from Article III on the less examined yet relevant connection between the Nam Theun 2 and the World Bank's attempts to respond to the critique of its support for climate-change-accelerating energy.

One of the recommendations of the Bank-commissioned Extractive Industries Review Report (2003) was that the World Bank should stop funding oil and gas projects. Article III drew attention to one of the World Bank's own responses to the review, the so-called Bonn Commitment, whereby the Bank declared it was committed to nothing less than a revolution in renewables. At first, large-scale hydropower had no part in this 'revolution', but it was not long before it was not only included, but made the most central element. Article III argues that the World Bank's so-called revolution in renewables has, in fact, consisted of stabilising win-win policy narratives on poverty alleviation and climate change mitigation that make two types of solutions in particular appear necessary: large-scale hydropower as the main on-grid solution and solar home systems as the main off-grid solution. Article III suggests that, with this agenda, the World Bank has followed a *sui generis* framing approach that is common to development agencies (Ferguson 1994, Li 2007a, Leach 2008). By foregrounding solutions that already fell within its repertoire, the Bank rapidly positioned itself as a key, potent, climate agent with immediate capacity to provide the expertise, resources and technologies most needed. Large hydro and solar home systems also comprise the central pillars of the World Bank's energy support in Laos, making Laos an illustrative case of the Bank's new energy agenda.

The message sent by the World Bank's support of the Nam Theun 2 is not only that large dams are fixable with its expertise and assistance, but also that, in their fixed form, large-scale hydropower dams provide a key solution to climate change. On the one hand, the justificatory affordances of climate-friendliness seem restricted or conditioned by the 'sustainability' test of hydropower. Thus, at least in the eyes of the Bank's adversaries, the attempt to make hydropower a key climate solution depends on the Bank's ability to prove that it has learnt the lessons taught by harmful large dams in the past. This has

added to the critical importance of the Bank's maintaining the success narrative of the Nam Theun 2, and for opponents to be particularly vigilant on the project. On the other hand, the climate frames seem to be perceived by many dam proponents as a potent tool in marginalising concerns about the adverse externalities of large dams. Article III notes that some World Bank documents and representatives have framed not only the Nam Theun 2 but the whole model of Laos' production of hydroelectricity for Thailand and its other neighbours as clean and green, an approach that has been effectively adopted by the Government of Laos (Olson and Gareau 2018). The Government of Cambodia also justifies its hydropower-dominated development of the power sector with reference to climate change, as noted in Article IV.

The framing of hydropower as climate-friendly is thus problematic: firstly, because even the most 'sustainable' dams, such as the Nam Theun 2, have only fixed their dispossessive and unjustly distributed effects to a very limited extent; and secondly, because the climate frames have been used to side-line concerns on these effects. Yet there is also a third reason: the 'low carbon' attribute of large dams in itself can be problematised. In Article III the huge and greatly fluctuating reservoir of the Nam Theun 2 was considered a potent source of greenhouse gas. Currently, there is even more evidence that tropical reservoirs can be significant emitters (Fearnside and Pueyo 2012, de Faria et al. 2015, Kumar and Sharma 2016). A recent analysis (T. Räsänen et al. 2018) suggests that in the Mekong Region the dams with the highest emissions may even equal those of fossil fuel plants; it also estimates that the Nam Theun 2 could be amongst them.

A fourth point problematising the climate-friendliness of Lao dams relates to the way they side-line other more sustainable and climate-friendly options. As highlighted in Article III, the World Bank has presented the rationalisation that Nam Theun 2 and other hydroelectricity export projects in Laos are needed to displace 'dirty' energy, such as coal power projects in Thailand. The claim that the imported Lao hydroelectricity is the only viable alternative to new fossil fuel projects is, however, challengeable. Demonstrably, viable alternatives in Thailand could have included more climate-friendly options of demand-side management and energy efficiency, as well as an increase in new, small producers of more sustainable renewable energy (du Pont 2004, Greacen and Greacen 2012, MEE Net 2012, Ryder and Permpongsacharoen 2018). These options have been marginalised by the decision to import large amounts of hydroelectricity from Laos and, in future, increasingly from Myanmar.

As for Laos, Article III established that the energy sector support that materialised in the combination of the Nam Theun 2 and solar home systems has also impeded rather than fostered a 'revolution' in more sustainable and climate-friendly renewables. The Nam



Theun 2 appears to have facilitated the locking of Lao's future energy pathway (Leach et al. 2010) into the hydroelectricity export model. Article III, however, does not solely address fostered hydropower preferences, but also how the prioritisation of solar home systems as the next preferred renewable energy form has furthered the centrality of large-scale hydropower. The solar home-system program swiftly produced high installation figures, but a closer look revealed that, because of its technical and institutional arrangements, the program was less an alternative way of providing electricity than a temporary pre-electrification phase. A more 'revolutionary' approach would have been supportive of more permanent small-scale renewable energy producers with attention paid to how these producers could be integrated into the expanding national grid. Problematically, the approach excluded considerations on how to support and foster institutional arrangements conducive to small-scale, distributed power generation. Instead, the World Bank energy support in Laos has strengthened socio-technical and socio-political arrangements that are conducive to centralised power generation through large power plants and thus likely to impede (Sovacool 2006) the development of more distributed, climate-friendly and environmentally sustainable power generation.

Article III observed that in some cases the World Bank's climate-friendly framing of hydropower referred not only to the mitigation but also to the adaptation potential of hydropower, although this was not carefully problematised apart from highlighting adverse effects of the Nam Theun 2 dam that could diminish people's capacities to cope with changing climate. Based on my post-Article III fieldwork in the Xe Bang Fai Basin (A. Räsänen et al. 2018), as well as recent research by others (Baird and Quastel 2015, Manorom et al. 2017), some further reflections can be added that augment the doubt that Nam Theun 2-type dams facilitate climate adaptation. Xe Bang Fai has been identified as one of the 'flood hotspots' of Laos (MRC 2009) where climate change is expected to increase the frequency of exceptionally high and long-lasting floods that destroy harvests, cattle and human settlements. Thus far, however, it is effectively the Nam Theun 2 that has transformed the floods from 'beneficial' to devastating. Before the dam, the affordances of floods in terms of 'free' alluvium and pest management had made the Xe Bang Fai one of the most fertile rice-growing areas in Laos and enabled the area to become the 'rice basket' of the country. Since 2010 the additional water discharge from the dam reservoir has prolonged the floods in many areas just enough to transform the floods from a force that is beneficial to harvests to one that is destructive. The kinds of floods the engineered waterscape and the changing climate will co-produce in the future is highly uncertain. While the hydropower company is obliged to shut off water discharge into the Xe Bang Fai River if a certain, pre-determined, critical water level is reached, this is rather far from flood mitigation and enhanced adaptation; however, at least there are

rules for avoiding the amplification of the effects of ‘exceptional’ floods. It remains to be seen how the dam’s overall operation regime – fixed for the maximisation of electricity sales for at least the next 25 years by the concession and power purchase agreements – will perform in relation to ‘exceptional’ floods, likely to become more frequent in future. Most probably the current concessionary governing mode is not easily reconcilable with flood mitigation objectives.<sup>20</sup>

### **Externalising and consensualising climate change: plausibility for large-scale hydraulic infrastructuring**

In Article IV I analyse the policy discourses and governing technologies through which climate change has been rendered governable in Cambodia, showing them to stem from, and align effectively with, the weak version of ecological modernisation (Bäckstrand and Lövbrand 2006; 2016). The article demonstrates the centrality of consensualising policy discourses in the production of climate governability. It shows how they have tended to stabilise key tensions between climate and economy as well as between North and South by attempts to make mutually adversarial goals complementary in order to render climate change actions uncontentious for all parties. Synergistic policy formulations in which climate mitigation and adaptation are presented as compatible with sustained economic growth – or with sustainable development – as well as with each other, are shown to be vital in enrolling key actors to climate action and forging alignment between international development organisations and national governments in countries like Cambodia. What has also facilitated the mainstreaming of climate change into Cambodian development policies is the technoscientific framing of climate change as an external threat to society against which development must be secured, together with depoliticising assumptions of how science is linearly translated into policies and transferrable technologies. Article IV also analyses certain governing technologies, such as the carbon accounting and monitoring techniques of the CDM projects and the techniques of vulnerability assessments. It argues that these, together with synergistic, consensualising climate policy discourses and framing climate change as an external threat, have co-constituted climate change in Cambodia as a technical domain of governance in which large-scale infrastructural solutions, including dams and irrigation schemes, are foregrounded in ways detailed below.

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<sup>20</sup> The experience of the exceptionally devastating flood of 2011 provides an example of the problems that may lay ahead. The company claims it fulfilled its obligations and refrained from releasing water when the river had reached the pre-determined maximum level and denies being responsible for worsening conditions. Others have suggested, however, that it is possible that the dam was operated in ways that added to the intensity and duration of flooding (Baird and Quastel 2015, Manorom et al. 2017).

In Article IV I highlight that Cambodia has been a frontrunner amongst the so called Least Developed Countries (LDCs) in several adaptation and mitigation initiatives and in mainstreaming the issue of climate change into national policies. I show how the donor-driven policy narratives of co-benefits, multiple benefits and ‘triple wins’ — as, for example, in the conceptualisation of ‘climate compatible development’ that emphasises the possibility of simultaneously producing adaptation, mitigation and development benefits — have had a ‘buy-in’ in the country. By analysing key national policy texts like the Cambodia Climate Change Strategic Plan, Article IV also demonstrates that climate change is discussed as an external threat to the recent growth performance of Cambodia and, consequently, that solutions are sought which rather secure current development priorities and projects from climate change than challenge them. In other words, the externalisation of climate change enables its governance to be operationalised in the form of status quo-enhancing rather than status quo-challenging activities. The article suggests that the seeming ease with which international climate policy discourses and governing mechanisms are appropriated by the Cambodian government can be understood by virtue of the apolitical framing of climate change, which excludes from consideration key underlying causes of climate and environmental vulnerability. It shows, for example, that governmental climate policy strategies are silent about the concentration of land ownership due to massive economic land concessions, the associated high rates of deforestation and the expansion of other resource-extractive activities with their centralising relations of resource control. Yet these processes have dispossessed a high proportion of rural residents and are also likely to influence their abilities to cope with further changes in their environment.

In relation to water resourcification, the analysed mode of rendering climate governable seems to foster large-scale hydraulic infrastructuring. Article IV notes that large-scale hydropower is presented unproblematically as a key climate solution in the Cambodia Climate Change Strategic Plan.<sup>21</sup> The framing is similar to the World Bank policy narrative of hydropower as a solution to climate change, as discussed in Article III, with the exception that the negative effects of the dams are given even less attention. The framing of climate change as an external threat to development side-lines considerations of how the development patterns themselves might be ‘maladaptive’ or vulnerabilising, an externalisation that upholds a separation between mitigation and adaptation which is not allayed by policy narratives that assume easy synergies between them. Within the frames of externalised climate change the synergistic climate discourse seems, in fact, to obfuscate critical discussion of possible conflicts between mitigation and adaptation efforts.

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<sup>21</sup> Most recently hydropower is included in Cambodia’s nationally determined contributions under the new Paris Agreement, illustrating the centrality hydropower is given in the country’s climate change mitigation strategy (Baird and Green 2020).

Accordingly, in the case of hydropower, it seems that certain vital considerations – how decisions on water development coupled with climate change may amplify or co-produce climate vulnerabilities, and how dam-induced livelihood losses likely diminish the capacity of riverine people to cope with unexpected floods or draughts – are bracketed. Even the Lower Sesan 2 has been included within the ‘climate-friendly’ framing by the government, despite being the most destructive of Mekong tributary dams (Baird 2016) that alone has been predicted to do away with 9.3% of Mekong fisheries (Ziv et al. 2012) and seriously affect the livelihoods of hundreds of thousands riverine people in Cambodia but also in other parts of the Mekong Basin (Baird and Green 2020). Meanwhile, the mitigation potential of large dams offers causes for scepticism which are similar to those in connection with dams in Laos. Some of the dams are likely to entail highly emitting reservoirs (T. Räsänen et al. 2018) and, although the Cambodian energy sector is more diverse and domestically oriented than in Laos, the decision to let hydropower dominate has made the development of more sustainable and climate friendly options less viable.

Article IV together with Article V further explains that the climate change mitigation initiative of CDM in Cambodia has strengthened hydropower dominance, reinforced its climate-friendly framings and upheld the synergistic climate policy discourse. Amongst the LDC countries, Cambodia has been a forerunner in global carbon markets, hosting one of the highest number of CDM projects, four of which are large hydropower dams producing 90% of the supposed annual emission reductions (UNEP DTU 2016). This means that, except for the Lower Sesan 2, all the other large Cambodian dams produce not only hydroelectricity but also carbon offset credits. The fact that they form part of a mitigation mechanism supervised by the UNFCCC has added credibility to justificatory attempts to portray Cambodian dams as part of the combat against climate change. Article IV explains how the dominance of large-scale hydropower amongst the Cambodian CDM projects relates to the governing rationales and techniques of the CDM.

In Article IV (as in Article V) the CDM is approached as an embodiment of the neoliberal, eco-modern rationale that combines the assumption that, rather than being regulated in a heavy-handed manner by the state, the private sector should operate flexibly through market-based solutions, in the belief that the internalisation of environmental externalities can and should be made profitable. Article IV explains how the costly upfront technical methodologies of CDM and the profit-maximising logic of carbon markets effectively restrict the possibilities of smaller scale and potentially more pro-poor rural energy projects becoming CDM projects and favour instead large-scale industrial

solutions, including hydropower.<sup>22</sup> The price collapse of CDM credits since 2012 has also added to the problems of many non-hydropower projects already registered or considering the CDM process. Furthermore, although the CDM is supposed to deliver not only carbon offsets but also sustainable development, its governing techniques are largely carbon reductionist, which allows for slack accounting, verification and monitoring methodologies in terms of environmental and social benefits and other non-carbon elements of supposedly sustainable development contributions.

This is how adverse dam effects are rendered invisible and hydropower projects enabled to advance in the CDM project pipeline. In contradiction of the co-benefit rationale of the CDM and the broader synergistic climate policy discourse, the findings from Articles IV and V demonstrate that the CDM hydropower projects in Cambodia result not only in rather unsustainable development but also in the exacerbation of climate vulnerabilities. Meanwhile, because CDM governing techniques obscure these contradicting outcomes, the projects may easily be used to support co-benefit narratives and the broader synergistic eco-modern climate policy discourse.

Article IV also demonstrates that, in terms of adaptation, the rationales and techniques of climate governing are co-generative and supportive of further water resourcification and hydraulic infrastructuring. It notes that, thus far, most of the resources directed to adaptation have gone to World Bank- and ADB-supported programmes that approach adaptation as a matter of climate-proofing standard development projects through infrastructural fixes, especially in roads and irrigation schemes. Article IV also discusses how the externalisation of climate change has shaped knowledge production on climate vulnerability and how the rationale of climate proofing development, in turn, has been reinforced by the ways vulnerability has been rendered assessable. Predominant vulnerability assessments build on downscaled outputs from the global-scale General Circulation Model which emphasises features of external bio-physical hazards such as sea-level and depth of flood water. Meanwhile, the often used adaptive capacity index in Cambodia is shown to account for only rather limited socio-economic, technological and infrastructural elements, while many elements creating the capacity to face disastrous manifestations of climate change are not taken into account. The index is unable to grasp how representative the governing systems are, how systems of social protection are organised or how relations of access to and exclusion from land, forests, wetlands, water and fisheries have changed. The selection of elements that are rendered assessable is generative of the kind of responses that are prioritised. Article IV suggests that the

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<sup>22</sup> Some of these might appear small-scale in a global context, but in Cambodia only the largest and commercially most influential actors in their respective sectors of hydropower, cement, cassava, rice and pork production have considered the complex CDM process worthwhile. (Käkönen 2013).

analysed and commonly used adaptive capacity index in Cambodia foregrounds infrastructural measures and fixes, including climate-proofed irrigation and flood control schemes. Meanwhile, the prevalent assessment techniques do not guide attention to measures that would address inequalities and socio-environmental precarity. Ultimately, the analysed forms of vulnerability assessment also provide support for the Cambodian government's approach of mainstreaming climate change in the water resources and agriculture sectors, with a focus on filling out what are perceived as infrastructural and 'development deficits'. This was already present in the analysed Cambodia Climate Change Strategic Plan but has become more apparent with the development of sectoral strategies for water management and agriculture (Dany et al. 2015).

Infrastructure is often welcomed by rural residents, and hydraulic schemes for flood protection may well be justified in many instances, so they are not to be automatically discredited as such. The relevance of Article IV's findings lies in provoking reflection on the limits of the approach that advocates climate-proofing and infrastructural fixing. There are also reasons to be cautious when adaptation is mainstreamed, as it increasingly now seems to be, with infrastructural fixes being amalgamated with fostering and securing agricultural intensification and commercialisation. While this kind of 'rural development' may make some more secure, it may also produce new vulnerabilities; smallholders who are not able to shift to external-input, intensive farming techniques may get pushed into indebtedness and more vulnerable positions, flood damages may be shifted to and exacerbated in unprotected areas, more climate-friendly and biodiverse agro-ecologies can be displaced, the longer term resilience of farming systems undermined and alterations in riverine and floodplain ecologies be triggered in ways that vulnerabilise artisan fishers (Work et al. 2018 for Cambodia, Taylor 2018 more broadly).

The main conclusion of Article IV is that the combination of donor-driven policy discourses and expert technologies is potent: it externalises and depoliticises climate change, rendering it governable through status quo-strengthening responses that predominantly take the form of technological fixes. At the same time it leaves unaddressed key processes that are currently making large groups of people more vulnerable, and the foregrounded responses include solutions that may themselves further the vulnerabilisation. The concessionary mode of development, the accompanying concentration of resource control and wealth, and related processes of dispossession are constitutively excluded from the domain to be governed. This is striking, because these are key processes which affect the possibilities of rural residents to cope with changing climate – and in some cases they also amplify the manifestations of climate change. It is expedient – because many of these processes, most importantly the economic land

concessions and related logging affairs, have formed the wealth base for the country's ruling party-state elite and its crony networks (Hughes and Un 2011, Un and So 2009; 2011, Milne 2015) – and it is effective. The exclusion of key processes of vulnerabilisation from the field of vision forecloses responses that could counter problematic resource-making processes, address the increasingly unequal access to and control over 'resources' and provoke broader re-structuring of political-economic and political-ecological relations. Further research (e.g. Christoplos and McGinn 2016, Lebel et al. 2018), partly building on Article IV, has shown that technoscientific climate framing dominates not only government policies but also many donor-led projects and CSO initiatives in Cambodia as well as in Laos. As emphasised also by Borrás and Franco (2018) such policies marginalise responses that would be more access-oriented or generative of redistribution, resistance and better recognition of the claims and needs of the most vulnerable groups.

With regard to water, what is significant is that the way climate change is rendered governable makes new hydraulic interventions more plausible in the shape of large-scale hydropower dams and irrigation schemes, meanwhile rendering numerous artisan fishers and small-holders less able to cope with changing climate, something which gets bracketed. What also seems to be happening is that the rationale of acclimatising hydraulic infrastructure is being amended with new meanings. It is becoming not only about developing and securing stabilised systems of agro-industrial production against monsoonal climatic variations, but also about securing the development of these systems against the monsoonal variations that are made more unpredictable and volatile by the changing climate.

### **The intersecting commodification of rivers and carbon: Politics of visibility**

Here I continue discussion of how the governing of rivers and climate change relate to each other by expanding on how the resourcification and commodification of fluvial waters intertwine with the making of carbon commodities through the CDM. I focus especially on the contributions of Article V to understanding how carbon offset markets affect rivers, hydrosocial relations and the governing of hydropower dams. I also take note of how CDM hydropower projects in turn affect climate change, which Article V touches upon but does not elaborate.

The relevance of discussing CDM dams relates to the fact that hydropower comprise one, if not the most central technology of climate change mitigation in the developing countries in the pre-Paris Agreement Period. Under the Kyoto Protocol, the CDM

formed the main vehicle for getting the developing countries (non-Annex I countries without reduction obligations) to mitigate greenhouse gas emissions and, by 2019, most of the emission reductions through this mechanism came from hydropower projects (UNEP DTU 2019). Hydropower has figured centrally in CDM operations almost since the mechanism was instigated, with most of the CDM dams being hosted by China, Brazil, India and – in the Mekong Region – by Vietnam. Cambodia has been a forerunner in the global carbon frontier among the so-called least developed countries (LDCs), to which attention has moved since the EU decided to allow credits from projects registered post-2012 only if they come from LDCs. The findings of Article V related to CDM projects in Cambodia are likely also to be relevant to the intersecting production of hydroelectricity and emission credits in Laos. In fact, Cambodia has recently been overtaken by Laos which now hosts the highest number of CDM projects of the LDCs. In Laos hydropower is even more salient than in Cambodia: of the 23 registered projects, 10 are small-scale and 10 large-scale hydropower dams. The large-scale dams are calculated to produce 86% of the projected emission reductions and more large dams are at the validation stage, including highly controversial projects that form a cascade of dams on the Nam Ou tributary. (UNEP DTU 2018.)

I start by articulating anticipated central effects which have not materialised, but which are of equal importance to those that have. Firstly, the CDM was expected to transform hydrosocial relations and hydropower development profoundly by directly accelerating the damming of rivers in the global South with the new stream of finance provided by the mechanism (Fletcher 2010). It failed, however, to become a decisive source of funding for new projects. It has been estimated that most of the hydropower projects, especially if large in scale, would have been built even without the revenues from carbon offset sales (Erickson et al. 2014). This also seems to be the case in the Mekong Region, at least in Vietnam (Smits and Middleton 2014) and Cambodia, as suggested by Article V, and probably also in Laos. This means that, thus far, carbon markets have not shaped the rivers either in the Mekong Region or more broadly in the global South as dramatically as expected. This is good news from the perspective of free flowing rivers but less so from the perspective of changing climate – something to which I return at the end of this subsection.

Secondly, the CDM has raised expectations that dams would be governed more sustainably. Because of the twin objectives of emission reductions for industrialised countries and sustainable development for the host country, the CDM projects were expected to be more sustainable than what would be achieved by normal national regulatory measures. Indeed, the analysed CDM hydropower projects promised various



sustainability benefits, for both the environment and in terms of new employment opportunities. Article V, however, demonstrates that instead of forming ‘sustainability enclaves’ with higher sustainability standards, they in fact formed rather exploitative enclaves with suspended environmental and labour norms. The findings from Article V align with Rousseau’s (2017) similarly empirical research, which found that the CDM did not add sustainability to hydropower projects. The failing sustainability effects are explained by the global governing of CDM credits which are carbon reductionist and, therefore, rather indifferent to non-carbon, socioenvironmental aspects. The assessment of sustainability criteria is practically limited to the national scale and only to the early stages of the projects when the project developers are handing out sustainability promises, which subsequently are not monitored. As pointed out in Articles IV and V, in the case of Cambodia, the national authorities within the Ministry of Environment designated to evaluate whether a project is sustainable enough to receive national approval lack both the resources and authority to evaluate the large foreign projects critically, especially when they are prioritised by the highest level of authority, as in the case of the Chinese concessionary hydropower projects in the Cardamoms.

Yet, while the CDM has not decisively caused new dams to proliferate in Cambodia, nor added to their sustainability, Articles IV and V demonstrate that the CDM has been significantly effective in other ways. In the previous subsection it was outlined how turning dams into producers of carbon offsets added a new justificatory rationale for Cambodian dams, thus more subtly facilitating hydropower development. Another relevant effect relates to politics of visibility which also entails certain legitimising effects. Article V highlights that the integration of Cambodian dams into the global governing space of climate change simultaneously exposed the Cardamom hydropower projects internationally and obscured dispossessive alterations in hydrosocial relations induced by dams, together with other problematic aspects and effects. Before the CDM documents were produced there were practically no official records available on these dams as even the EIAs were not made public. More generally, the large dams in Cambodia do not entail supporters such as the World Bank or ADB, like some of the dams in Laos, so there are no similar enclaves of heightened transnational visibility and accountability. In the case of the Cardamom dams, entering the global carbon markets has been the crucial factor in terms of visibility. The added visibility that simultaneously brackets adverse effects has been convenient for the hydropower concessionaires as well as for the government of Cambodia, which has supported the projects. Moreover, new actors at different scales and in different locations became involved with the hydropower dams, some of them new beneficiaries and all of them in various ways responsible parties in CDM-related politics of visibility. They include different kinds of consultants verifying and monitoring the

projects, the CDM Executive Board under the UNFCCC certifying the projects, carbon traders dealing the credits and the buyers, in this case including high emitters in Sweden, Netherlands and Switzerland.

Article V demonstrates that the governing techniques of dams in the form of environmental impact assessments together with the regulatory assessment techniques and procedures of the CDM co-produce the obscuring of adverse effects. The EIAs of the Cardamom dams produced a very limited zone of impacts in only the most immediate areas, and only the most direct losses in terms of biodiversity, and even these inadequately. Most of the losses to downstream fisheries were excluded or seriously downplayed, as were the damages to the coastal mangrove swamps vital for people's climate resilience in an area considered one of Cambodia's most vulnerable to climate change. The residents excluded from the impact zones were also excluded from consultations, while those invited to participate were provided with limited portrayals of impacts combined with unkept promises of electrification and compensation; furthermore, critical questions were pre-empted by intimidating practices. The EIAs were not made publicly accessible, and – against Cambodian legislation – the EIA for Atay Dam was finalised only after construction had already started. Together with earlier national approval of the projects, narrowly selected parts of seriously limited assessments formed the only basis on which the CDM Executive Board evaluated whether sustainability criteria were adequately met. Meanwhile, the limited zones of impacts and the problematic claims of local consent were reproduced and circulated internationally via the CDM project documents and validation reports, while the adverse effects were occluded. This also added legitimacy to the flawed EIA processes as there was silence on their inadequacies.

Because there were no additional assessment procedures, many other effects of the dams also went unnoticed. The dams were registered at a time when exploitative labour practices at the dam construction sites had already been going on for some time and most of the lethal accidents had already been reported. Even the violent, semi-legalised logging activities the projects triggered within the vast protected forests around the dams had already peaked by the time the projects had advanced to registration stage. The successful registration of the projects was a surprise even for some of the interviewed Ministry of Environment officials. It seems that while they themselves had been forced to approve the projects, they expected that, during the evaluation process, dam-related problems would be exposed, if not by the consultants verifying the project then at least by international NGOs, so that the Executive CDM Board would not give the final green light.

After successful project registration, the selling of carbon credit is conditional only on the monitoring of carbon reductions; there is no further regulatory accounting for the non-carbon aspects. This seems to be the case even when large hydropower-based credits enter the EU ETS markets. Although the EU decided in 2004 to allow such credits only if they are in compliance with the guidelines of the World Commission on Dams, and thus assured to be environmentally, socially and economically sustainable, the compliance mechanism has remained weak and there are no requirements for proper additional assessment processes. Thus, with only emission reductions monitored, after entering carbon markets the credits as commodities become further detached from the socio-ecological relations of their production, and, while the buyers of the credits become complicit in the carbon commodification, they may remain, or rather are enabled to remain, unaware at what socioenvironmental costs their carbon emitting activities get compensated.

While there is a significant body of CDM-related research, it has been dominated by desk studies. More empirical research – especially on the CDM's contribution to sustainable development – has been recommended (Horstmann and Hein 2017), as the future of the CDM and certified carbon offset markets are undergoing intense negotiations with the Paris Agreement. The empirical CDM cases of Article V contribute to filling this gap with relevance to the discussions on future climate mitigation mechanisms. The findings of Article V highlight that the carbon reductionist governmental techniques of the CDM have been constitutive of a global regulatory space that allows credits to be bought even from projects such as the Cardamom dams that have been built by exploited workers, that damage biodiversity inside important conservation areas, dispossess thousands of fishers and vulnerabilise coastal residents to climate change, and entail broken promises of compensations and electrification to those negatively affected. Moreover, these projects have triggered massive logging of valuable timber inside protected forests, intimidating indigenous forest communities and enriching powerful tycoons who provide part of the logging rents to an authoritarian party-state (Milne 2015). Regarding the last point, Article V also offers an account on how neoliberal environmental governance mechanisms may get entangled with rather illiberal processes of state power consolidation, something that has recently raised research interest (e.g. Dunlap and Sullivan 2020).

Lastly, I turn briefly to the effectiveness of CDM dams in terms of climate mitigation. If the revenues from carbon credits are not a decisive factor for project materialisation it means, in CDM terminology, that the project is non-additional. Non-additionality practically means that no emissions have been mitigated, as high-emitting credit buyers have been allowed to continue emitting without any real offsets. Additionality is, thus, the

*raison d'être* of the CDM. Yet it has been suspected that, while small-scale hydropower projects are more likely in fact to be additional, the majority of the large CDM projects would have been built even in the absence of carbon credits (Haya and Parekh 2011, Erickson et al. 2014, Fearnside 2015, Soanes et al. 2016). Thus, the overt attention to, and seeming sophistication of, carbon accounting, does not seem to equate with having comprehensive and accurate methodologies, even in terms of emission reductions. The carbon reductionist governing mechanisms thus seem to not only allow non-carbon elements to be disregarded, but also account for only very narrowly selected carbon dynamics partly based on problematically constructed 'baselines'.

Article V suggests that the Cambodian CDM dams were also based on flawed calculations of carbon reductions, although there was no space to explicate this in a detailed manner. The construction of the dams was in full swing before CDM processes reached the stage of registration and, with the low price of carbon since 2012, CDM revenues are likely to be less than 1% of the power sale revenues (Soanes et al. 2016). These facts already indicate that the dams would have been built regardless of CDM revenues. Additionally, Article V notes that the displacement calculations of fossil fuel ignored the fact that Cambodian hydropower dams, including the Cardamom dams, have been accompanied by new coal power plants to level seasonal fluctuation in the dams' power production. It also highlights that, while the dams triggered intensive logging of high value timber in large areas around the dams on the pretext of salvage logging, the actual clearance of the reservoirs was left barely half-done, so the methane emissions from rotting trees in the reservoirs were far from optimal.<sup>23</sup> Overall, the non-additionality and problematic emission calculations of the analysed Cambodian hydropower projects mean that they have performed poorly in climate change mitigation. This, in turn, seriously undermines the attempt to add legitimacy to the dams with CDM registration by presenting them as part of the UNFCCC's climate change strategies.

The findings of Article IV and V bring forth some of the key problems related to the neoliberal flexibilisation of climate change mitigation through the CDM. Especially the detailed account of the actual effects of the CDM dams given in Article V supports a call for radically transformed mitigation mechanisms that would need to involve affected communities much more effectively in decision-making processes and evaluate much more carefully how and at what costs the emission reductions are being produced. The new mechanisms currently being designed to replace the CDM should also be more

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<sup>23</sup> Left out from Article V but still noteworthy is that the calculations of reservoir emissions for all three cases were very limited and basically consisted only of a given power density figure that is high enough to be in compliance with CDM requirements. Fearnside (2015) has, however, demonstrated that power density can be overtly crude and uncertain measure for estimating emissions from reservoirs. So CDM's own requirements might not be tight enough to exclude dams with highly emitting reservoirs although that has been the attempt.

effective in accounting for and supporting ‘real’ emission reductions instead of virtual, non-existent reductions such as in the case of the Cardamom dams and so many other CDM hydropower projects.

Based on the findings from Articles III, IV and V, a central argument in this section has been that, thus far, the governing of climate change has provided new justification and impetus for large-scale hydraulic infrastructuring. Climate concerns have tended to override other important socio-environmental concerns, especially when it comes to the adverse effects of large dams. This has been facilitated by externalised climate change in combination with the limitations of the carbon-reductionist governing techniques of the climate change mitigation mechanisms, as well as the limited vulnerability assessments. Nevertheless, a collision between climate and other hydrosocial concerns seems in many cases unnecessary. Unlike the proposals made in many of the analysed policy narratives and supported by dam proponents, large-scale hydraulic infrastructuring, especially in the form of large hydropower dams, has been shown not to be convincingly compatible, at least in the Mekong Region, with the tasks of mitigating climate change and even less with reducing climate vulnerabilities. The findings here are supportive of initiatives that call for excluding large dams from new forms of climate finance, initiatives such as the Green Climate Fund and the new mechanisms being negotiated under Article 6 of the Paris Agreement (Civil Society Statement 2016, Klemm and Ortúzar 2017, Timpereley 2019).

#### 4.5 CONCESSIONARY HYDROPOWER DAMS IN OVERLAPPING ZONES OF EXCLUSION

Article V does not only analyse the CDM element of the Cardamom dams but also, more broadly, the interplay of different governing rationales and techniques that shape the resourcification and commodification of rivers through hydropower development in Cambodia. It also addresses how the dams get entangled with other resource control schemes and the consequent power effects of this intersecting thereby connecting analysis of hydrosocial ordering with broader resource politics, and elaborating a way of analysing hydraulic infrastructure projects through a cross-sectoral and multi-resource approach. A key contribution of the article to further studies on similar topics is its conceptualisation of overlapping zones of exclusion, developed to grasp the complex sociospatial frontier dynamics at stake and highlighting how interaction between the heterogeneous spaces of governing, including territorially fixed spaces of resource governing and non-territorial regulatory spaces, takes places on the basis of the distinct mechanisms of exclusion constitutive of each zone.

In this section, I synthesise the findings of the article by explaining, firstly, how the resourcification of rivers in Cambodia has evolved through a ‘post-neoliberal’ concessionary governing mode that materialises in enclaves of Chinese State-Owned Enterprises’ (SOEs) heightened corporate authority. I also detail, more carefully than in the published article, the effects of these enclaves when considered as constitutive parts of a broader complex of Sino-Cambodian relations. I then summarise the relevance of studying the interaction between the dams and other spaces of resource governing in the Cardamoms. Overall, the article finds that enclavistic dams strengthen corporate powers over rivers and riverine people but also that, while the dams limit the development of state hydraulic powers, certain effects which overflow the enclave boundaries also ultimately strengthen other aspects of current, party-state rule.

Article V argues that the grounds for the concessionary governing mode of dams, were established under guidance from the World Bank and the ADB as part of the efforts of these global regulatory institutions to steer the re-embedding of Cambodia in regional and global circuits of capital after decades of wars, the devastating self-isolationist experiment of the Khmer Rouge followed by a period of command economy under Vietnamese guidance and years of insurgencies. The Banks’ efforts to ‘open up’ Cambodia have entailed assistance in the making of commodifiable and investable resources, for example, through property regime reforms while encouraging regulatory reforms supposedly conducive to foreign, private-sector investors. In contrast to Laos, hydropower has not been considered to hold out great potential as a key revenue-earning opportunity for the government, nor is it regarded as such a strategic sector in the overall ‘opening up’ of the country. Yet it has been seen as a key remedy to the problems of low domestic electricity-generation capacity and dependence on an expensive combination of diesel generators and imported electricity which, in turn, have been considered barriers to attracting foreign investment. Like Laos, Cambodia was seen to lack domestic finances and other capacities required for the construction of large dams, so the guided way forward was similarly to mobilise capital from foreign investors and technical capacities from foreign corporations. Unlike in Laos, however – perhaps because of the lack of involvement in concrete projects and their attached preconditions – the World Bank and the ADB have not been as intensively involved in developing dam-related sustainability standards. The most important ‘greening’ part of the neoliberal agendas of the Banks has been the EIA regulations which the ADB guided and funded at the end of the 1990s (Hensengerth 2017).

The World Bank pushed forward conditions that would create a private sector-led power sector – an important one being concessionary BOT contracts – and also advised on how

to add attractiveness to the contracts by, for example, offering tax holidays. Despite the neoliberal reforms, however, the profitability prospects of potential dam projects seem not to have been clear enough (Middleton 2008), and attracting investors and concessionaires has been more challenging in Cambodia than in Laos. In addition to concerns over economic viability,<sup>24</sup> controversy avoidance might also have played a role in making Japanese and more Western-based investors and companies shy away from the hydropower projects, as most potential off-the-Mekong sites are situated within important protected areas,<sup>25</sup> while the Mekong tributary and mainstream dams come with high socio-ecological effects, especially in terms of fisheries (Lyttleton and Nyíri 2011, Hensengerth 2017). Instead of being taken up by the foreign private investors and developers for whom the neoliberal reforms were meant to carve out the terrain, the hydropower projects have attracted Chinese state-owned banks and state-owned companies that are not strictly profit oriented.

An important part of China's outbound re-orientation through its earlier Going Out strategy and current Belt and Roads Initiative is to create new markets for Chinese engineering firms, especially in sectors like hydropower that are domestically oversaturated, and entail high surplus expertise (Urban et al 2018). This outbound infrastructural fixing of domestic problems, importantly spearheaded by the internationalisation of hydropower, is also driven by the motivation to secure the value of domestic currency by forming outlets for China's accumulating foreign exchange reserves (Matthews and Motta 2015) and ensuring flows of critical resources (e.g. oil) by exchanging infrastructure for resource access (Mohan and Tan-Mullins 2019). While the Chinese state-owned hydropower companies mostly operate with similar commercial considerations as those in the private sector, the state backing they receive allows them to carry out less profitable projects as well. Indeed, sometimes they are encouraged to do so if the broader packages of aid, investments, trade, resource access and geostrategic deals, of which the projects form part, yield opportunities that China's government considers geoeconomically and/or geopolitically important (Lee 2014, Siciliano et al. 2019). In terms of controversy concerns, while Chinese hydropower SOEs have encountered opposition and increasingly subscribe to international standards on environmental and social safeguards to increase their reputation (Kirchherr et al. 2017), this is not yet consistent; the main position they still assume is to follow host country laws and law enforcement practices, which means that their adherence to environmental regulations depends on the host country's authorities (Hensengerth 2017, Siciliano et al. 2019). Overall, they seem to

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<sup>24</sup> This is possibly and at least partially related to the fact that most potential sites in Cambodia have a relatively low dry season production capacity which reduces the profitability of the dams.

<sup>25</sup> This certainly seems to be the case with investors and developers from Canada in the case of Kamchay (Hensengerth 2017) and from Japan in the case of the Atay Dam (Lyttleton and Nyíri 2011).

still remain less pressurised by international campaigns and thus less preoccupied with reputational risks than, for example, the World Bank (Urban et al. 2019), which also means that they are less concerned over distancing them from surrounding governing practices by adhering to transnational technical zones of governing (Barry 2006).

Cambodia's first large-scale dam, Kamchay, became operational in 2012. It formed a similar frontier-opener for Cambodia as Nam Theun 2 for Laos. Concessioned in 2005 for 44 years to a Chinese state-owned enterprise, Sinohydro, it was one of the first overseas BOT hydropower project undertaken solely by a Chinese SOE. It thus presented a formative experience for the Chinese overseas hydropower industry, which had earlier tended to undertake EPC (Engineering, Procurement and Construction) contracts in which ownership is handed to host authorities immediately after the construction is completed (Urban et al. 2018, Mohan and Tan-Mullins 2019). Kamchay was funded by the China Exim Bank as part of an aid package that consisted of loans and grants that were tied to the contracting of a Chinese SOE as the dam concessionaire, and separate funds for a Cambodian naval patrol craft and a new Council of Ministers building in Phnom Penh (Dreher et al. 2017). The Cardamom dams analysed in Article V and the most recent Lower Sesan 2, built on a Mekong tributary, soon followed, and have been developed through similar tied loan arrangements and concessionary contracts.

While not necessarily entirely profit-driven, Chinese overseas SOEs often try (and are incentivised to do so) to optimise the economic viability of their contracts (Lee 2014). In this respect, as Article V points out, the authoritarian powers of the Cambodian ruling regime have provided the concessionaires with augmented exploitative opportunities – in addition to the already concessionaire-friendly BOT contracts – by guaranteeing highly flexible oversight in regard to EIA regulations and labour laws, thus allowing nominal internalisation of hydrosocial externalities and minimisation of profit-inhibitive construction costs. Moreover, the highest party-state authorities have granted the concessionaires exemptions from the Protected Area Law by securing access to rivers within conservation zones that is friction-free of regulatory impediments. In response to requests by its Chinese counterpart, the government also pushed rather unusual legislative guarantees through the National Assembly to secure the agreed electricity purchasing for the concessionary periods, regardless of whether Cambodia's state power company, Electricite du Cambodge, is disposed to buy it (Hensengerth 2015, O'Neill 2018). These conditions also provide long-term backing for the Chinese concessionaires should a less generous government take power in the future.

Article V thus shows how neoliberal rationales importantly shaped the concessionary governing mode of dams, but also that the companies taking advantage of the pro-



investor and pro-corporate mode of hydraulic infrastructuring do not entirely conform with neoliberal reasoning and, further, that the concessions have been facilitated by rather illiberal modes of governing on the part of the Cambodian authorities. It also analyses the resultant sociospatial power formations, highlighting that the (neoliberal) BOT contracting template grants a high degree of autonomy to the corporate concessionaires in conducting their dam operations, thereby generating enclaved (hydro)territorial formations. Yet, at the same time, concessioning out specifically to Chinese state-corporates strengthens certain aspects of the exclusivity and disembeddedness of the Cardamom dam zones, something which the authoritarian powers of the party-state have further intensified by granting exemptions from national laws and regulations. Furthermore, while enclaved in partially unique ways, the Chinese concessionary zones are also networked in distinctive ways, which results in various 'overflows' that enmesh the pursuit of expanding circulation of (Chinese state) capital with the pursuits of the Cambodian state to consolidate its powers.

In terms of economic enclavism, a specifically Chinese feature is to include the loan condition that a Chinese SOE must build and operate the dams, which guarantees that 'most of the money never leaves China' (Mohan and Tan-Mullins 2019: 1374). Another enclavistic feature of the Cardamom dams common to Chinese overseas infrastructure contracts (Urban et al. 2019) is that equipment, expertise, managers and skilled labour, as well as a high proportion of manual labour during the construction phase, come from China, which means by-passing the domestic economy. The long-term BOT contracts, the use of Chinese managers and the fact that in Cambodia, unlike in Laos, state-owned domestic companies do not take shares in hydropower projects, leave very limited possibilities for the 'transfer' of expertise capacities. In more local terms, the promised employment remained very limited as most Khmer workers were eventually drawn from other parts of the country. The most obvious connection the Cardamom dams have with Cambodian society – the electricity they produce – also by-passed adjacent areas, largely going to power Phnom Penh and other urban centres, leaving those most negatively affected by the dams without the promised access to electricity. The local 'overflows' that the dams did produce, were decidedly negative, including the out bleeding externalities that the companies were not responsabilised to limit or compensate and which have dispossessed downstream fishers and vulnerabilised coastal residents. The latter point underlines that the hydropower corporates exercise control well beyond project boundaries as they have been afforded wide discretion over regulating the fluvial flows of the Koh Pao and Tatai Rivers, simultaneously conditioning downstream hydrosocial relations and disallowing many other ways of using the rivers.

As the article points out, the de facto corporate authority within the hydropower enclave was most intensive during the construction phase when it was exercised over the living and labouring conditions of the workers confined to stay within the construction site for the duration of their work contracts. Chinese overseas construction projects not uncommonly expect workers to live in on-site dormitories and submit to strict corporate control as part of a labour regime that has been interpreted as bearing legacies of the socialist work unit model (Nyíri 2013, Lee 2014). Yet the Cardamom hydropower zones' exemption from state oversight, coupled with the workers' being denied labour union protection, seem to have contributed to the rather harsh, carceral, exploitative and dangerous working conditions found by the study (evidenced in the number of lethal accidents and injuries), which are not necessarily characteristic of most Chinese overseas hydropower projects. The features of extraterritorial authority were manifested most concretely in certain violent disputes in which the suspected Chinese offenders were apparently sent to China rather than subjected to Cambodian jurisdiction.<sup>26</sup> Article V also highlights the disconnectedness of the hydropower zones in terms of the minimal mechanisms of public information disclosure they are allowed to uphold, even in cases when major fluctuations in water levels are produced.

In many ways the powers of the corporate dam concessionaires have been strengthened by and at the expense of the Cambodian state authority. As Article V notes, concessionary hydraulic infrastructuring does not offer direct avenues for developing hydraulic state capacities; neither does it offer opportunities for 'hydro-territorialisation' like the Mekong Delta's hydraulic infrastructuring schemes, examined in Article I. Through the contract agreements the state has given away the now centralised governing powers over the dammed rivers and the effects of the dams for several decades. Even some of the hydroelectricity transmission lines have been concessioned out to Chinese SOEs which, in addition to the concessioned dams, means that a significant share of vital Cambodian energy infrastructure is now in the hands of Chinese state-private entities. Article V discusses the discursive strategies through which the highest state authorities such as the Prime Minister Hun Sen have attempted to smooth out the tension between the nearly extraterritorial concessional spaces of Chinese hydropower enclaves and the Cambodian state's endeavours of its own power consolidation by developing narratives that incorporate the out-concessioned hydraulic infrastructures as part of the achievements of the ruling regime and showpieces of national pride. But more importantly, as the article suggests, the opportunities generated by the larger complex of bilateral affairs of which the dams are part are what make the concessions of state power acceptable.

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<sup>26</sup> The discussion of these cases was left out of the final version of the Article V because of length constraints.

Unique to the Chinese enclavistic projects is that they are not just separate unipurpose dam concessions set to turn rivers into hydroelectricity but, instead, constitutive components of multipurpose bilateral affairs containing a wide variety of more or less bundled aid, investment, trade and diplomatic deals. It is through this complex that the Chinese dams produce their distinctive 'overflowing' effects. Most of these seem asymmetrically geared towards the benefit of the Chinese. Despite China's official rhetoric of no-strings-attached, often praised by the Prime Minister Hun Sen, and in addition to the very direct loan conditionality of using Chinese contractors, there are also other, more diffuse ties and debts of obligation attached to projects such as the Cardamom dams. On the one hand, the large-scale, state-backed projects are expected to perform as frontier openers for other types of Chinese investors, services and goods, thus advancing more fluid globalising circuits for Chinese capital and expertise and establishing a China-dominated trading regime (Lyttleton and Nyíri 2011, Verver 2019). On the other hand, the aid and investment packages to which the dam projects are attached are also geopolitically motivated, entailing China's attempts to territorialise its (geo)political powers in Southeast Asia. These packages oblige Cambodia to support China's territorial claims over Taiwan and in the South China Sea (Siciliano et al. 2018, Urban et al. 2019, Mohan and Tan-Mullins 2019), support which Cambodia has been providing in UN contexts and more influentially within ASEAN (O'Neill 2018). It has also been claimed that China has gained territorial foothold by positioning naval and air bases along the Cambodian coast within strategic military reach of the South China Sea and South Asia, possibly to enable future secure routes for transport, especially important for critical resources such as oil (Dahles and Pheakday 2017, Yamada 2019). Furthermore, while the Cardamom dams are off-the-Mekong, they possibly connect to Mekong transboundary hydropolitical relations because the Chinese dams and other major infrastructure investments, together with generous aid, may have pre-empted Cambodia's criticism of China's upstream dams (Dahles and Pheakday 2017), which, along with the Mekong Delta of Vietnam, dramatically affect Cambodia's riverine people.

While the multidimensional, bilateral relations entail constrained diplomatic positions and zones of surrendered state authority for Cambodia, which in addition to dam enclaves also include Special Economic Zones and possibly military bases, they also yield opportunities whereby state power considered vital by the current regime may be strengthened. In the continuing absence of a functional tax system, Cambodia remains dependant on external grants and loans and China has been increasingly generous in this respect (Sato et al. 2011, Ear 2013, Yamada 2019), even supplying military assistance (Dahles and Pheakday 2017). Above all, the ruling party leaders prefer the Chinese 'strings' over the more Western conditionalities as they are more accommodating of Cambodian domestic pursuits and are

not accompanied by pressure to alter or conceal authoritarian and neo-patrimonial modes of governing (Sullivan 2015, Mohan and Tan-Mullins 2019). Chinese involvement in Cambodia does not involve external fiscal oversight and even when neoliberal governing techniques are adopted, such as BOT contracts, they can be applied without the exigencies of rule-of-law and ‘good governance’ reforms. Importantly, increased Chinese assistance and investments offer new opportunities and resources for state patronage, in both elite and mass patronage forms (Nyíri 2017, Verver 2019), which continue to be important in the efforts of the party-state to consolidate its sovereign powers (Hughes and Un 2011, Milne and Mahanty 2015). Not all of the dam enclave-produced overflows which play into domestic statecraft are, however, related to the Chinese engagement; a number are also related to the ways hydropower zones interact with other spaces of resource governing.

The Cardamom range is not approached in the article solely as a frontier for hydroelectricity. The area not only encompasses rivers with hydropower potential but also some of the largest remaining forests in mainland Southeast Asia. Until the end of the 1990s the Cardamoms were the last refuge of the Khmer Rouge and in the following decade remained one of the regions of Cambodia least tightly connected to the space of state rule. They are, therefore, discussed in Article V as a frontier for hydroelectricity, timber and carbon commodities, as well as state control that has attracted agents operating on different scales and with divergent governing rationales. The most important of these include 1) the rationales that facilitate market expansion by turning investable resources into a ‘tap’ (hydroelectricity and timber) or a ‘sink’ (carbon markets); 2) preservationist rationales of resource-making that further the expansion of conserved areas within which forests are rendered governable resources while the opportunities for their extraction are mostly closed down; and 3) state rationales for pursuing the territorialisation and strengthening of its powers, importantly through authoritarian and neo-patrimonial modes of governing. The article discusses how this co-presence of various governing rationales materialises in distinct, yet overlapping, spaces of governing. In addition to the enclavistic hydropower zones (discussed above), and the technical CDM zone of global climate governing, these spaces include conservation zones co-governed by international NGOs – operating according to a preservationist logic – and by national authorities whose motivations include the strengthening of state rule over the Cardamoms. They also include semi-official logging zones governed, de-facto, by *okbnyas*, well-connected domestic tycoons to whom most logging revenues accrue and who, in turn, make generous contributions to the party-state. A key argument of the article is that the four zones of resource(-making and) governing not only overlap but also interact with each other in ways that are consequential, as summarised below.

Firstly, despite their differing purposes, the interaction between the zones create situations where one zone provides enabling conditions for another. The article suggests that the conservation zones facilitate the hydropower concessions by halting in-migration and preempting the need for dam-related evictions that could give rise to strong resistance. The hydropower dams, in turn, trigger selective logging of high value timber within the protected forests, while the initial contracts for salvage logging grant these activities an appearance of legality even when carried out well beyond the reservoir boundaries. Meanwhile, cooperation with conservation patrols and surveillance posts facilitates the exclusion of competing loggers and brokers. The exclusionary mechanisms of the conservation zones are thus re-purposed to serve controlled extraction and the monopolisation of timber revenue. The highly exclusive logging not only enables maximised wealth generation for the *okhnyas* but also ensures that maximum shares of the timber rents are efficiently channelled to the party-state. While not consistently studied, the hydropower and timber logging connections seem to be similar in the more recently constructed Lower Sesan 2 dam and are also relevant to Lao dams, although with distinctive patronage and state power entanglements (Singh 2012) and also, for example, particular connection with the financing of rural infrastructure, especially roads<sup>27</sup> (Dwyer pers. comm. 2018).

Secondly, the interconnections between the zones are relevant in terms of the politics of visibility. As already discussed in section 5.4, dam-related governing techniques in the form of EIAs produce seriously limited zones of impact which, together with the carbon reductionist CDM regulatory zone, exclude most detrimental dam effects from the ‘field of vision’. The interacting, technical EIA and CDM zones, together with the high exclusivity of the hydropower and logging territories, contribute to obscuring dam-related, dispossessive, socio-ecological effects and exploitative labour relations. They also shield from international attention the ways Cardamom CDM dams have entangled with authoritarian and neopatrimonial resource politics.

Thirdly, the article explains how the overlaps and interplay between the zones are important in terms of power effects as they invoke a partly unintentional convergence of Chinese investors and concessionaires, carbon markets, international conservation organisations, domestic tycoons and party-state authorities that has entrenched crony networks through which the powers of the party-state are consolidated. This convergence has implied significantly centralised control over the Cardamoms rivers and forests, circumscribing more autonomous hydrosocial and forest relations while limiting livelihood

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<sup>27</sup> According to Dwyer the timber-hydropower nexus in Laos aligns with a mode of de facto budgeting for rural public infrastructure such as roads through timber quotas that has been prevalent up until quite recent times.

options for riverine and coastal people in Koh Kong and increasing their dependency on labour markets. The article also discusses how the combined effects of the different zones of exclusion pre-empt concerted resistance.

Overall, the analysis of the Cardamom hydropower enclaves and their relations with other zones of exclusion Article V contributes to studies that try to account how divergent forms of sociospatial organisation may interconnect (Jessop et al. 2008). The corporate enclaves were approached as forms of global territoriality and thus in themselves 'polymorphic', simultaneously manifesting the global and the territorial, which, although often regarded as opposites, are increasingly understood as interconnected, even co-constitutive (Ferguson 2006, Sassen 2006, Opitz and Tellman 2012, Mohan and Tan-Mullins 2019). Furthermore, while these forms of global territoriality, in the shape of 'postneoliberal' hydropower enclaves, are primarily formative of global flows of capital (and hydraulic expertise) – in this case particularly the production of more China-gearred global circuits of (state-)capital – and are disconnected from local state rule, they are shown to be networked in ways that eventually also play into strengthening Cambodian territorial state powers: firstly, as catalytic composites of a broader complex of bilateral Sino-Cambodian relations; and secondly, through their interactions with other, rather heterogeneous zones. Both findings add understanding to the multidimensionalities of sociospatial formations. They also show how the governing rationales of securing global circulation and territorial fixation may shape resource control in parallel and interacting ways. In more concrete terms the article discusses how the enclavistic hydraulic infrastructuring forms part of Cambodia's broader, concession-based development model, which results in territorial fragmentation that partly undermines state power but also exerts and extends it, thus resonating with a pattern of graduated (rather than surrendered) sovereignty (Ong 2006).

## 5. DISCUSSION: PATTERNS OF WATER RESOURCIFICATION AND THEIR CONSEQUENTIAL POWER EFFECTS

Two distinct patterns of water resourcification emerge from the analysis and findings of the composite articles: one which is more characteristic of the first wave of hydraulic infrastructuring, tending to waterscapes with uniform and centrally coordinated hydrosocial ordering, and those of the second wave, which tend to exhibit more dispersed, corporate-led modes of hydrosocial ordering. The first wave of hydraulic infrastructuring was largely animated by a high-modern governing rationale and took shape through large-scale master plans of riverine control through which riverine affordances were to be optimised in terms of a limited range of water uses. An important site where these schemes materialised in physical hydraulic infrastructures was the Mekong Delta of Vietnam where hydrosocial relations and riverine livelihoods were to be acclimatised and terrestrialised to enable intensive, industrial agriculture (Article I). The delta-wide infrastructure schemes produced new nodes for hydrosocial ordering and re-scaled power relations, which provided opportunities for North Vietnamese state agencies to strengthen their hydraulic capacities, fusing the delta's Southern waterscapes with the regulative powers of the Northern ruling regime. Most of the hydroelectric dams planned by the Basin-wide development schemes were shelved (indefinitely or for good), however, while others were constructed off-the-Mekong. All were built and operated by state agencies, albeit with external support shaped by Cold War allegiances. This first wave of water resourcification in the Mekong Region was thus rather congruent with the paradigm of 'state hydraulic mission' (Molle et al. 2009) and developmentalist statecraft, with its aspirations for a homogenously governed state space. It is noteworthy that the Delta's infrastructuring efforts did not result in the envisioned hydrosocial legibility and governability but, rather, in new complexities and endless fixing efforts; nonetheless, they generated powerful entanglements of technoscientific and state capacities, as well as waterscapes that were more or less uniformly under a state system of rule and regulations.

Currently, the legacies of rational, Basin-wide planning are perhaps most intensively present in the work of the MRC, albeit morphed into an even more ambitious form as the riverine aspects that are to be rendered knowable and manageable have become more numerous (Article II). The earlier simplifications have been complicated by environmental assessments and more comprehensive fisheries studies, for example, but there is

continuity in perceiving and enacting riverine flows primarily as a controllable resource that should be centrally managed and allocated to different uses in a centrally coordinated manner. The mission of modernising Mekong has evolved into one of ecomodernisation pursuing ‘sustainable’ infrastructuring and damming. This is thought to be accomplished via more integrative basin planning through which dams might serve as technologies for various purposes; cumulative impacts receive consideration and the least harmful projects prioritised, which some (e.g. Sabo et al. 2017) optimistically suggest will eventually enable rationally coordinated operation of the built dams. Instead of problematising a dam-centred approach to organising river-society relations, the MRC has upheld a socio-technical imaginary (Jasanoff 2015) of large dams as fixable with the right kind of planning and expertise. This conditional legitimacy has created space for many tributary projects, such as the Nam Theun 2, while the MRC’s attempts to temper development it perceives as unsustainable, such as mainstream damming, have proved unsuccessful.

While the MRC’s attempts to merge dam development with integrated river basin planning maintains continuity with the past, this amalgamation is increasingly disjointed outside its technoscientific sphere. China’s recent effort to launch a new Basin-wide cooperation mechanism seems not to have curbed this trend. The Lancang-Mekong Cooperation framework enmeshes basin cooperation with geopolitical aspirations (Biba 2018), as did the early Mekong Committee, only that now US Cold War technopolitics have been replaced by China’s new infrastructural foreign policy (Bach 2016, Mohan and Tan-Mullins 2019). Yet it is still not effecting the development of individual dam projects, and overall it seems most concerned with streamlining dam operation in order to optimise electricity production; thus, it is more interested in producing an efficiently operating ‘energyscape’ (Kaisti and Käkönen 2012) or ‘powershed’ – especially from the perspective of the increasing number of Chinese dam concessionaires – than a waterscape produced through the more multipurpose basin planning that is the goal of the increasingly sidelined MRC (Middleton and Allouche 2016).

Overall, the most powerfully lingering effect of the first wave’s technoscientific inscriptions (Sneddon 2015) seems to be the fuelling of aspirations to release the Mekong’s untapped hydroelectricity potential. The recent proliferation of hydropower projects has little to do with centrally coordinated, eco-modern, river-basin management; rather, it has evolved through separate concessionary arrangements in which rivers are approached rather exclusively as potential producers of hydroelectricity. Here we can also observe a certain tension between the more technoscientific tenets of eco-modern rationales and the neoliberal rationales of water resourcification. On a project level, however, the two were shown to be more easily aligned, as discussed in the case of the



Nam Theun 2 (Article III), a project which has been formative for the new governmental assemblage (Li 2007b) and discourse of ‘sustainable hydropower’ (Middleton 2018). Yet even in this case it was shown that their alignment has been built on a constitutive exclusion of deeper contradictions between them, and that ‘sustainable hydropower’ dams fail forward because internalisation of externalities is unlikely without fundamental changes in the logics of profit maximisation. Overall, in this study I have tried to show how both IWRM-guided basin planning and project-specific sustainability standards have problematically provided an aura of legitimacy for large dams deemed fixable, under the umbrella of which an astounding number of (mostly less rather than more fixed) dams have gone forward with detrimental and drastically cascading effects.

What has also facilitated the resurgence of large dams, as well as other forms of large-scale hydraulic infrastructure, is the anti-politics of climate change. As I have demonstrated, climate change-related justifications figure centrally in attempts to re-legitimise and consensualise large dams, facilitated by the ways that climate change itself has been rendered governable. Rationalisation of climate change efforts through technomanagerial and neoliberal variants of ecomodernism, both based on the externalisation of climate change, has enabled the enrolling of powerful agencies and made the climate change agenda powerful – so powerful that it is liable to override other important environmental concerns, such as the adverse socioenvironmental effects of large dams. At the same time, the credo of technofixes and the adaptation frames that provoke technical status-quo responses have situated large-scale hydraulic infrastructuring at the centre of climate responses, despite the fact that they may, particularly in the case of large dams, often augment climate vulnerabilities. I have also shown how the carbon-reductionist governing techniques of climate change mitigation mechanisms, such as CDM, have facilitated the climate-friendly framings of large dams by obscuring the adversities they generate. In some cases, such as the downstream areas of the Nam Theun 2 dam in Xe Bang Fai Basin, the worsening floods are more readily discussed within the frame of climate change, thereby deflecting attention from how it has, importantly, been dam operations that have transformed the floods from ‘beneficial’ to devastating.

The concessionary governing mode through which the enclavistic, water-resourcification pattern of second wave dams has evolved was shown to be importantly animated by neoliberal governing rationales but also shaped by illiberal governing logic (Article V). As Schindler et al. (2019) have noted of other contemporary megaprojects, the second wave dams entail more diffuse and varied forms of planning, authority and responsibility than the first. Enclavistic dams also generate much more ambiguous spaces of rule that are often exempted from state authority to the benefit of corporate powers. An important

caveat in this generalisation is the seemingly different situation of the current expansion of large-scale irrigation schemes in Laos and in Cambodia which more directly involve state agents and lend more directly to statecraft, including the strengthening of state hydraulic capacities (Blake and Barney 2018, Blake 2019). It is possible to say of recent large dam projects in Laos and Cambodia, however, that all form enclaves of heightened corporate authority (Merme et al. 2014, Middleton et al. 2015). Their (neoliberal) BOT templates have been designed to secure profits for the concessionaires by allowing them a high degree of autonomy in altering riverine flows to optimise electricity sales. This means that the hydrosocial relations of riverine people are increasingly conditioned by corporate decisions as well as by the patterns of electricity consumption in far-away urban centres, principally Bangkok and other Thai cities in the case of Lao dams (Article III, Baird and Quastel 2015, Marks and Zhang 2019), and domestic capital in Cambodia (Article V, Mohan and Tan-Mullins 2019). Riverine flows are thus increasingly operationalised to secure urban electricity affluence while fluvial relationalities that have secured rural, riverine livelihoods are disrupted.

At the same time, because of the high degree of autonomy granted to the concessionaires, many other aspects of hydrosocial ordering vary significantly depending on the composition of the companies and financiers involved. There is variation, for example, in rules governing workers within the hydropower enclaves and in consultative processes, resettlement practices and compensatory schemes for affected people outside the dam site. The Mekong corporate hydropower enclaves range from ‘sustainability enclaves’ epitomised by the Nam Theun 2 (Article III) to ‘enclaves of added exploitative opportunities’ epitomised in this study by the Cardamom dams (Article IV). The concessionary governing mode of dams thus allows for differential treatment of riverine residents in the waterscapes produced by the dams, something resonating with post-developmental spatial formations and graduated citizenship (Ong 2006, Bach 2011).

The dam-produced waterscapes are also variegated in the sense that the hydropower zones are divergently networked and unevenly transnationalised. The involvement of international development banks connects a project like the Nam Theun 2 to transnational spaces of governing emerging from attempts to re-legitimise hydropower through new sustainability standards; these are, importantly, shaped by disputes over earlier projects elsewhere, and address the concerns of international policy networks rather than the adjacent affected people themselves. CDM status, in turn, connects many of the Mekong dam projects, such as the Cardamom dams, to global carbon markets and the international regulatory spaces of climate change mitigation. In the case of the Cardamom dams the carbon markets also forge connections between vulnerabilised downstream and coastal

Koh Kong fishers, and high-emitting corporations in Sweden, Switzerland and Netherlands. Meanwhile, the increasing involvement of Chinese developers enmeshes many of the Mekong projects in China's broader geopolitical-geo-economic attempts to create re-gear regional and global connectivity in the Mekong. Thus, while the projects are not the result of multipurpose basin planning and, in terms of riverine ordering, are unipurposefully designed for electricity production, they do emerge from and foster further broader, bilateral, multipurpose investment-aid-trade packages that are also structured to conjure up new infrastructure corridors. While Article V only discussed Chinese projects in Cambodia, a similar pattern with both Chinese and Vietnamese state-owned hydropower companies is also found in Laos (Matthews and Motta 2015, Tan 2015).

The differing assemblages of involved parties and determinations gathered around and shaping the projects also translate into different dynamics in the politics of visibility: the highest transnational exposure follows from the involvement of the World Bank or Asian Development Bank, while the CDM exposes many projects that might otherwise remain without international attention, albeit in a carbon-reductionist way that brackets many detrimental, dam-related hydrosocial effects. An important addition to this is that mainstream projects, due to their marked transboundary character and submission to the MRC's prior consultation and notification processes, tend to receive more international attention than tributary projects. Overall, the heterogeneity of dam enclaves is more pronounced within Laos than within Cambodia as there is much more variation in the involved parties, and the projects include both mainstream and tributary projects.

The converse side of the global connectivities of the dam enclaves is their disconnectedness from the regulatory space of the host state. After the concession agreements have been sealed, state authorities have very little to say about what goes on within the enclaves. Furthermore, while large dams have centralised control over riverine flows and hydrosocial relations, these powers do not accrue to state authorities but instead get transferred between different corporate concessionaires for several decades. Neither do the technoscientific competences nor hydraulic capacities evolving through the damming accumulate to state bureaucracies as straightforwardly as would be the case for state-owned hydropower projects. Thus the avenues for hydraulic statecraft are narrower than, for example, in the case of the Mekong Delta's hydraulic infrastructuring. Surrendered state powers over riverine flows, however, is not the whole story of the Mekong's second wave dams, as even when the projects are enclavistic they create avenues for strengthening other aspects of state power.

One link in this respect is rather direct: state revenues. This is particularly important in Laos where the number of large concessionary dams is almost ten times greater than in

Cambodia, and where the dams export electricity and minor shares of the concession consortiums are held by Lao state-owned companies. The dams thus produce significant resources in Laos that can be converted into strengthening the ruling capacity of the party-state (Creak and Barney 2018). In Cambodia, direct revenues are lower but Article V described how the dam projects open up significant opportunities for timber extraction, from which rents, through elite patronage relations, are channelled into consolidating the sovereign powers of the party-state. The dam-timber nexus is also relevant in Laos but connections with processes of state formation, while relevant, are not entirely similar (Singh 2012). In Cambodia and, to a lesser extent, also in Laos (Tan 2015, Pang 2017), the dam projects concessioned to state-owned Chinese companies facilitate broader constellations of bilateral affairs with China, which, on the one hand, further new political-economic dependencies on China but, on the other, provide opportunities and resources for domestic statecraft without external pressure being placed on situated authoritarian and neo-patrimonial modes of governing (Article V).

Furthermore, in Laos and Cambodia large dams with associated roads and resettlement schemes provide state accessibility to previously remote areas. This, however, seems more relevant for Laos, where the resettlement schemes accompanying the dams appear to be perceived as welcome external resources to the state's long term objectives of sedentarising upland, semi-nomadic, swidden agriculturalists and, overall, of consolidating small and dispersed rural settlements into bigger and more readily governable units (Evrard and Goudineau 2004, Ovesen 2008, Syladeth and Guoqing 2016, Blake and Barney 2018). The compensatory livelihood projects accompanying dams also offer opportunities to state authorities to intervene in how people organise their lives and livelihoods. Here, in fact, the projects with higher sustainability standards and involvement from the Asian Development Bank or World Bank, also have more ample resources for this, which is why the ordering valence of 'sustainability enclaves' may be more intensively geared at state territorialisation than projects with fewer resources allocated to compensation schemes (Blake and Barney 2018). Blake and Barney (2018) also highlight that in the case of the Theun-Hinboun and its extension project the state agencies have advanced irrigation schemes in the resettlement and affected areas. Thus, the projects have also augmented the state hydrosocial ordering capacities.

Thus, while the concessionary deals facilitate the access of foreign investors to the Mekong's commodified rivers and the expansion of the global circulation and accumulation of capital, the dam projects also entail elements which may be geared to fixating territorial state power. This, together with the variegated aspects of the resulting waterscapes (discussed above), illuminates that, in frontier sites where both resources and

states are in the making, concessionary dams shaped by neoliberal and authoritarian governing logics may generate highly multidimensional sociospatial formations. These are, at the same time, locally territorialised and globally networked in highly divergent ways and, while primarily designed to secure global circulation increasingly favouring China's orbit, may also become intensively enmeshed with state territorialisation.

From the perspective of the affected riverine people, the mutually supportive entanglements of neoliberal and authoritarian governing modes amount to disruptions in previous hydrosocial relations and livelihood practices and in narrowed opportunities for more autonomous modes of living (Articles III and V, Barney 2009, Baird et al. 2015, Blake and Barney 2018). The imposed changes do not assign the same, determining constraints to all, however; indeed, they are interwoven with local socio-ecological and political relations and thus differentially experienced (for Lao dams Katus et al. 2016, more broadly Taylor 2015). It is also often not only large dams that bring about drastic changes; rather, the effects of hydropower are often encountered in combination with other resource extraction projects, like large-scale, agro-industrial plantations and mines (Lagerqvist et al. 2014, Baird and Barney 2017), and/or how the dams intersect with such schemes (Article V). This kind of 'development squeeze' is something that project-by-project assessment and the fragmented knowledge-production regime (Baird and Barney 2017) generated by the concessionary development model to which Cambodia and Laos have subscribed tend to render invisible.

While the effects of dams and those cascading from various large-scale concessionary extraction projects are differentially experienced, there is a pattern of increased rural inequality, vulnerability and incapacity to cope with environmental change (e.g. Lagerqvist et al. 2014). The people most hard hit seem to be those whose livelihood mosaics 'stretch across' aquatic and terrestrial systems, who are more subsistence-oriented and more reliant on direct fluvial or forest affordances such as fisheries, fluvial sediment-nourished farmlands and forest produce (Baird and Barney 2017). While the comparative invisibility of the dispossession of these small holders and artisan fishers perhaps facilitates the proliferation of extraction projects, it also seems that many of the losses are, in fact, understood; indeed, for the state authorities, they may not represent unfortunate externalities but, rather, forceful catalysts for more market-dependent and -oriented modes of production (Whittington 2019: 194), which, in turn, will enable the development of more export-oriented commercial agriculture, the goal of official development strategies in both Laos and Cambodia. Albeit unstated in official policies, this suggests a biopolitical reasoning (Foucault 2003, Li 2010) whereby the modes of living of peasant

small-holders and artisan fishers are deemed disposable and something to 'let die' rather than 'make live'.

## 6. CONCLUSION: VARIEGATED WATERSCAPES WITH SIMILAR DISRUPTIONS OF FLUVIAL RELATIONALITIES

In this study I have analysed a range of attempts to intervene, rearrange and fix hydrosocial relations in order to augment understandings of the ends, means and implications of accelerating hydraulic infrastructuring in the Mekong Region as epitomised by large dams. One of the key arguments of the thesis is that there is no single rationale to explain the current dynamics but, rather, an interplay of different rationales, practices and techniques. I have also highlighted the importance of the legacies of past hydraulic endeavours, their infrastructural power and that of fluvial waters, and how processes of water resourcification have generated new power formations and drastically altered hydrosocial relations. Moreover, the study examined how attempts to control and attain stability through schemes of ecological simplification and large-scale hydraulic infrastructuring are prone to producing volatile ecologies and new complexities and indeterminacies. Another contribution it has made has been to bridge water and climate studies by highlighting how the dominant attempts to govern rivers and climate change relate to each other in increasingly problematic ways.

The composite cases have also allowed me to identify important continuities and changes in the Mekong Region's hydrosocial ordering efforts. I have shown how the high-modern rationales of resourcification have morphed into eco-modern versions which are currently especially relevant to attempts to re-legitimise large dams, either in terms of expert knowledge production (Article II), sustainability standards (Article III) or climate change mitigation and adaptation efforts (Article IV). At the same time, this study brings to the fore a major rupture in hydraulic infrastructuring in terms of the increasing disjointedness between damming and river basin planning due to the proliferation of concessionary hydropower projects. It is a situation that presents one of the major contradictions in the current resurgence of hydropower: while large dams are being justified with multiple and ever-increasing purposes, from poverty alleviation to better governing of climate change, the concessionary dams are, in fact, geared almost solely towards optimising riverine affordances in terms of their hydroelectricity production, while most other riverine affordances are disallowed.

Importantly, the synthesis of the composite articles demonstrates the differences between the large-scale, hydraulic infrastructure assemblages in terms of agents, rationales and

techniques. The synthesis of the composite articles demonstrates how, on the one hand, the assemblages of different agents, rationales and techniques around the various large-scale hydraulic infrastructuring efforts differ, and how the waterscapes produced are variegated: variously networked and with divergent power formations. On the other hand, it makes apparent that the implications of these efforts in terms of disruptions of fluvial relationalities and the centralisation of resource control bear resemblance. There is variation in the magnitude of the effects and also in the mechanisms of how the benefits and adversities of the projects are distributed; however, whether in the form of the integrated systems of high dikes in the Mekong Delta of Vietnam or large dams in Cambodia and Laos – including ‘sustainable’ dams with eco-modern safeguard policies – they generate comparable effects: radically disrupting fluvial relationalities; halting the possibilities of alternate hydrosocial relations for very long periods of times if not irreversibly; diminishing opportunities for diverse and decentralised river uses; supporting intensified monocultures while foreclosing on biodiverse agroecologies; tending toward more centralised control of hydrosocial relations; and vulnerabilising those with the most intimate riverine connections. Yet, despite these resemblances, a nuanced analysis of the assemblages of agents, rationales and techniques constituting each attempt to fix the fluid is important. While the effects of these assemblages are not reducible to any of the component parts, nor controllable by any of the single agents involved, their analysis enables more detailed reflection on their distributed responsibilities. The research undertaken for this study hopefully provides new directions for exploring them further.

On a more future-oriented note, this study calls for radical transformations in the governing rationales, institutions and infrastructures for more liveable and just waterscapes in the Mekong Region: waterscapes that could sustain a just, socionatural abundance (Collard et al. 2014). The findings of this study challenge and question the eco-modern assumptions of technical fixes for large-scale hydraulic infrastructures, such as large dams. Instead of intensifying efforts at fixing the fluid and keeping doors open for more damming, the findings call for the incorporation of more amphibious approaches (Jensen 2017) to environment-making. Unlike the large-scale dams and terrestrialising hydraulic infrastructures that fracture fluvial relationalities, destroy fisheries, strip fluvial waters of their delta-making powers and role in rendering lands fertile, with greater appreciation of the fluid agencies of fluvial waters and the generative powers of fluvial relationalities, more amphibious environment-making approaches could engender longer-term hydrosocial prosperity for riverine and deltaic people.

With the term ‘engender’ I partly paraphrase Latour’s (2017) recent call for a terrestrial turn, which implies a transition from systems of extractivist production on the basis of



externalising nature as a resource, to systems of engendering based on cultivation of attachments and dependencies amongst animate beings – but perhaps with an added emphasis that being terrestrial and earthbound inevitably entails the watery relationalities discussed here. Adopting more amphibious approaches would also mean working with the seasonal changes rather than against them, as in the past acclimatising efforts discussed in this thesis. While climate change presents new volatilities from which protection can be warranted, in some cases also in infrastructural forms, current climate change responses continue on the path of acclimatisation through large hydraulic infrastructures that purport to secure infrastructures and development schemes from climate change, meanwhile causing new vulnerabilities. Responses should, rather, address socio-environmental precarity (Ribot 2014) through various societal measures including redistributive processes that would reverse the dispossessive concentrations of resource control and wealth (Borras and Franco 2018) of the current development path, particularly in Cambodia and Laos. When infrastructural measures are needed, it should be ensured that they do not provoke unjustly re-distributed socio-ecological adversities and new volatilities. Overall, the call for more just and amphibious approaches entails radically altered hydropolitics in which the different groups of the Mekong’s riverine people would have more say over what kind of hydrosocial relations and riverine affordances should be fostered: how, for whom and on whose terms; as well as the kind of watery adversities that require addressing: how and on whose terms.

## REFERENCES

- ADB, Asian Development Bank (2018) Cambodia: Energy sector assessment, strategy, and road map. December 2018. Manila: Asian Development Bank. DOI: <http://dx.doi.org/10.22617/TCS189801>
- Ahlers, Rhodante (2020) Where walls of power meet the wall of money: Hydropower in the age of financialization. *Sustainable Development* 28: 405– 412.
- Ahlers, Rhodante, Jessica Budds, Deepa Joshi, Vincent Merme and Margreet Zwaarteveen (2015) Framing hydropower as green energy: assessing drivers, risks and tensions in the eastern Himalayas. *Earth System Dynamics* 6: 195–204.
- Ahlers, Rhodante, Margreet Zwaarteveen and Karen Bakker (2017) Large dam development: From Trojan horse to Pandora's box. In B. Flyvbjerg (Ed.), *The Oxford handbook of mega project management* (pp. 566–576). Oxford: Oxford University Press.
- Anderssen, Niels (2003) *Discursive analytical strategies*. Bristol: The Policy Press.
- Anthony, Edward J., Guillaume Brunier, Manon Besset, Marc Goichot, Philippe Dussouillez and Van Lap Nguyen (2015) Linking rapid erosion of the Mekong River delta to human activities. *Scientific reports* 5:14745.
- Arias Mauricio E., Thomas A. Cochrane, Matti Kummu, Hannu Lauri, Jorma Koponen, Gordon Holtgrieve and Thanapon Piman (2014) Impacts of hydropower and climate change on drivers of ecological productivity of Southeast Asia's most important wetland *Ecological Modelling* 272:252-63.
- Bäckstrand, Karin and Eva Lövbrand (2006) Planting Trees to Mitigate Climate Change: Contested Discourses of Ecological Modernization, Green Governmentality and Civic Environmentalism. *Global Environmental Politics* 6 (1): 50–75.
- Bäckstrand, Karin and Eva Lövbrand (2019) The Road to Paris: Contending Climate Governance Discourses in the Post-Copenhagen Era, *Journal of Environmental Policy & Planning* 21(5): 519-532.
- Bach, Jonathan (2011) Modernity and the Urban Imagination in Economic Zones. *Theory, Culture & Society*, 28(5): 98–122.
- Bach, Jonathan (2016) China's infrastructural fix. *Limn* 7. <http://limn.it/chinas-infrastructural-fix/>
- Bach, Jonathan (2019) What Kind of Model? Thinking about the Special Economic Zone and the Socialist City. *Made in China Journal*: <https://madeinchinajournal.com/2019/07/23/what-kind-of-model-thinking-about-the-special-economic-zone-and-the-socialist-city/>
- Baird, Ian G. (2016) Non-government organizations, villagers, political culture and the Lower Sesan 2 dam in Northeastern Cambodia. *Critical Asian Studies* 48(2): 257-277.
- Baird, Ian G. and Bruce Shoemaker (2007) Unsettling experiences: Internal resettlement and international aid agencies in Laos. *Development and Change* 38(5): 865– 888.

- Baird, Ian G., Bruce Shoemaker, Kanokwan Manorom (2015) The people and their river revisited: the World Bank, the Nam Theun 2, and the Xe Bang Fai River in Laos. *Development and Change* 46(5): 1080–1105.
- Baird, Ian G. and Noah Quastel (2015) Rescaling and reordering nature-society relations: The Nam Theun 2 Hydropower Dam and Laos-Thailand Electricity Networks. *Annals of the Association of American Geographers* 105(6): 1221-1239.
- Baird, Ian G. and Keith Barney (2017) The political ecology of cross-sectoral cumulative impacts: modern landscapes, large hydropower dams and industrial tree plantations in Laos and Cambodia, *The Journal of Peasant Studies* 44(4): 769–795.
- Baird, Ian G., Bruce Shoemaker and Kanokwan Manorom (2018) Troubles Downstream: Changes in the Xe Bang Fai River Basin. In Bruce Shoemaker and William Robichaud (eds) *Dead in the Water: Global Lessons from the World Bank's Model Hydropower Project in Laos*. Madison: Wisconsin University Press, 182- 205.
- Baird, Ian G. and Nathan Green (2020) The Clean Development Mechanism and large dam development: contradictions associated with climate financing in Cambodia. *Climatic Change* 161: 365–383.
- Bakker, Karen (1999) The politics of hydropower: developing the Mekong. *Political Geography* 18: 209–232.
- Bakker, Karen (2002) From State to Market?: Water Merantilización in Spain. *Environment and planning A* 34(5), 767-790.
- Bakker, Karen (2005) Neoliberalizing Nature? Market Environmentalism in Water Supply in England and Wales. *Annals of the Association of American Geographers* 95(3): 542–565.
- Bakker, Karen (2009) Neoliberal Nature, Ecological Fixes, and the Pitfalls of Comparative Research. *Environment and Planning A* 41(8): 1781–1787.
- Bakker, Karen (2010) The limits of ‘neoliberal natures’: Debating green neoliberalism. *Progress in human geography* 34(6), 715-735
- Bakker, Karen (2012) Water: Political, biopolitical, material. *Social Studies of Science* 42(4), 616–623.
- Bakker, Karen and Gavin Bridge (2006) Material worlds? Resource geographies and the ‘matter of nature’. *Progress in Human Geography* 30(1), 5–27.
- Banister, Jeffery M. (2014) Are you Wittfogel or against him? Geophilosophy, hydro-sociality, and the state. *Geoforum* 57:205–214.
- Baran, Eric and Chris Myschowoda (2009) Dams and fisheries in the Mekong Basin. *Aquatic Ecosystem Health & Management* 12(3): 227–234.
- Barney, Keith (2009) Laos and the Making of a ‘Relational’ Resource Frontier. *The Geographical Journal* 175 (2): 146–159.
- Barney, Keith (2017) Environmental Neoliberalism in Southeast Asia. In Philip Hirsch (ed.) *Handbook of the Environment in Southeast Asia*. Oxon and New York: Routledge, 99–114.
- Barney, Keith and Kerstin Canby (2011) Lao PDR: Overview of Forest Governance, Markets and Trade. Forest Trends. Forest Trends For FLEGT Asia Regional Programme, July 2011. [http://www.forest-trends.org/publication\\_details.php?publicationID=2920](http://www.forest-trends.org/publication_details.php?publicationID=2920)

- Barry, Andrew (2001) *Political machines: governing a technological society*. London and New York: The Athlone Press.
- Barry, Andrew (2006) Technological Zones. *European Journal of Social Theory* 9(2): 239–253.
- Bates, B.C., Z.W. Kundzewicz, S. Wu and J.P. Palutikof, (eds) (2008) *Climate Change and Water*. Technical Paper of the Intergovernmental Panel on Climate Change, Geneva: IPCC Secretariat. <https://www.ipcc.ch/publication/climate-change-and-water-2/>
- Benedikter, Simon (2014) Extending the Hydraulic Paradigm: Reunification, State Consolidation, and Water Control in the Vietnamese Mekong Delta after 1975. *Southeast Asian Studies* 3(3): 547–587.
- Bennett, Jane (2010) *Vibrant Matter: A Political Ecology of Things*. Durham: Duke University Press
- Biba, Sebasitan (2018) China’s ‘old’ and ‘new’ Mekong river politics: the Lancang-Mekong cooperation from a comparative benefit-sharing perspective. *Water International* 43:622–641.
- Biggs, David (2008) Water Power: Machines, Modernizers, and Meta-Commoditization on the Mekong River. In Joseph Nevins and Nancy Lee Peluso (eds) *Taking Southeast Asia to Market: Commodities, Nature, and People in the Neoliberal Age*. Ithaca and London: Cornell University Press, 108-123.
- Biggs, David (2010) *Quagmire: Nation-Building and Nature in the Mekong Delta*. Seattle and London: Washington University Press.
- Biggs, David, Fiona Miller, Chu Thai Hoanh and François Molle (2009) The Delta Machine: Water Management in the Vietnamese Mekong Delta in Historical and Contemporary Perspectives. In François Molle, Tira Foran and Mira Käkönen (eds) *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*. London and Sterling: Earthscan, 203–225.
- Blake, David (2019) Recalling hydraulic despotism: Hun Sen’s Cambodia and the return of strict authoritarianism, *Austrian Journal of South-East Asian Studies* 12(1): 69-89.
- Blake, David and Keith Barney (2018) Structural Injustice, Slow Violence? The Political Ecology of a “Best Practice” Hydropower Dam in Lao PDR, *Journal of Contemporary Asia* 48(5): 808-834.
- Blaser, Mario (2009) Political Ontology, *Cultural Studies* 23(5-6): 873-896
- Blok, Anders, Moe Nakazora and Brit Ross Winthereik (2016) Infrastructuring Environments. *Science as Culture* 25(1): 1–22.
- Blomley, Nicholas (2003) Law, Property, and the Geography of Violence: The Frontier, the Survey, and the Grid. *Annals of the Association of American Geographers* 93: 121-141.
- Boelens, Rutgerd, Jaime Hoogesteger, Erik Swyngedouw, Jeroen Vos and Philippus Wester (2016) Hydrosocial territories: a political ecology perspective. *Water International* 41(1): 1–14.
- Boltanski, Luc and Eve Chiapello (2007) *The New Spirit of Capitalism*. London: Verso.
- Boer, Ben, Philip Hirsch, Fleur Johns, Ben Saul and Natalia Scurrah (2016) *The Mekong: A Socio-legal Approach to River Basin Development*. London: Routledge.

- Borras, Saturnino M. and Jennifer C. Franco (2018) The challenge of locating land-based climate change mitigation and adaptation politics within a social justice perspective: Towards an idea of agrarian climate justice. *Third World Quarterly* 39(7):1308–1325.
- Braun, Bruce (2008) Environmental issues: inventive life. *Progress in Human Geography* 32(5):667–679.
- Bridge, Gavin (2014) Resource geographies II The resource-state nexus. *Progress in Human Geography* 38(1):118–130.
- Bridge, Gavin, James McCarthy and Tom Perrault (2015) Editor's Introduction. In Tom Perreault, Gavin Bridge and James McCarthy (eds) *Routledge Handbook of Political Ecology*. London and New York: Routledge, 3-18.
- Callon, Michel (1984) Some elements of a sociology of translation: domestication of the scallops and the fishermen of St Brieuc Bay. *The Sociological Review* 32:196–233.
- Carrol, Patrick (2012) Water and technoscientific state formation in California. *Social Studies of Science* 42(4):489–516.
- Castree Noel (2003) Commodifying what nature? *Progress in Human Geography* 27:273–297.
- Castree Noel (2008) Neoliberalising nature: the logics of deregulation and reregulation. *Environment and Planning A* 40:131–152.
- Chapman, Alexander D., Stephen E. Darby, Hoang M. Hông, Emma L. Tompkins, Tri P.D. Van (2016) Adaptation and development trade-offs: fluvial sediment deposition and the sustainability of rice-cropping in An Giang Province, Mekong Delta, *Climatic Change* 137(3): 593–608.
- Civil Society Statement (2016) 10 Reasons Why Climate Initiatives Should Not Include Large Hydropower Projects: A Civil Society Manifesto for the Support of Real Climate Solutions. <https://www.internationalrivers.org/node/9204> (Accessed: 1 August 2019)
- Cochrane, Thomas A., Mauricio E. Arias, Thanapon Piman (2014) Historical impact of water infrastructure on water levels of the Mekong River and the Tonle Sap system. *Hydrology and Earth Systems Sciences* 18(11): 4529–4541.
- Collard, Rosemary-Claire, Jessica Dempsey and Juanita Sundberg (2015) A Manifesto for Abundant Futures, *Annals of the Association of American Geographers* 105(2): 322-330.
- Collier, Stephen J. and Aihwa Ong (2005) Global Assemblages, Anthropological Problems. In Aihwa Ong and Stephen J. Collier (eds) *Global Assemblages: Technology, Politics, and Ethics as Anthropological Problems*, Malden: Blackwell Publishing, 3–21.
- Cooke, Bill and Uma Kothari (2001) The case for participation as tyranny. In Bill Cooke and Uma Kothari (eds) *Participation: The New Tyranny?* New York: Zed Books.
- Creak, Simon and Keith Barney (2018) Conceptualising Party-State Governance and Rule in Laos, *Journal of Contemporary Asia* 48(5): 693–716.
- Christoplos, Ian and Colleen McGinn (2016) Climate Change Adaptation from a Human Rights Perspective: Civil Society Experiences in Cambodia, *Forum for Development Studies* 43(3): 437–465.
- Dahles, Heidi and Heng Pheakdey (2017) China's strategic liaison with Cambodia: beyond resource diplomacy, *China's World* 2(1): 52–68.

- Dany, Va, Ros Taplin, Bhishna Bajracharya, Michael Regan and Louis Lebel (2016). Entry points for climate-informed planning for the water resources and agriculture sectors in Cambodia. *Environment, Development and Sustainability* 19: 1167-1188.
- Dean, Mitchell (1999) *Governmentality: Power and rule in modern society*. London: Sage.
- Dean, Mitchell (2013) *The Signature of Power: Sovereignty, Governmentality and Biopolitics*. London: Sage.
- Deleuze, Gilles and Felix Guattari (1987) *A Thousand Plateaus: Capitalism and Schizophrenia*. Minneapolis and London: University of Minnesota Press.
- Diepart, Jean-Christophe and Laura Schoenberger (2017) Concessions in Cambodia: Governing Profits, Extending State Power and Enclosing Resources from the Colonial Era to the Present. In Katherine Brickell and Simon Springer (eds) *The Handbook of Contemporary Cambodia*. London and New York: Routledge.
- Dreher, A., Fuchs, A., Parks, B.C., Strange, A. M., and Tierney, M. J. (2017) *Aid, China, and Growth: Evidence from a New Global Development Finance Dataset*. AidData Working Paper #46. Williamsburg, VA: AidData.
- Dunlap, Alexander and Sian Sullivan (2020) A faultline in neoliberal environmental governance scholarship? Or, why accumulation-by-alienation matters. *Environment and Planning E: Nature and Space* 3(2):552–579.
- Dwyer, Michael B. (2011) *Territorial Affairs: Turning Battlefields into Marketplaces in Postwar Laos*. PhD Thesis, University of California, Berkeley.
- Dwyer, Michael B. (2014). Micro-Geopolitics: Capitalising Security in Laos's Golden Quadrangle. *Geopolitics* 19(2), 377–405.
- Dwyer, Michael B. (2015) The Formalization fix? Land Titling, Land Concessions and the Politics of Spatial Transparency in Cambodia. *Journal of Peasant Studies* 42(5): 903–928.
- Dwyer, Michael B. (2018) Personal communication 12.2.2018.
- Dwyer, Michael B. (2020) “They will not automatically benefit”: The politics of infrastructure development in Laos's Northern Economic Corridor, *Political Geography* 78 <https://doi.org/10.1016/j.polgeo.2019.102118>.
- Ear, Sophal (2013) *Aid Dependence in Cambodia: How Foreign Assistance Undermines Democracy*. New York: Columbia University Press.
- Ehlert, Judith (2012) *Beautiful floods: Environmental knowledge and agrarian change in the Mekong Delta, Vietnam*. Zurich: Lit Verlag.
- Eilenberg, M. (2014) Frontier Constellations: Agrarian Expansion and Sovereignty on the Indonesian-Malaysian Border. *Journal of Peasant Studies* 41(2): 157–182.
- Emel, Jody, Matthew T. Huber, and Madoshi H. Makene (2011) Extracting Sovereignty: Capital, Territory, and Gold Mining in Tanzania. *Political Geography* 30(2): 70–79.
- Enfield, N. J. (2018) Social Change in the Nam Theun 2 Catchment: The Kri Experience. In Bruce Shoemaker and William Robichaud (eds) *Dead in the Water: Global Lessons from the World Bank’s Model Hydropower Project in Laos*. Madison: Wisconsin University Press, 141–155.
- Erickson, Peter, Michael Lazarus and Randall Spalding-Fecher (2014) Net climate change mitigation of the clean development mechanism. *Energy Policy*, 72: 146–154.

- Eriksen, Siri H., Andrea Nightingale and Hallie Eakin (2015) Reframing adaptation: The political nature of climate change adaptation. *Global Environmental Change* 35:523–533.
- Escobar, Arturo (2010) Postconstructivist political ecologies. In M.R. Redclift and G. Woodgate (eds) *The International Handbook of Environmental Sociology*. Cheltenham and Northampton: Edward Elgar, 91-105.
- Evans, Grant (2002) *A Short History of Laos: The Land in Between*. Chiang Mai: Silkworm Press.
- Evers, Hans-Dieter and Simon Benedikter (2009) Hydraulic bureaucracy in a modern hydraulic society: Strategic group formation in the Mekong Delta, Vietnam. *Water Alternatives* 2(3):416–439.
- Evrard, Oliver and Yves Goudineau (2004) Planned Resettlement, Unexpected Migrations and Cultural Trauma in Laos. *Development and Change*, 35(5):937–962.
- Fairhead, James and Melissa Leach (2003) *Science, Society and Power: Environmental Knowledge and Policy in West Africa and the Caribbean*. Cambridge: Cambridge University Press.
- de Faria Felipe A. M., Paulina Jaramillo, Henrique O. Sawakuchi, Jeffrey E. Richey and Nathan Barros (2015) Estimating greenhouse gas emissions from future Amazonian hydroelectric reservoirs *Environmental Research Letters* 10(12): 124019.
- Fearnside, Philip (2015) Tropical hydropower in the Clean Development Mechanism: Brazil's Santo Antônio Dam as an example of the need for change. *Climatic Change* 131: 575–589.
- Fearnside, Philip and Salvador Pueyo (2012) Greenhouse-Gas Emissions from Tropical Dams. *Nature Climate Change* 2: 382–84.
- Ferguson, James (1994) *The Anti-Politics Machine: 'Development', Depoliticization and Bureaucratic Power in Lesotho*, Minneapolis: University of Minnesota Press.
- Ferguson, James (2005) Seeing like an Oil Company: Space, Security and Global Capital in Neoliberal Africa. *American Anthropologist* 107(3): 377–382.
- Ferguson, James (2006) *Global Shadows: Africa in the Neoliberal World Order*. Durham and London: Duke University.
- Fletcher, Robert (2010) When environmental issues collide: Climate change and the shifting political ecology of hydroelectric power. *Peace Conflict Review* 5(1): 1–15.
- Fletcher, Robert and Bram Büscher (2017) The PES conceit: Revisiting the relationship between payments for environmental services and neoliberal conservation. *Ecological Economics* 132: 224–231.
- Fletcher, Robert and Crellis Rammelt (2017) Decoupling: A Key Fantasy of the Post-2015 Sustainable Development Agenda. *Globalizations* 14(3): 450-467.
- Floch, Philippe and François Molle (2013) Irrigated agriculture and rural change in Northeast Thailand: reflections on present developments. In Rajesh Daniel, Louis Lebel, and Kanokwan Manorom (eds), *Governing the Mekong: Engaging in the Politics of Knowledge*. Petaling Jaya: Strategic Information and Research Development Centre, 188–212.
- Flyvbjerg, B. (2006) Five Misunderstandings About Case-Study Research. *Qualitative Inquiry*, 12(2): 219–245.

- Foran, Tira and Kanokwan Manorom (2009) Pak Mun Dam: Perpetually Contested? In François Molle, Tira Foran and Mira Käkönen (eds) *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*. London: Earthscan.
- Forsyth, Timothy (2003) *Critical political ecology: The politics of environmental science*. New York: Routledge.
- Foucault, Michel (1991) Governmentality. In Graham Burchell, Colin Gordon and Peter Miller (eds), *The Foucault Effect: Studies in Governmentality: With Two Lectures by and an Interview with Michel Foucault*, Chicago: University of Chicago Press, pp. 87–104.
- Foucault, Michel (2003) *Society Must be Defended: Lectures at the Collège de France 1975–1976*. New York: Picador.
- Foucault, Michel (2007) *Security, Territory, Population: Lectures at the Collège de France 1977–78*. Basingstoke: Palgrave Macmillan.
- Foucault, Michel (2008) *The Birth of Biopolitics: Lectures at the Collège de France 1978–79*. Basingstoke: Palgrave Macmillan.
- Frewer, Timothy (2016) From vulnerability to immunization—A genealogy of early attempts to deal with the climate. *Singapore Journal of Tropical Geography* 37(1):43–58.
- Geheb, Kim and Diana Suhardiman (2019) The Political Ecology of Hydropower in the Mekong River Basin. *Current Opinion in Environmental Sustainability* 37:8-13.
- Germanwatch (2019) Global Climate Risk Index 2019. Bonn: Germanwatch e. V. [www.germanwatch.org/en/cri](http://www.germanwatch.org/en/cri)
- Global Witness (2015) *The Cost of Luxury: Cambodia's Illegal Trade in Precious Wood with China*. London: Global Witness.
- Goldman, Michael (2005) *Imperial Nature: The World Bank and Struggles for Social Justice in the Age of Globalization*. New Haven, CT: Yale University Press.
- Gottweiss, Herbert (2003) Theoretical strategies of poststructuralist policy analysis: Towards an analytics of government. In Maarten A. Hajer and Henrik Wagenaar (eds) *Deliberative Policy Analysis: Understanding Governance in the Network Society*, Cambridge: Cambridge University Press, 247–265.
- Greacen, Chuenchom Sangarasri and Chris Greacen (2012) *Proposed Power Development Plan (PDP) 2012 and a Framework for Improving Accountability and Performance of Power Sector Planning*. Bangkok: Palang Thai.
- Grill, Günther, Bernhard Lehner, Alexander E. Lumsdon, Graham K. MacDonald, Christiane Zarfl, Catherine R. Liermann (2015) An index-based framework for assessing patterns and trends in river fragmentation and flow regulation by global dams at multiple scales. *Environmental Research Letter* 10:1 <http://dx.doi.org/10.1088/1748-9326/10/1/015001>
- Hagmann, Tobias and Benedikt Korf (2012) Agamben in the Ogaden: Violence and Sovereignty in the Ethiopian–Somali Frontier. *Political Geography* 31(4): 205–214.
- Hajer, Maarten A. (1995) *The Politics of Environmental Discourse: Ecological Modernization and the Policy Process*. Oxford: Oxford University Press.
- Hall, Derek, Philip Hirsch and Tania Murray Li (2011) *Powers of exclusion: Land dilemmas in Southeast Asia*. Singapore: Singapore University Press.



- Hansen, Thomas Blom and Finn Stepputat (2006) Sovereignty Revisited. *Annual Review of Anthropology* 35(1): 295-315.
- Haraway, Donna (2016) *Staying with the Trouble: Making Kin in the Chtulucene*. Durham: Duke University Press.
- Harris, Leila (2012) State as Socionatural Effect: Variable and Emergent Geographies of the State in Southeastern Turkey. *Comparative Studies of South Asia, Africa and the Middle East* 32 (1): 25–39.
- Harris, Leila (2017) Political ecologies of the state: Recent interventions and questions going forward. *Political Geography* 58: 90–92.
- Hasan, Shahnoor, Jaap Evers, Arjen Zegwaard and Margreet Zwarteveen (2019) Making waves in the Mekong Delta: recognizing the work and the actors behind the transfer of Dutch delta planning expertise, *Journal of Environmental Planning and Management* 62(9): 1583–1602.
- Haya, Barbara and Payal Parekh (2011) Hydropower in the CDM: Examining additionality and criteria for sus-tainability. Berkeley Energy and Resources Group Working Paper No. ERG-11-001. Berkeley: University of California.
- Hensengerth, Oliver (2015) Global Norms in Domestic Politics: Environmental Norm Contestation in Cambodia’s Hydropower Sector. *The Pacific Review* 28(4): 505–528.
- Hensengerth, Oliver (2017) Water governance in the Mekong Basin: Scalar trade-offs, transnational norms, and Chinese Hydropower Investment In Pál Nyíri and Danielle Tan (eds) *Chinese encounters in Southeast Asia: How people, money, and ideas from China are changing a region*. Seattle and London: University of Washington Press, 174-191.
- Hildyard, Nicholas (2016) *Licensed larceny: Infrastructure, financial extraction and the global South*. Manchester University Press
- Hirsch, Philip (2010) The changing political dynamics of dam building on the Mekong. *Water Alternatives* 3(2): 312-323.
- Hirsch, Philip (2011) China and the Cascading Geopolitics of Lower Mekong Dams. *The Asia-Pacific Journal* 9(2):1–4.
- Hirsch, Philip (2016) The shifting regional geopolitics of Mekong dams. *Political Geography* 51: 63-74.
- Horstmann, Britta and Jonas Hein (2017) Aligning climate change mitigation and sustainable development under the UNFCCC: a critical assessment of the clean development mechanism, the green climate fund and REDD+. Bonn: German Development Institute.
- Hughes, Caroline (2009) *Dependent Communities: Aid and Politics in Cambodia and East Timor*. Ithaca: Cornell Southeast Asia Program.
- Hughes, Caroline and Kheang Un (2011) Cambodia’s Economic Transformation: Historical and Theoretical Frameworks. In: Caroline Hughes and Kheang Un (eds) *Cambodia’s Economic Transformation*, 1–26. Copenhagen: Nordic Institute of Asian Studies Press.
- Hulme, Mike (2011) Reducing the future to climate: A story of climate determinism and reductionism. *Klima* 26(1): 245–66.

- Hunt, Glenn, Marika Samuelsson and Satomi Higashi (2018) Broken Pillars: The Failure of the Nakai Plateau Livelihood Resttlement Program. In Bruce Shoemaker and William Robichaud (eds) *Dead in the Water: Global Lessons from the World Bank's Model Hydropower Project in Laos*. Madison: Wisconsin University Press, 106-140.
- ICEM (2010). MRC Strategic Environmental Assessment (SEA) of hydropower on the Mekong mainstream: Final report. Hanoi: International Center for Environmental Management.
- International Hydropower Association (IHA) (2019) 2019 Hydropower status report: sector trends and insights. International Hydropower Association. <https://www.hydropower.org/status2019>
- IPCC (2018) Summary for Policymakers. In: Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds) *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. Geneva: World Meteorological Organization. [www.ipcc.ch/sr15/chapter/spm/](http://www.ipcc.ch/sr15/chapter/spm/)
- International Rivers (IR) (2019) Tragic Trade-offs: The MRC Council Study and the Impacts of Hydropower Development on the Mekong. International Rivers. [https://www.internationalrivers.org/sites/default/files/attached-files/factsheet\\_mrc\\_council\\_study\\_-\\_english-proof\\_5.pdf](https://www.internationalrivers.org/sites/default/files/attached-files/factsheet_mrc_council_study_-_english-proof_5.pdf)
- Jasanoff, Sheila (ed.) (2004) *States of Knowledge: The co-production of science and social order*. London and New York: Routledge
- Jasanoff, Sheila (2015) Future Imperfect: Science, Technology, and the Imaginations of Modernity. In Sheila Jasanoff and Sang-Hyun Kim (eds) *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*. Chicago: The University of Chicago Press, 1–33.
- Jensen, Casper Bruun (2017) Amphibious Worlds: Environments, Infrastructures, Ontologies. *Engaging Science, Technology, and Society* 3: 224–234.
- Jessop, Bob (2007) From micro-powers to governmentality: Foucault's work on statehood, state formation, statecraft and state power. *Political Geography* 26(1): 34–40.
- Jessop, Bob, Neil Brenner and Martin Jones (2008) Theorizing Sociospatial Relations. *Environment and Planning D: Society and Space*, 26(3): 389–401. <https://doi.org/10.1068/d9107>
- Johns, Fleur (2015) On Failing Forward: Neoliberal Legality in the Mekong River Basin. *Cornell Inter-national Law Journal* 48(2): 347–383. <http://scholarship.law.cornell.edu/cilj/vol48/iss2/3>
- Kaika, Maria (2006) Dams as Symbols of Modernization: The Urbanization of Nature Between Geographical Imagination and Materiality, *Annals of the Association of American Geographers*, 96(2): 276–301.
- Kaist, Hanna and Mira Käkönen (2012) Actors, Interests and Forces Shaping the Energyscape of the Mekong Region. *Forum for Development Studies*, 39(2): 147–158.

- Käkönen, Mira (2013) CDM and its Challenges to Deliver to the Poor: The Case of Cambodia. In M. Käkönen, K. Karhunmaa, O. Bruun, H. Kaisti, V. Tuominen, T. Thuon, J. Luukkanen (eds) *Climate mitigation in the least carbon emitting countries: Dilemmas of co-benefits in Cambodia and Laos*. FFRC eBOOK 3/2013, Turku: Finland Futures Research Centre, University of Turku.
- Katus, Susanne, Diana Suhardiman, Sonali Sellamutu (2016) When local power meets hydropower: Reconceptualizing resettlement along the Nam Gnouang River in Laos, *Geoforum* 72: 6–15.
- Keeley, James and Ian Scoones (2003) *Understanding Environmental Policy Processes: cases from Africa*. London: Earthscan
- Kelly, Alice B. and Nancy Lee Peluso (2015) Frontiers of Commodification: State Lands and Their Formalization, *Society & Natural Resources*, 28(5): 473–495.
- Keskinen, Marko, Matti Kumm, Mira Käkönen and Olli Varis (2012) Mekong at the Crossroads: Next Steps for Impact Assessment of Large Dams. *Ambio* 41(3): 319–324.
- Khagram, Sanjeev (2004) *Dams and development: Transnational struggles for water and power*. Ithaca: Cornell University Press.
- Kirchherr, Julian, Nathaniel Matthews, Katrina J. Charles, Matthew J. Walton (2017) “Learning it the Hard Way”: Social safeguards norms in Chinese-led dam projects in Myanmar, Laos and Cambodia, *Energy Policy* 102: 529–539.
- Klemm, Joshua and Florencia Ortúzar in Songdo (2017) Large hydropower dams have no place in the Green Climate Fund.  
<https://www.climatechangenews.com/2017/04/04/large-hydropower-dams-no-place-green-climate-fund/> (Accessed: 1 August 2019)
- Kondolf, George Mathias, Rafael J.P. Schmitt, Paul Carling, Steve Darby, Mauricio Arias, Simone Bizzi, Andrea Castelletti, Thomas A. Cochrane, Stanford Gibson, Matti Kumm, Chantha Oeurng, Zan Rubin and Thomas Wild (2018) Changing sediment budget of the Mekong: Cumulative threats and management strategies for a large river basin, *Science of the Total Environment* 625:114-134.
- Kondolf, George Mathias, Zan K. Rubin, J.T. Minear (2014) Dams on the Mekong: Cumulative sediment starvation. *Water Resources Research* 50: 5158–5169.
- Korf, Benedikt, Tobias Haggmann and Rony Emmenegger (2015) Re-spacing African drylands: territorialisation, sedentarization and indigenous commodification in the Ethiopian pastoral frontier. *The Journal of Peasant Studies* 42(5): 881–901.
- Krause, Franz and Veronica Strang (2013) Introduction to Special Issue: “Living Water”. *Worldviews: Global Religions, Culture, and Ecology* 17(2): 95–102.
- Krause, Franz (2017) Toward an Amphibious Anthropology of Delta Life. *Human Ecology*. 45(3): 403–8.
- Kumar, Amit and M. P. Sharma (2016) Assessment of risk of GHG emissions from Tehri hydropower reservoir, India. *Human and Ecological Risk Assessment: An International Journal* 22(1):71–85.
- Kumm, Matti, Xi Xi Lu, Jianjun Wang and Olli Varis (2010) Basin-wide sediment trapping efficiency of emerging reservoirs along the Mekong. *Geomorphology* 119: 181–97.

- Lahiri-Dutt, Kuntala (2014) Beyond the Land-Water Binary in Geography: Water/lands of Bengal Revisioning Hybridity. *ACME: An Interdisciplinary E-Journal for Critical Geography* 13: 505–29.
- Lamb, Vanessa, Melissa Marschke and Jonathan Rigg (2019) Trading Sand, Undermining Lives: Omitted Livelihoods in the Global Trade in Sand, *Annals of the American Association of Geographers*, 109(5):1511-1528.
- Lagerqvist, Yayoi, Laura Woollacott, Avakat Phasouysaingam and Southida Souliyavong (2014) Resource Development and the Perpetuation of Poverty in Rural Laos. *Australian Geographer*, 45:407–417.
- Latour, Bruno (1987) *Science in action: How to follow scientists and engineers through society*. Cambridge, MA: Harvard University Press.
- Latour, Bruno (1990) Drawing things together. In Michael Lynch and Steve Woolgar (eds) *Representation in Scientific Practice*. Cambridge, MA.: MIT Press, 19–68.
- Latour, Bruno (1993) *We Have Never Been Modern*. Cambridge, MA: Harvard University Press.
- Latour, Bruno (1999) *Pandora's Hope: Essays on the Reality of Science Studies*. Cambridge and London: Harvard University Press.
- Latour, Bruno (2004) *Politics of Nature: How to Bring the Sciences into Democracy*. Cambridge, MA: Harvard University Press
- Latour, Bruno (2017) *Facing Gaia: Eight Lectures on the New Climatic Regime*. Cambridge and Malden: Polity Press.
- Latour, Bruno (2018) *Down to Earth. Politics in the New Climatic Regime*. Cambridge: Polity Press.
- Laungaramsri, Pinkaew (2019) China in Laos: Enclave spaces and the transformation of borders in the Mekong Region. *Australian Journal of Anthropology* 30:195–211.
- Law, John (2003) Order and Obduracy. Lancaster: Centre for Science Studies, University of Lancaster. <https://www.lancaster.ac.uk/fass/resources/sociology-online-papers/papers/law-ordering-and-obduracy.pdf>
- Ley, Lukas and Franz Krause (2019) Ethnographic conversations with Wittfogel's ghost: An introduction. *Environment and Planning C: Politics and Space* 37(7):1151–1160.
- Lauri, H., H. Moel, P. Ward, T. Räsänen, M. Keskinen, M. Kummur (2012) Future changes in Mekong River hydrology: impact of climate change and reservoir operation on discharge. *Hydrology and Earth System Sciences* 16(12): 4603–4619.
- Leach, Melissa (2008) Pathways to Sustainability in the forest? Misunderstood dynamics and the negotiation of knowledge, power and policy, *Environment and Planning A*, 40(8): 1783–1795.
- Leach, Melissa, Ian Scoones, Andy Stirling (2010) *Dynamic Sustainabilities: Technology, Environment and Social Justice*. London: Earthscan.
- Lebel, Louis, Mira Käkönen, Va Dany, Phimphakan Lebel, Try Thuon, Saykham Voladet (2018) The framing and governance of climate change adaptation projects in Lao PDR and Cambodia. *International Environmental Agreements: Politics, Law and Economics* 18(3): 429–446.

- Le Billon, P. (2002) Logging in Muddy Waters: The Politics of Forest Exploitation in Cambodia. *Critical Asian Studies* 34(4): 563–586.
- Lee, Ching Kwan (2014) The Specter of Global China. *New Left Review* 89, 29–65.
- Levien, Michael (2012) The Land Question: Special Economic Zones and the Political Economy of Dispossession in India. *Journal of Peasant Studies* 39(3–4): 933–969.
- Li, Tania Murray (2007a) *The Will to Improve: Governmentality, Development, and the Practice of Politics in Indonesia*, Durham, NC: Duke University Press.
- Li, Tania Murray (2007b) Practices of assemblage and community forest management, *Economy and Society*, 36(2): 263–293.
- Li, Tania Murray (2010) To Make Live or Let Die? Rural Dispossession and the Protection of Surplus Populations. *Antipode* 41: 66–93.
- Li, Tania Murray (2014) What is Land? Assembling a Resource for Global Investment. *Transactions of the Institute of British Geographers* 39(4): 589–602.
- Li, Tania Murray (2018) After the land grab: Infrastructural violence and the “Mafia System” in Indonesia's oil palm plantation zones. *Geoforum* 96: 328–337.
- Li, Tania Murray (2019) Politics, Interrupted. *Anthropological Theory* 19(1): 29–53.
- Linton, Jamie (2006) The social nature of natural resources: *The case of water. Reconstruction: Studies in Contemporary Culture* 6(3) <http://reconstruction.eserver.org/063/linton.shtml>
- Linton, Jamie (2010) *What is Water? The History of a Modern Abstraction*. Vancouver: UBC Press.
- Linton, Jamie and Jessica Budds (2014) The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water, *Geoforum* 57(11): 170–180.
- Lund, Christian (2011) Fragmented Sovereignty: Land Reform and Dispossession in Laos. *Journal of Peasant Studies* 38(4): 885–905.
- Lund, Christian (2014) Of What is This a Case?: Analytical Movements in Qualitative Social Science Research. *Human Organization* 73(3): 224–234.
- Lund, Christian (2016) Rule and Rupture: State Formation through the Production of Property and Citizenship. *Development and Change* 47(6): 1199–1228.
- Lyttleton, Chris and Pál Nyíri (2011) Dams, Casinos and Concessions: Chinese Megaprojects in Laos and Cambodia. In Stanley D. Brunn (Ed.) *Engineering Earth* Dordrecht: Springer, 1243–1265.
- MacKenzie, Donald (2009) Making things the same: Gases, emission rights and the politics of carbon markets. *Accounting, Organizations and Society* 34: 440–455.
- Mahanty, Sango (2019) A tale of two networks: Market formation on the Cambodia–Vietnam frontier. *Trans Inst Br Geogr.* 44: 315– 330.
- Manorom, Kanokwan, Ian Baird and Bruce Shoemaker (2017) The World Bank, Hydropower-based Poverty Alleviation and Indigenous Peoples: On-the-Ground Realities in the Xe Bang Fai River Basin of Laos, *Forum for Development Studies* 44(2): 275–300.
- Mansfield, Becky (2004) Neoliberalism in the oceans: “rationalization,” property rights, and the commons question. *Geoforum* 35(3): 313–326.

- Marks, Danny and Jun Zhang (2019) Circuits of power: Environmental injustice from Bangkok's shopping malls to Laos' hydropower dams. *Asia Pacific Viewpoint* 60(3): 296–309.
- Marx, Karl and Friedrich Engels (1998) *Communist manifesto: a modern edition*. London and New York: Verso.
- Matthews, Nathaniel and Stew Motta (2015) Chinese state-owned enterprise investment in Mekong hydropower: Political and economic drivers and their implications across the water, energy, food nexus. *Water* 7(11): 6269–6284.
- McCully, Patrick (2001) *Silenced Rivers: The Ecology and Politics of Large Dams*. New York: St. Martin's Press.
- MEE Net (2012) Know Your Power: Toward a Participatory Approach for Sustainable Power Development in the Mekong Region. Bangkok: MEE Net.
- Mehta, Lyla (2005) *The Politics and Poetics of Water: Naturalising Scarcity in Western India*. New Delhi: Orient Longman Private Limited.
- Mehta, Lyla (ed.) (2010) *Limits to Scarcity: Contesting the Politics of Allocation*. London: Earthscan.
- Mekong River Commission (2005) Overview of the Hydrology of the Mekong Basin. Vientiane: Mekong River Commission.
- Mekong River Commission (2009) Strategic Directions for Integrated Flood Risk Management in Focal Areas. Draft Final Report, Volume 2D, Vientiane: Mekong River Commission Secretariat.
- Mekong River Commission (2017) Council Study. The Study on the Sustainable Management and Development of the Mekong River Basin, Including Impacts of Mainstream Hydropower Project. Vientiane: Mekong River Commission.
- Mekong River Commission (2018) MRC's updated database offers comprehensive information on Mekong fish species. 19 December 2018. <http://www.mrcmekong.org/news-and-events/events/mrc-updated-database-offers-comprehensive-information-on-mekong-fish-species/> (Accessed: 28.12.2019)
- Mekong River Commission (2019) State of the Basin Report 2018. Vientiane: Mekong River Commission.
- Menga, Filippo and Erik Swyngedouw (eds) (2018) *Water, Technology and the Nation-State*. Oxon and New York: Routledge.
- Merme, Vincent, Rhodante Ahlers and Joyeeta Gupta (2014) Private equity, public affair: Hydropower financing in the Mekong Basin, *Global Environmental Change* 24: 20–29.
- Middleton, Carl (2018) Branding Dams – Nam Theun 2 and its Role in Producing the Discourse of “Sustainable Development”. In Bruce Shoemaker and William Robichaud (eds) *Dead in the Water: Global Lessons from the World Bank's Model Hydropower Project in Laos*. Madison: Wisconsin University Press, 271.292.
- Middleton, Carl, Jelson Garcia and Tira Foran (2009) Old and new hydropower players in the Mekong Region: Agenda and strategies. In François Molle, Tira Foran and Mira Käkönen (eds) *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*. London: Earthscan, 23–54.

- Middleton, Carl, Nathaniel Matthews and Naho Mirumachi (2015) Whose risky business? Public-private partnerships, build-operate-transfer and large hydropower dams in the Mekong Region. In Nathaniel Matthews and Kim Geheb (eds) *Hydropower Development in the Mekong Region: Political, Socio-economic and Environmental perspectives*. London: Routledge, 127–152.
- Middleton, Carl and Jeremy Allouche (2016) Watershed or Powershed? Critical Hydropolitics, China and the ‘Lancang-Mekong Cooperation Framework’, *The International Spectator* 51(3): 100–117.
- Miller, Fiona (2003) *Society-Water Relations in the Mekong Delta: A Political Ecology of Risk*. PhD thesis, University of Sydney (Division of Geography).
- Milne, Sarah (2015) Cambodia’s Unofficial Regime of Extraction: Illicit Logging in the Shadow of Transnational Governance and Investment. *Critical Asian Studies* 47(2): 200–228.
- Milne, Sarah and Sango Mahanty (2015) The Political Ecology of Cambodia’s Transformation. In Sarah Milne and Sango Mahanty (eds) *Conservation and Development in Cambodia: Exploring the Frontiers of Change in Nature, State and Society*. Oxon and New York: Earthscan, 1–27.
- Mitchell, Timothy (1991) The Limits of the state: beyond statist approaches and their critics. *American Political Science Review*, 85:77–96.
- Mitchell, Timothy (2002) *Rule of Experts: Egypt, Techno-Politics, Modernity*. Berkeley and Los Angeles: University of California Press.
- Mitchell, Timothy (2014) Introduction: Life of Infrastructure. *Comparative Studies of South Asia, Africa and the Middle East* 34(3): 437–439.
- Mohan, Giles and May Tan-Mullins (2019) The geopolitics of South–South infrastructure development: Chinese-financed energy projects in the global South. *Urban Studies* 56(7) 1368–1385.
- Molle, Francois (2008) Nirvana concepts, narratives and policy models: insight from the water sector. *Water Alternatives* 1(1): 131–156.
- Molle, Francois (2009) River-basin planning and management: The social life of a concept. *Geoforum* 40, 484–494.
- Molle, Francois (2017) River Basin Management and Development. In D. Richardson, N. Castree, M.F. Goodchild, A. Kobayashi, W. Liu and R.A. Marston (eds) *International Encyclopedia of Geography: People, the Earth, Environment and Technology*, 585–624.
- Molle, F., P.P. Mollinga and P. Wester (2009) Hydraulic bureaucracies and the hydraulic mission: Flows of water, flows of power. *Water Alternatives* 2(3), 328–349.
- Moore, Jason (2015) *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*. London and New York: Verso.
- Morita, Atsuro (2016) Infrastructuring Amphibious Space: The Interplay of Aquatic and Terrestrial Infrastructures in the Chao Phraya Delta in Thailand. *Science as Culture* 25(1): 117–140.
- Morita, Atsuro and Casper Bruun Jensen (2017) Delta Ontologies: Infrastructural Transformations in the Chao Phraya Delta, Thailand. *Social Analysis* 61(2): 118–133.

- Mosse, David (2005) *Cultivating Development: An Ethnography of Aid Policy and Practice*. London and Ann Arbor: Pluto Press.
- Nevins, Joseph and Nancy Lee Peluso (eds) (2008) *Taking Southeast Asia to Market: Commodities, Nature, and People in the Neoliberal Age*. Ithaca and London: Cornell University Press, 108–123.
- Nüsser Marcus and Ravi Baghel (2017) The emergence of technological hydroscares in the Anthropocene: Socio-hydrology and development paradigms of large dams. In: B. Warf (ed.) *Handbook on Geographies of Technology*. Cheltenham, United Kingdom: Edward Elgar, 287–301.
- Nyíri, Pál (2012) Enclaves of improvement: Sovereignty and developmentalism in the special zones of the China-Lao borderlands. *Comparative Studies in Society and History*, 54(3): 533–562.
- Nyíri, Pál (2013) Chinese Investors, Labour Discipline and Developmental Cosmopolitanism. *Development and Change*, 44: 1387–1405.
- Nyíri, Pál (2017) Investors, Managers, Brokers, and Culture Workers: How Migrants from China Are Changing the Meaning of Chineseness in Cambodia. In Pál Nyíri and Danielle Tan (eds) *Chinese encounters in Southeast Asia: How people, money, and ideas from China are changing a region*. Seattle and London: University of Washington Press, 25–42.
- Nyíri, Pál and Danielle Tan (2017) Introduction: China’s “Rise” in Southeast Asia from a Bottom-Up Perspective. In Pál Nyíri and Danielle Tan (eds) *Chinese encounters in Southeast Asia: How people, money, and ideas from China are changing a region*. Seattle and London: University of Washington Press, 3–22.
- Olson, Kathryn A. and Brian J. Gareau (2018) Hydro/Power? Politics and Neoliberalization in Laos’s Hydroelectric Development *Sociology of Development* 4(1): 94–118.
- O’Malley, Pat (2015) Uncertainty Makes Us Free: Insurance and Liberal Rationality. In Limor Samimian-Darash and Paul Rabinow (eds) *Modes of Uncertainty: Anthropological Cases*. Chicago: University of Chicago Press, pp. 13– 28.
- Ong, Aihwa (2006) *Neoliberalism as Exception: Mutations on Citizenship and Sovereignty*. Durham and London: Duke University Press.
- Ong, Aihwa (2007) Neoliberalism as a Mobile Technology. *Transactions of the Institute of British Geographers* 32(1): 3–8.
- O’Neill, Daniel C. (2018) *Dividing ASEAN and Conquering the South China Sea: China’s Financial Power Projection*. Hong Kong: Hong Kong University Press.
- Opitz, Sven and Ute Tellmann (2012) Global Territories: Zones of Economic and Legal dis/Connectivity. *Distinktion: Scandinavian Journal of Social Theory* 13(3): 261–282.
- Orr, Stuart, Jamie Pittock, Ashok Chapagain and David Dumaresq (2012) Dams on the Mekong River: Lost fish protein and the implications for land and water resources. *Global Environmental Change* 22(4): 925–932.
- Ovesen, Jan (2008) All Lao? Minorities in the Lao People’s Republic. In Christopher R. Duncan (ed) *Civilizing the Margins: Southeast Asian Government Policies for the Development of Minorities*. Singapore: NUS Press, 214–240.



- Pang, Edgar (2017) "Managing Reliance": The Socio-Economic Context of the Chinese Footprint in Laos and Cambodia. *ISEAS Perspective* 67.
- Paulson, Susan, Lisa Gezon and Michael Watts (2003) Locating the Political in Political Ecology: An Introduction, *Human Organization* 62(3): 205–217
- Peluso, Nancy and Christian Lund (2011) New Frontiers of Land Control: Introduction. *Journal of Peasant Studies* 38(4): 667–681.
- Peck, Jamie (2010) *Constructions of Neoliberal Reason*. Oxford: Oxford University Press,
- Phraxayavong, Viliam (2009) *History of Aid to Laos – Motivations and Impacts*, Chiang Mai: Mekong Press.
- Porter, I. C. and Shivakumar, J. (2011) *Doing a dam better: the Lao People's Democratic Republic and the story of Nam Theun 2 (NT2)*. Washington DC: World Bank.
- Rabinow, Paul (2011) *The accompaniment: Assembling the contemporary*. Chicago: University of Chicago Press.
- Räsänen, Aleks, Anja Nygren, Adrian Monge Monge, Mira Käkönen, Markku Kanninen and Sirkku Juhola (2018) From divide to nexus: Interconnected land use and water governance changes shaping risks related to water. *Applied Geography* 90: 106–114.
- Räsänen, Timo A., Paradis Someth, Hannu Lauri, Jorma Koponen, Juha Sarkkula and Matti Kumm (2017) Observed river discharge changes due to hydropower operations in the upper Mekong Basin *Journal of Hydrology* 545: 28–41.
- Räsänen, Timo A., Olli Varis, L. Scherer and Matti Kumm (2018) Greenhouse gas emissions of hydropower in the Mekong River Basin. *Environmental Research Letters*, 13(3) <https://doi.org/10.1088/1748-9326/aaa817>
- Rasmussen, Mattias Borg and Christian Lund (2018) Reconfiguring frontier spaces: the territorialization of resource control. *World Development* 101: 388–399.
- Ribot, Jesse (2014) Cause and response: Vulnerability and climate in the Anthropocene. *Journal of Peasant Studies*, 41(5), 667–705.
- Richardson, Tanya (2018) The Terrestrialization of Amphibious Life in a Danube Delta 'Town on Water', *Suomen Antropologi* 43(2), 3–26.
- Richardson, Tanya and Gisa Weszkalnys (2014) Introduction: Resource Materialities. *Anthropological Quarterly* 87(1): 5–30.
- Richter, Brian D., Sandra Postel, Carmen Revenga, Thayer Scudder, Bernhard Lehner, Allegra Churchill and Morgan Chow (2010) Lost in development's shadow: The downstream human consequences of dams. *Water Alternatives* 3(2):14–42.
- Robbins, Paul (2008) The State in political ecology: a postcard to political geography from the field, in Kevin Cox, Murray Low and Jennifer Robinson (eds) *The SAGE Handbook of Political Geography*. London: Sage, 205–218.
- Robertson, Morgan M. (2006) The Nature That Capital Can See: Science, State, and Market in the Commodification of Ecosystem Services. *Environment and Planning D: Society and Space* 24(3):367–387.
- Robichaud, William (2018) Elusive Conservation in the Nam Theun 2 Catchment. In Bruce Shoemaker and William Robichaud (eds) *Dead in the Water: Global Lessons from the*

- World Bank's Model Hydropower Project in Laos*. Madison: Wisconsin University Press, 156–181.
- Shoemaker, Bruce and William Robichaud (eds) (2018) *Dead in the Water: Global Lessons from the World Bank's Model Hydropower Project in Laos*. Madison: Wisconsin University Press.
- Romero, María José (2015) What lies beneath? A critical assessment of PPPs and their impact on sustainable development. Eurodad.  
<http://www.eurodad.org/files/pdf/559da257b02ed.pdf>
- Rose, Nikolas (1993) Government, authority and expertise in advanced liberalism, *Economy and Society* 22(3): 283–299.
- Rose, Nikolas (1999) *Powers of Freedom: Reframing Political Thought*. Cambridge: Cambridge University Press.
- Rose, Nikolas and Peter Miller (1992) Political power beyond the State: Problematics of government', *The British Journal of Sociology*, 43(2):173–205.
- Rose, Nikolas, Pat O'Malley and Mariana Valverde (2006) Governmentality. *Annual Review of Law and Social Sciences* 2: 83-104.
- Rousseau, Jean-Francois (2017) Does carbon finance make a sustainable difference? Hydropower expansion and livelihood trade-offs in the Red River valley, Yunnan Province, China. *Singapore Journal of Tropical Geography* 38: 90–107.
- Royal Government of Cambodia (RGC) (2013) Cambodia Climate Change Strategic Plan (CCCSP) 2014–2024, Phnom Penh: Ministry of Environment.
- Rutherford, Paul (1999) Ecological modernization and environmental risk, in Eric Darier (ed) *Discourses of the Environment*, Oxford: Blackwell Publishers: 95–118.
- Rutherford, Stephanie (2007) Green governmentality: Insights and opportunities in the study of nature's rule. *Progress in Human Geography* 31(3): 291–307.
- Ryder, Gráinne and Witoon Permpongsacharoen (2018) Overpowered: Limiting Liability within Thailand's Nam Theun 2 Electricity Deal. In Bruce Shoemaker and William Robichaud (eds) *Dead in the Water: Global Lessons from the World Bank's Model Hydropower Project in Laos*. Madison: Wisconsin University Press, 254-270.
- Sabo, John L., Albert Ruhi, Gordon W. Holtgrieve, Vittoria Elliott, Mauricio E. Arias, Peng Bun Ngor, Timo A. Räsänen, So Nam (2017) Designing river flows to improve food security futures in the Lower Mekong Basin. *Science* 258(6368).  
<https://doi.org/10.1126/science.aao1053>
- Sanderman, Jonathan, Tomislav Hengl, Greg Fiske, Kylene Solvik... and Emily Landis (2018). A global map of mangrove forest soil carbon at 30 m spatial resolution. *Environmental Research Letters* 13(5) <https://doi.org/10.1088/1748-9326/aabe1c>
- Sassen, Saskia (2006) *Territory, Authority, Rights: From Medieval to Global Assemblages*. Princeton: Princeton University Press.
- Sato, Jin, Hiroaki Shiga, Takaaki Kobayashi and Hisahiro Kondoh (2011) Emerging Donors' from a Recipient Perspective: An institutional analysis of Foreign Aid in Cambodia. *World Development* 39(12): 2091-2104.

- Schneider, Howard (2013) World Bank Turns to Hydropower to Square Development with Climate Change, Washington Post, May 8 2013, [https://www.washingtonpost.com/business/economy/world-bank-turns-to-hydropower-to-square-development-with-climate-change/2013/05/08/b9d60332-b1bd-11e2-9a98-4be1688d7d84\\_story.html?noredirect=on&utm\\_term=.a98dbccc9f66](https://www.washingtonpost.com/business/economy/world-bank-turns-to-hydropower-to-square-development-with-climate-change/2013/05/08/b9d60332-b1bd-11e2-9a98-4be1688d7d84_story.html?noredirect=on&utm_term=.a98dbccc9f66)
- Scott, James C. (1990) *Domination and the arts of resistance: Hidden transcripts*. New Haven: Yale University Press.
- Scott, James C. (1998) *Seeing like a state: how certain schemes to improve the human condition have failed*. New Haven: Yale University Press.
- Scott, James C. (2005) Afterword to “moral economies, state spaces, and categorical violence”. *American Anthropologist* 107: 395–402.
- Scott, James C. (2009) *The art of not being governed: An anarchist history of upland Southeast Asia*. New Haven: Yale University Press.
- Seijger, Chris, Vo Thi Minh Hoang, Gerardo van Halsema, Wim Douven and Andrew Wyatt (2019) Do strategic delta plans get implemented? The case of the Mekong Delta Plan. *Regional Environmental Change* 19: 1131–1145.
- Shoemaker, Bruce (2018) Revenues without Accountability: National Poverty Alleviation and Nam Theun 2. In Bruce Shoemaker and William Robichaud (eds) *Dead in the Water: Global Lessons from the World Bank’s Model Hydropower Project in Laos*. Madison: Wisconsin University Press, 206–214.
- Shoemaker, Bruce and William Robichaud (2018) Transforming Loss. In Bruce Shoemaker and William Robichaud (eds) *Dead in the Water: Global Lessons from the World Bank’s Model Hydropower Project in Laos*. Madison: Wisconsin University Press, 293-306
- Schoenberger, Laura and Alice Beban (2018) “They Turn Us into Criminals”: Embodiments of Fear in Cambodian Land Grabbing. *Annals of the American Association of Geographers* 108(5):1338–1353.
- Siciliano, Giuseppina, Daniela Del Bene, Arnim Scheidel, Juan Liu, Frauke Urban (2019) Environmental justice and Chinese dam-building in the global South, *Current Opinion in Environmental Sustainability* 37: 20–27.
- Sidaway, James D. (2007) Enclave space: A new metageography of development? *Area* 39(3): 331–9.
- Sidaway, James D. and Chinh Yuan Woon (2017) Chinese narratives on “One Belt, One road” (一帶一路) in geopolitical and imperial contexts. *The Professional Geographer* 69(4): 591–603.
- Singh, Sarinda (2012) *Natural Potency and Political Power: Forests and State Authority in Contemporary Laos*. Honolulu: University of Hawai’i Press.
- Singh, Sarinda (2018) Nam Theun 2 and the Transformation of Institutions and Public Debate in Laos. In Bruce Shoemaker and William Robichaud (eds) *Dead in the Water: Global Lessons from the World Bank’s Model Hydropower Project in Laos*. Madison: Wisconsin University Press, 217–241.
- Smajgl, A., Toan, T., Nhan, D. et al. (2015) Responding to rising sea levels in the Mekong Delta. *Nature Climate Change* 5: 167–174.

- Smits, Mattijs and Carl Middleton (2014) New Arenas of Engagement at the Water Governance-Climate Finance Nexus? An Analysis of the Boom and Bust of Hydropower CDM Projects in Vietnam. *Water Alternatives* 7(3): 561–583.
- Sneddon, Christopher (2015) *Concrete revolution: Large dams, Cold war geopolitics, and the US Bureau of reclamation*. Chicago: University of Chicago Press.
- Sneddon, Christopher and Coleen Fox (2006) Rethinking transboundary waters: A critical hydropolitics of the Mekong Basin *Political Geography* 25(2): 81–202
- Sneddon, Christopher and Coleen Fox (2012) Inland Capture Fisheries and Large River Systems: A Political Economy of Mekong Fisheries.” *Journal of Agrarian Change* 12(2–3): 279–299.
- Soanes, Marek, Jamie Skinner and Lawrence Haas (2016) Sustainable hydropower and carbon finance. London: IIED. <https://pubs.iied.org/pdfs/17580IIED.pdf>
- Sonnenfeld, David A. and Arthur P.J. Mol (2002) Globalization and the transformation of environmental governance, *American Behavioral Scientist* 45(9): 1318–1339.
- Sovacool, Benjamin (2006) Reactors, weapons, X-rays, and solar panels: Using SCOT, technological frame, epistemic culture, and actor network theory to investigate technology. *The Journal of Technology Studies*, 32(1): 4–14.
- Springer, Simon (2009) Violence, Democracy, and the Neoliberal “Order”: The Contestation of Public Space in Posttransitional Cambodia. *Annals of the Association of American Geographers* 99(1):138–162.
- Stern, Nicholas (2006) *The Economics of Climate Change: The Stern Review*, Cambridge: Cambridge University Press.
- Stone, Richard (2016) Dam-building threatens Mekong fisheries. *Science* 354: 1084–5.
- Suhardiman, Diana, Mark Giordano and François Molle (2012) Scalar Disconnect: The Logic of Transboundary Water Governance in the Mekong. *Society & Natural Resources*, 25(6): 572–586.
- Sullivan, Michael (2015) Contested Development and Environment: Chinese-backed Hydropower and Infrastructure Projects in Cambodia. In S. Milne, and S. Mahanty (eds) *Conservation and Development in Cambodia: Exploring the Frontiers of Change in Nature, State and Society*. Oxon and New York: Earthscan, 120–139.
- Sullivan, Sian (2018) Making nature investable: From legibility to leverageability in fabricating ‘nature’ as ‘natural capital’. *Science and Technology Studies* 31(3): 47–76.
- Swyngedouw, Erik (1999) Modernity and Hybridity: Nature, Regeneracionismo, and the Production of the Spanish Waterscape, 1890–1930. *Annals of the Association of American Geographers* 89(3): 443–465.
- Swyngedouw, Erik (2007) Technonatural Revolutions: The Scalar Politics of Franco’s Hydro-Social Dream for Spain, 1939–1975. *Transactions of the Institute of British Geographers* 32(1): 9–28.
- Swyngedouw, Erik (2009) The political economy and political ecology of the hydro-social cycle. *Journal of Contemporary Water Research and Education* 142(1): 56–60.
- Swyngedouw, Erik (2010) Apocalypse Forever? *Theory, Culture & Society* 27(2–3): 213–232.

- Syladeth, Saychai and Shi Guoqing (2016) Resettlement Implementation Management Caused by Hydropower Development: A Case Study of Nam Ngum 2 Hydropower Project in Laos. *Journal of Public Administration and Policy Research* 8(2): 12–24.
- Tan, Danielle (2015) Chinese Engagement in Laos: Past, Present, and Uncertain Future. Singapore: ISEAS Publishing.
- Tan, Danielle (2017) Chinese enclaves in the Golden Triangle Borderlands: An Alternative Account of State Formation in Laos. In Pál Nyíri and Danielle Tan (eds) *Chinese encounters in Southeast Asia: How people, money, and ideas from China are changing a region*. Seattle and London: University of Washington Press, 136–152.
- Taylor, Peter J. (1997) How Do We Know We Have Global Environmental Problems? Undifferentiated Science-Politics and its Potential Reconstruction. In P. Taylor, S. Haflon and P. Edwards *Changing Life: Genomes-Ecologies-Bodies-Commodities*. Minneapolis: University of Minneapolis Press, 149–174.
- Taylor, Marcus (2015) *The political ecology of climate change adaptation: livelihoods, agrarian change and the conflicts of development*. London: Routledge.
- Taylor, Marcus (2018) Climate-smart agriculture: what is it good for? *Journal of Peasant Studies*, 45(1): 89-107.
- Timperley, Jocelyn (2019) Carbon offsets have patchy human rights record. Now UN talks erode safeguards. <https://www.climatechangenews.com/2019/12/09/carbon-offsets-patchy-human-rights-record-now-un-talks-erode-safeguards/> (Accessed 8 January 2020)
- Tran, Dung Duc and J. Weger (2018) Barriers to Implementing Irrigation and Drainage Policies in An Giang Province, Mekong Delta, Vietnam. *Irrigation and Drainage* 67(S1): 81–95.
- Tran, Dung Duc, Gerardo van Halsema, Petra J.G. Hellegers., Long Phi Hoang, T. Quang Tran, Matti Kumm and Fulco Ludwig (2018a) Assessing impacts of dike construction on the flood dynamics of the Mekong Delta. *Hydrology and Earth System Sciences* 22(3):1875–1896, <https://doi.org/10.5194/hess-22-1875-2018>
- Tran, Dung Duc, Gerardo van Halsema, Petra J.G. Hellegers, Fulco Ludwig, Andrew Wyatt (2018b) Questioning triple rice intensification on the Vietnamese Mekong Delta floodplains: An environmental and economic analysis of current land-use trends and alternatives. *Journal of Environmental Management* 217: 429–441.
- Tran, Thong Anh and Le Anh Tuan (2020) Policy transfer into flood management in the Vietnamese Mekong Delta: a North Vam Nao study, *International Journal of Water Resources Development*, 36(1): 106–126.
- Tsing, Anna (2005) *Friction: An Ethnography of Global Connection*. Princeton: Princeton University Press.
- Tsing, Anna (2015) *Musbroom at the end of the world: On the Possibility of Life in Capitalist Ruins*. Princeton: Princeton University Press.
- Un, Kheang and Sokbunthoeun So (2009) Politics of Natural Resource Use in Cambodia, *Asian Affairs: An American Review*, 36(3): 123–138.
- Un, Kheang and Sokbunthoeun So (2011) Land Rights in Cambodia: How Neopatrimonial Politics Restricts Land Policy Reform. *Pacific Affairs* 84(2): 289–308.

- UNEP DTU (2016) CDM Pipeline Spreadsheet. <http://www.cdmpipeline.org> (Accessed 1 March 2016).
- UNEP DTU (2018) CDM Pipeline Spreadsheet. <http://www.cdmpipeline.org> (Accessed 1 June 2018).
- UNEP DTU (2019) CDM projects by type (updated 1.10.2019). <http://www.cdmpipeline.org> (Accessed 15 Oct 2019).
- Urban, Frauke, Giuseppina Siciliano and Johan Nordensvard (2018) China's dam builders: their role in transboundary river management in South-East Asia, *International Journal of Water Resources Development*, 34(5): 747-770.
- Vandergest, Peter and Nancy Lee Peluso (1995) Territorialization and state power in Thailand. *Theory and Society* 24: 385-426.
- Verver, Michiel (2019) "Old" and "New" Chinese Business in Cambodia's Capital. (Trends in Southeast Asia; No. 17). Singapore: ISEAS Publishing.
- Verver, Michiel and Heidi Dahles (2015) The Institutionalisation of Oknha: Cambodian Entrepreneurship at the Interface of Business and Politics. *Journal of Contemporary Asia* 45(1): 48-70.
- Vientiane Times/Asia News Network (2020) Laos to export 20,000 MW of electricity by 2030. Vientiane Times / Asian News Network 15 Jan 2020. <https://annx.asianews.network/content/laos-export-20000-mw-electricity-2030-112058> (Accessed 20 Jan 2020.)
- Wanner, Thomas (2015) The New 'Passive Revolution' of the Green Economy and Growth Discourse: Maintaining the 'Sustainable Development' of Neoliberal Capitalism, *New Political Economy* 20(1): 21-41.
- Warner, Jeroen F., Martijn F. van Staveren, Jan van Tatenhove (2018) Cutting dikes, cutting ties? Reintroducing flood dynamics in coastal polders in Bangladesh and the Netherlands. *International Journal of Disaster Risk Reduction* 32: 106-112.
- Watts, Michael (2000) Political Ecology. In Trevor Barnes and Eric Sheppard (eds) *A Companion To Economic Geography*, Oxford: Blackwell, 257-275.
- Watts, Michael (2015) Now and Then: the origins of political ecology and the rebirth of adaptation as a form of thought. In James McCarthy and Thomas Perrault (eds) *Handbook of Political Ecology*. London: Routledge, 19-50.
- Watts, Michael (2018) Frontiers: Authority, Precarity, and Insurgency at the Edge of the State. *World Development* 101: 477-488.
- Welker, Marina (2014) *Enacting the Corporation: An American Mining Firm in Post-authoritarian Indonesia*. Berkeley: University of California Press.
- Whittington, Jerome (2012) The Institutional Condition of Contested Hydropower: The Theun Hinboun-International Rivers Collaboration. *Forum for Development Studies* 39(2): 231-256.
- Whittington, Jerome (2019) *Anthropogenic Rivers: The Production of Uncertainty in Lao Hydropower*. Ithaca and London: Cornell University Press.
- Williams, Mark, Jan Zalasiewicz, Neil Davies, Ilaria Mazzini, Jean-Philippe Goiran and Stephanie Kane (2014) Humans as the third evolutionary stage of biosphere engineering of rivers, *Anthropocene* 7: 57-63.

- Winemiller, K.O., P. B. McIntyre, L. Castello, E. Fluet-Chouinard, T. Giarrizzo etl ... L. Sáenz (2016) Balancing hydropower and biodiversity in the Amazon, Congo, and Mekong. *Science* 351(6269): 128-129.
- Wittfogel, Karl (1957) *Oriental Despotism: A Comparative Study of Total Power* New Haven: Yale University Press.
- WLE (2018) Dataset on the Dams of the Irrawaddy, Mekong, Red and Salween River Basins. CGIAR Research Program on Water, Land and Ecosystems (WLE)
- Work, Courtney, Vannrith Rong, Danik Song and Arnim Scheidel (2018) Maladaptation and development as usual? Investigating climate change mitigation and adaptation projects in Cambodia, *Climate Policy* 19(sup1): S47-S62.
- World Bank (2019) Powering the Future: the Nam Theun 2 Project in Lao PDR, Results Briefs May 6, 2019. <https://www.worldbank.org/en/results/2019/05/06/powering-the-future> (Accessed 29 Oct 2019)
- World Bank (2004) Modelled Observations on Development Scenarios in the Lower Mekong Basin , Prepared for the World Bank with Mekong River Commission, World Bank, Vientiane, Laos PDR
- World Bank and ADB (Asian Development Bank) (2006) Future Directions for Water Resources Management in the Mekong Basin: Mekong Water Resources Assistance Strategy World Bank/ADB Joint Working Paper, [www.adb.org/water/operations/partnerships/mwras-June2006.pdf](http://www.adb.org/water/operations/partnerships/mwras-June2006.pdf)
- World Commission on Dams (WCD) (2000) Dams and Development: A New Framework for Decision-Making. Report of the World Commission on Dams. London: Earthscan Publications.
- World Economic Forum (2011) Global risks, 2011. Geneva: World Economic Forum.
- Wynne, Brian (2010) Strange Weather, Again. *Theory, Culture & Society* 27(2–3): 289–305.
- Yamada, Teri Shaffer (2019) Cambodia's Changing landscape: Rhetoric and Reality. In Alvin Cheng-Hin Lim and Frank Cibulka (eds) *China and Southeast Asia in the Xi Jinping Era*. London: Lexington Books
- Yates, Julian S., Leila Harris and Nicole Wilson (2017) Multiple ontologies of water: Politics, conflict and implications for governance. *Environment and Planning D: Society and Space* 35(5): 797–815.
- Zarfl, Christiane, Alexander E. Lumsdon, Jürgen Berlekamp, Laura Tydecks, Tockner Klement (2015) A global boom in hydropower dam construction. *Aquatic Sciences* 77: 161–170.
- Ziv, Guy, Eric Baran, So Nam, Ignacio Rodríguez-Iturbe, and Simon A. Levin (2012) Trading-off Fish Biodiversity, Food Security, and Hydropower in the Mekong River Basin. *Proceedings of the National Academy of Sciences* 109(15): 5609–5614.

# DIVISION OF LABOUR REGARDING THE COMPOSITE PUBLICATIONS OF THE DISSERTATION

The publications composing this dissertation have not been used and will not be used in another dissertation. The division of labour is detailed below. It has been discussed and acknowledged by the co-authors.

**Article I** (Käkönen 2008): Mira Käkönen is the sole author of Article I.

**Article II** (Käkönen and Hirsch 2009): Mira Käkönen is the lead author of Article II. The idea for the book chapter and its theoretical and analytical approach was developed by Käkönen. The chapter is mainly based on materials collected by Käkönen with the exception of the subsection “Knowledge production and the entry of participation discourse in the riparian states” which is based on the previous work carried out by Philip Hirsch. The above mentioned subsection on participation in riparian states is mainly authored by Hirsch.

**Article III** (Käkönen and Kaisti 2012): Mira Käkönen is the lead author of Article III. The article is based on joint fieldwork with Hanna Kaisti. The materials collected together were also analysed jointly. The policy documents on World Bank’s energy strategies and Nam Theun 2 were identified, collected and analysed mainly by Mira Käkönen. The line of arguments was principally developed by Käkönen. Hanna Kaisti contributed significantly to the analysis of the findings regarding the small-scale, off-grid electrification projects. The article was written together by both co-authors with Käkönen leading the writing of most sections and Kaisti leading the writing of Section 5 “SHS falling short of expectations”.

**Article IV** (Käkönen et al. 2014): Mira Käkönen is the lead author of Article IV. The article is based on materials mainly collected by Käkönen and she is responsible for developing the theoretical and analytical approach. Kamilla Karhunmaa took part in analysing some of the key policy texts. The article was written together mainly by Käkönen and Louis Lebel. Section 3 (especially subsection 3.1.) includes also text written together with Kamilla Karhunmaa. Lebel contributed to the organisation of the text and provided analytical insights during the writing process. The other co-authors provided comments to the text, Dany Va contributing especially to the empirical section 3.2.2. on climate change adaptation. The writing process was coordinated by Käkönen.



**Article V** (Käkönen and Thuon 2019): Mira Käkönen is the principal author of Article V. She is responsible for the conceptual approach, analysis and interpretation of findings. Try Thuon's input was important in the joint fieldwork. He is also responsible for the initial examination of the dams' EIA reports (in Khmer). The article was written by Mira Käkönen with ideas and comments provided by Try Thuon.

# ORIGINAL PUBLICATIONS