

1 The boomerang effect

Overview and implications for climate governance

*Larry A. Swatuk, Lars Wirkus, Florian Krampe,
Bejoy K. Thomas and Luis Paulo Batista da Silva*

Introduction

The world is ramping up its actions towards combating human-induced climate change. Through the COP processes, national governments have committed to a wide variety of mitigation and adaptation actions through their NDCs (Nationally Determined Contributions) to emissions reduction. While actions are to be primarily taken at national level, it is made clear that ‘parties may use internationally transferred mitigation outcomes to achieve NDCs’ (Article 6 of the Paris Agreement). This opens a path for such things as carbon-market development, biofuels production and other forms of green energy and green economy development. How these will all be measured and evaluated is rather opaque. It is clear, however, that developing countries, particularly those most vulnerable to climate change, are least able to design, implement, monitor and evaluate climate action interventions. Billions of dollars are to be made available for these actions through mechanisms such as the Green Climate Fund (GCF); and billions more are likely to be generated through largely artificially devised carbon markets.

While the narrative of ‘global threat leading to collective action’ seems straight forward, the actual landscape of global climate governance is fragmented and fraught with contradictions, conflicts and conundrums (Widerberg and Pattberg, 2016). Moreover, the ‘crisis’ aspect of the narrative encourages states to scramble around for examples of ‘good practice’, relabelling and marketing existing development interventions in the name of climate change adaptation and mitigation. Forests have suddenly become not a living entity both intrinsically valuable and instrumentally valuable to animals and humans alike, but a category for meeting emissions targets. Agriculture has become both threat and opportunity in relation to both adaptation and mitigation: particular agricultural practices are regarded as greenhouse-gas-emission-heavy; others are seen to be climate friendly. While the transformation from the former to the latter is seen as a potential multi-purpose win, rare is the question ever asked ‘What does this mean for social stability?’ Whereas many countries have built into their national climate strategies the need for a ‘pro-poor approach’, the reality is that ‘agriculture’ – like ‘forests’ – stands to become a category, not a

socio-cultural process embedded within a particular geographical landscape, yielding value beyond just food and/or profit.

While national actions plans and programmes are intended to yield multiple benefits to humans and nature – i.e. ‘climate security’ (Boas and Rothe, 2016; Gemmene *et al.*, 2014; Dabelko *et al.*, 2013; Barnett, 2007; Barnett and Adger, 2007) – failure to adapt to or mitigate the hypothesized effects of climate change is forecast to result in dramatic social and environmental instability, including mass migration and resource-related violent conflict (German Advisory Council on Climate Change, 2007). While effects will be felt unevenly both within and among states and regions, the overall outcome is anticipated to be negative (Dalby, 2013; Bernauer *et al.*, 2010; Wisner *et al.*, 2003; Bohle *et al.*, 1994). However, in the rush to action there is also the danger of generating unanticipated and unintended negative impacts. These negative impacts have drawn different labels such as ‘maladaptation’ and ‘back-draft’, and different scholarly and policy-oriented communities have begun to theorize ways to avoid them (Dabelko *et al.*, 2013). For this to happen, an integrated, transdisciplinary approach is necessary. A recent policy paper commissioned for the G7 argues that climate change adaptation/mitigation actions require a ‘conflict-sensitive approach’ that integrates both climate and socio-economic-political vulnerabilities (Ruttinger *et al.*, 2015). This recommendation stems from the view that climate change will overburden weak states, may also destabilize strong states (cf. Moran, 2011), and have negative regional impacts (Conca, 2001).

In this chapter we introduce ‘the boomerang effect’, defined here as the emergence of largely unanticipated and unintended negative consequences of climate change adaptation and mitigation policies and programmes on domestic non-state actors that result in negative feedbacks on the state. By ‘state’, we mean government actors taking decisions as representatives of the state. The chapter has three objectives. First, to contribute directly to theory by articulating a framework for analyzing one particular aspect of maladaptation, that is, ‘the boomerang effect’. Second, to present an overview of the chapters in this collection reflecting on the real and potential unanticipated and unintended negative effects at the local level (local-level side effects – LLSEs) and at the state level (state-level boomerang effects – SLBEs). Third, to draw lessons from the cases for research, policy and practice. Each case study engaged (more or less directly) with four primary research questions:

- What are the (social/economic/ecological/political) drivers behind a particular development or climate intervention?
- What was the decision-making process that led to this specific climate action or development intervention?
- What are the LLSEs (social/economic/ecological/political) of the action and are any of these unintended and/or unanticipated and negative in consequence?
- What are the boomerang effects felt by the state?

Each chapter also addressed a policy-oriented question: Recognizing that there will always be uneven outcomes and maladaptive practices, what are better processes to minimize negative impacts? In this chapter, we aggregate the findings and distil the lessons to be learned. In this way, we hope to assist policymakers in avoiding both LLSEs and SLBEs as climate action-oriented development interventions are rolled out.

Climate action and ‘boomerang effects’: towards a framework of analysis

The impacts of climate security actions involving land-use change are being studied intensively (see, e.g. CCMCC research programme www.nwo.nl; Maignan *et al.*, 2016) and are being integrated into a variety of literatures that, for our purposes here, may be considered together under the term ‘climate security’ (Swain, 2015; Scheffran *et al.*, 2012; Smit and Wandel, 2006; O’Brien and Leichenko, 2000; Graeger, 1996). Within this broad church, there is also broad disagreement, as methods, episto-methodologies, ontologies, analytical frameworks and ideological perspectives vary widely (Bavinck, Mostert and Pellgrini, 2014; Gleditsch, 2012; Schnurr and Swatuk, 2012; Detraz and Betsill, 2009; Matthew *et al.*, 2009; Grothmann and Patt, 2005). The result is a highly fragmented field of study (Bräutigam and Zhang, 2013; Anseeuw *et al.*, 2012). Our research project, of which this edited collection is a part, aims to contribute directly to theory by developing a framework for analysing the boomerang effect.

To elaborate somewhat: Deriving from state actor climate change adaptation or mitigation policies and programmes, the implementation of these climate interventions (through state or state-authorized private actors) often has unanticipated and unintended negative social, political, economic and ecological effects that impact on local communities on various spatial and temporal scales. These impacts in turn negatively feed back to the state on multiple levels (e.g. local, regional, national), at various scales (e.g. watershed, forest, landscape, ecosystem), with numerous impacts (e.g. political economic instability, social unrest and violence), thus undermining climate security.

This definition builds on similar framings such as the Wilson Center’s idea of ‘backdraft’ (Dabelko *et al.*, 2013), and the extensive work on ‘maladaptation’ (Barnett and O’Neill, 2013; Barnett and O’Neill, 2010; McCarthy *et al.*, 2001; Scheraga and Grambsch, 1998), defined by the IPCC in its AR5-WGII report as ‘actions that may lead to increased risk of adverse climate related outcomes, increased vulnerability to climate change, or diminished welfare, now or in the future’ (quoted in Field *et al.*, 2014).

In this chapter, we specifically articulate local-level and state-level impacts and discern their interrelationship, particularly the negative – or ‘boomerang’ – effects felt by the state (see Figure 1.1) thereby refining the ability to differentiate among ‘maladaptive’ impacts. We differentiate these complementary effects in terms of (i) local-level side effects and (ii) state-level boomerang effects. In Figure 1.1 it can be seen that climate action-oriented policies initiated by

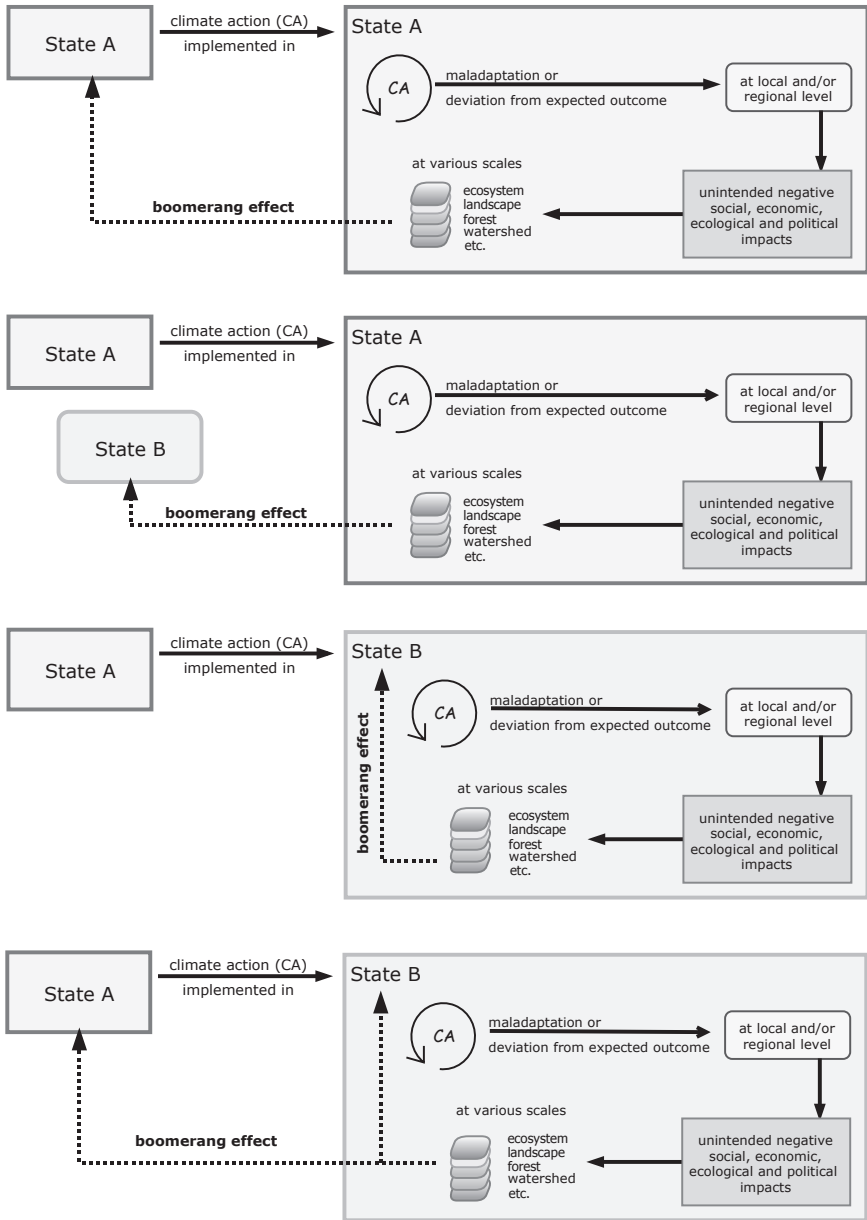


Figure 1.1 The boomerang effect.

one state actor can result in boomerang effects along (at least) four different pathways. All four cases see climate actions initiate local-level side effects in the target country, but it is also possible for regional local-level side effects to occur (as shown in Chapter 4 in this collection), possibly leading to boomerang effects in either the state that initiated the action or/and in the target state (as is happening with land and water grabbing across the African landscape).

In our collection, local-level side effects are delineated along blue-water (hydraulic infrastructure such as dams and canals) and green-water (forest conservation, biofuels development) pathways – and may be discerned through empirically demonstrable social, economic, political and ecological impacts. These indicators measure the local-level impacts that derive as side effects of implemented climate change adaptation and mitigation programmes and policies. State-level boomerang effects may be discerned through empirically demonstrable impacts manifesting as threats to economic stability, state authority and/or ecological sustainability. This typology differs from that developed by Magnan (2014) (in his framework for avoiding environmental, sociological and economic maladaptation) in its specific focus on local-level impacts and state-level impacts resulting from explicitly defined and traceable climate security actions. Boomerang effect indicators measure governance-level impacts that are the feedback loop that derive from the local-level side effects and impacts. These indicators assess three critical threats to the state that emerge on multiple levels (e.g. local, regional, national) and at various scales (e.g. watershed, forest, landscape, ecosystem) (see Table 1.1 below). By disaggregating real and potential effects in this way, we aim to assist government actors to devise more socially equitable, environmentally sustainable and economically efficient policies and programmes.

Green water and blue water

Many claims regarding the positive or negative outcomes of climate change actions rest on a series of over-generalizations regarding land (e.g. that it is degraded, over-utilized or under-utilized), water (e.g. wasted, limited, poorly utilized) and people (e.g. ‘too many’; lacking skills or motivation/incentives). In our view, better information must be made available to inform decisions at various stages and of various stakeholders. Important is the distinction between green and blue water. Green water is water that is utilized by plants from the soil directly following rainfall. Productive green water is defined as that which transpires through a plant, creating biomass. Unproductive green water is defined as rainfall that evaporates directly back to the atmosphere. Blue water is that which is available as run-off after rainfall. It takes the form of surface water (rivers, lakes, streams, impounded behind dam walls) and readily accessible sub-surface water, i.e. groundwater (through borehole/well technology) (Falkenmark and Rockstrom, 2004). Swatuk *et al.* (2015) further refine unproductive green water into a ‘socio-ecological unproductive pathway’, meaning water that is productively used by plants that either (i) are destructive of the local ecosystem

Table 1.1 Local-level side effects and boomerang effects from case studies

Cases	Local-level side effects				State-level boomerang effects			
	Country	Action	Social	Economic	Political	Ecological	Economic stability	State authority
Chapter 2: TGD	Dam	1.5 million displaced	Mixed (positive and negative)	Social protest	Dramatic change to aquatic and terrestrial environment	High costs associated with relocation, environmental rehabilitation, etc	None discernible	Government argues multiple benefits from flood management
Chapter 3: Guarani	Aquifer Management Agreement (not activated)	Numerous discrete urban and rural water-supply problems	Business as usual with uneven benefits	Site-specific protests	Worries about aquifer health from poor waste management (cities, farming, mining)	Costs 'normalized'	None discernible	Soil degradation, deforestation, urban sprawl all treated as routine within government departments
Chapter 4: Farakka	Water diversion project (symbol of technological mastery of man over nature)	Small-scale farmers displaced in Bangladesh	GDP impacts from agricultural challenges	Social protest	Dramatic change to dry season ecology	Numerous costs for Bangladesh	None discernible but persistent poor inter-state relations	Dramatic challenges to all in GMB basin
Chapter 5: Belo Monte	Dam	Displacement	Mixed	Social protest	Dramatic changes to aquatic and terrestrial environment	Internationalization of issue has numerous knock-on effects in Brazil	Corruption scandals lead to government change	State announces no further dams in the region

Chapter 6: UN-REDD	Forest conservation and rehabilitation	Mixed	Mixed	Mixed	None discernible	Government argues multiple benefits from REDD activities
Chapter 7: Ilisu	Dam	Displacement	None discernible	Social protest	Dramatic change to aquatic and terrestrial environment	Downstream basin states claim significant change to ecology
Chapter 8: Jordan	Desalination and other technological innovations	Persistent social instability in relation to Palestine	Mixed	Social protest	Living 'beyond the water barrier'	Local and basin-wide evidence of resource degradation
Chapter 9: Ghana	Drought-resistant agriculture	Intra-household and intra-community conflict	Mixed	Small-scale disputes	Cash-crop focus risks long-term chance to ecological sustainability	Scaling-up of approach may negatively affect regional ecosystem
Chapter 10: Gigel/Gilbe III	Dam	Health of local people affected through malaria; downstream people affected by loss of access	Increase in ill-health impacts livelihoods; loss of access to water impacts livelihoods	Small-scale disputes	Dramatic ecosystem change	Research suggests downstream ecosystems being seriously altered

(e.g. alien or invasive species); and/or (ii) ultimately benefit only a few users (e.g. privately owned sugar cane plantations exploiting land and labour for profits accruing to the few).

This more nuanced understanding of green/blue water will provide an important means for assessing the likelihood of success for intended mitigation/adaptation actions in relation to short, medium and long-term socio/political-ecological system resilience. For example, biofuels expansion into lands deficient in green water may result in compound (environmental/social/ political) negative effects while yielding limited (environmental/economic) benefits.

There is an important class-related distinction to green/blue water. Across the Global South, the best land – i.e. with robust soil-water holding capability and, if necessary, ready access to supplemental blue-water irrigation – has been captured by large-scale commercial agriculture, relegating smallholder peasants to land that is more difficult to farm. These are overwhelmingly green-water-dependent landscapes, meaning that farmers depend on rainfall for crop production. It is these marginal lands that now are being targeted for expansion within the framework of climate change adaptation/mitigation activities. The potential for social upheaval leading to spontaneous and/or organized violence, therefore, is very real.

Green-water pathway

It is generally argued that climate change is impacting hydrological cycles leading to increasing difficulties for regions and countries to meet their food security needs. In consequence, states and private sector actors have entered into a wide variety of land-use agreements designed to ensure win-win outcomes: food, water, livelihood and state security through better crop choice and/or food production in areas best suited for production. This is an adaptation pathway.

At the same time, countries have agreed to limits on carbon emissions. One means for many coal-dependent countries to meet these limits is to encourage increased production of crops for biofuels. Another is to conserve forest lands – either their own or in another state through the purchase of carbon credits – for carbon sequestration. Many states, private sector actors, and non-governmental organizations are actively engaged in these practices through REDD and REDD+ (Gallemore and Jespersen, 2016; Lund *et al.*, 2016; Abbott, 2012). These are mitigation pathways. In this collection, Chapters 6 (Vietnam) and 9 (Ghana) specifically deal with green-water pathways.

Blue-water pathway

It is generally agreed that climate change will lead to more extreme events. It also will lead to more water in some places and less water in others; and to widely fluctuating hydrological cycles that will be increasingly unpredictable. To ensure water security for human activities, therefore, this unpredictability must be dealt with through infrastructure development – what Conca (2006)

calls, 'damming, diverting and draining'. This is primarily an adaptation pathway, though multi-purpose hydraulic infrastructure often claims mitigation elements as well, where, for example, hydropower displaces thermal-power as a primary means of electricity generation. In this collection, Chapters 2 (China), 4 (India–Bangladesh), 5 (Brazil), 7 (Turkey) and 10 (Ethiopia) showcase the negative local-level side effects and (real and potential) boomerang effects from big infrastructure projects.

Mixed approaches

Largely depending on scale, blue-water and green-water interventions often bleed into each other. For example, forests make use of both green and blue water. As peasant farmers alter the landscape for agricultural purposes, they remain largely dependent upon rainfall for crop production. This is green water. But, as UN-REDD programmes encourage forest rehabilitation, planted trees will ultimately and predominantly tap groundwater, which is blue water. The distinction is important, as impacts at the scale of the intervention and at the scale of the watershed will be different. Similarly, primarily blue-water interventions such as multi-purpose dams make it possible for significant extension of agriculture (via irrigation) into formerly green-water-dominant areas. Put differently, the application of technology and capital make it possible for powerful actors to displace subsistence farmers in the interests of cash-crop production (i.e. 'land grabbing' and 'water grabbing').

In our collection, in contrast to the other cases, there are two that present quite unique challenges for policymakers regarding climate change and environmentally sustainable, socially equitable and economically efficient resource use: large-scale transboundary aquifers and transboundary river basins shared by highly antagonistic states. In the case of the former, the Guarani Aquifer, shared among Brazil, Paraguay, Argentina and Uruguay is treated in Chapter 3. In the case of the latter, the Jordan River Basin, shared among Syria, Jordan, Lebanon, Israel and Palestine is the focus of Chapter 8. In both cases, these large basins show the importance of collective management in the face of changing climates and socio-economic demographics. However, state actors are resistant to anything other than state-based approaches serving 'national interests'. Irrespective of blue-water (dams, canals, pipelines, large-scale irrigation) or green-water (expansion of rainfed agriculture) activities in these basins, states continue to rely on either technological innovation and trade (Chapter 8) or a case-by-case approach (Chapter 3) to problem solving. While the local-level side effects are numerous and varied, the boomerang effects appear either manageable or latent, so giving to policymakers an illusion of security.

Case studies

While it is generally agreed that climate actions of different types will result in unintended negative consequences, impacting people at different scales in

different ways around the world (see www.newsecuritybeat.org/category/blog-columns/backdraft-podcast/ for numerous examples and insights), our project aims to disaggregate these effects so as to better inform both our understanding of their dynamics and to assist state, civil society and private-sector actors to target their interventions so as to minimize the social, economic, environmental and political costs. We distinguish between LLSEs and SLBEs in order to turn a spotlight on the 'boomerang effect' in the belief that improved policy-making is more likely when state actors are made aware through empirical evidence of the direct and potentially serious negative impacts that derive from their resource use decisions (see Table 1.1 for a disaggregation of these effects). The papers in this collection, except for Chapter 9, derive from desk studies overseen by Swatuk. The goal was to assemble information enabling the authors of this introductory chapter to better understand the impacts of climate action with a view towards developing a sustained research project. In this way, we hope to contribute to the emerging literature discussed above. As we developed the case studies it became clear that disaggregating the local-level effects from those at the state level was important. On the one hand, it helped explain why obvious policy missteps were tolerable in some instances but not in others. On the other hand, it helped us discern insights and approaches to better policy-making. We return to this last point near the end of the chapter.

Chapter 2 focuses on China's Three Gorges Dam. This massive exercise in hydraulic infrastructure raises important questions regarding how those at the receiving end of state-directed development – climate action-oriented or otherwise – share in the project's design, direction, implementation and benefits. The global track record on dams and development does not offer much hope in this regard. After a short lull in construction before and after the convening of the World Commission on Dams (see WCD, 2000), big dam-building exercises are underway in earnest across the Global South, much of it facilitated by China. The climate adaptation and mitigation narrative undergirds many of these exercises, all of which are being championed as necessary to ensure water and energy security in a climate change-affected world. As shown in Table 1.1, the local-level side effects are numerous and dramatic, especially in relation to displaced people and flooded landscapes. However, the state-level boomerang effects are few, containable and/or tolerable, suggesting that the Chinese government is confident with its approach to development in the face of current and anticipated climate challenges.

Over the last 10–15 years, increased focus has been given to the world's groundwater resources. Due to changing demographics, less reliable rainfall forecasting and changing market demands, human settlements and farm enterprises of all sizes are increasingly turning to groundwater. In consequence, great stress is being placed on this resource, with the Ogallala Aquifer being an important case in point. The Guarani Aquifer is the subject of Chapter 3. In the mid-2000s the four states that share the aquifer – Brazil, Argentina, Paraguay, Uruguay – endeavoured to arrive at a transboundary groundwater basin management arrangement. This was fostered by a great deal of international support.

As with many other international agreements, however, the 2010 Guarani Aquifer Agreement has foundered on the rocks of national ratification. It is only a small exaggeration to say that it is ‘business as usual’ across the basin. While not directly related to commitments made at COP21, the case does raise questions about the ways and means of fostering necessary cooperation when parties perceive the impacts to be tolerable and manageable, discreetly felt and only tangentially linked to state-level negative effects.

Chapter 4 focuses on the Farakka Barrage, a water-diversion project initiated by India several decades ago but which serves as a symbol of the folly of state-led actions taken in the ‘national interest’ to ‘bend Mother Nature’ to the will of ‘Man’. We use the noun ‘man’ deliberately here, as it is primarily male engineers and politicians who continue with an unflagging faith in the combined application of technology and capital to ‘solve’ problems related to resource access, use and management. Tony Allan (2003) describes this as ‘the hydraulic mission’, most typical in the West during the early-to-mid part of the twentieth century, but, as illustrated in this collection, very typical of large parts of the Global South today. The Farakka Barrage is a ‘river-training’ project, and forms one part of India’s long-standing grand scheme of linking ‘its’ rivers in a manageable grid so that areas of shortage may find the necessary supply to satisfy their varied demands. If four decades of global water-governance has taught us anything, it is the value of a basin-wide approach, involving all relevant stakeholders, and mobilizing all relevant forms of knowledge. Many of the problems the states of the Ganges–Megna–Brahmaputra (GMB) basin face derive from their fragmented, nationalist approaches to resource planning. Successful adaptation and mitigation activities require collective engagement and agreement, yet this case suggests that India has no intention of moving in this direction. The LLSEs and SLBEs resulting from such an approach are many and costly: mass migration; diminished agricultural production stemming from significant changes to the ecology; reinforcement of poor political relations between India and Bangladesh. This is hardly a firm foundation upon which to take collective climate action in the GMB basin.

While Bangladesh has had marginal success in internationalizing India’s ‘river-training’ intentions and interventions, groups most negatively affected by Brazil’s Belo Monte Dam project have had much more success, but also with significant LLSEs. As shown in Chapter 5, local actors have partnered with global civil society groups to press the Brazilian government to address their numerous serious concerns. International civil society pressure has had demonstrable SLBEs. For example, exposing the numerous LLSEs to world scrutiny and helping to blow the whistle on government corruption in the construction industry not only helped bring down the Rousseff government, but led the Temer government in January 2018 to declare that no further mega-dams would be built in the Amazon region (see <https://news.mongabay.com/2018/01/brazil-announces-end-to-amazon-mega-dam-building-policy/>). Granted, the dam is operational, but government was forced to alter its design so as to become more socially and environmentally responsible. Indeed, the government of Brazil

continues to tout the Belo Monte as a symbol of its commitment to clean and renewable energy.

In Chapter 6, the authors examine the case of UN-REDD in Lam Dong province, Vietnam. Vietnam is extensively involved in REDD and REDD+ programmes, mainly due to the immense pressures rural populations (through sheer numbers) and big agriculture (through land conversion) are putting on forest resources. The case study is most interesting in that it highlights the mixed outcomes at local and national level. In important ways, the introduction of internationally supported programmes and projects such as REDD serve to either reinforce or alter existing social relations at the local level. The economic opportunities created by REDD create new scrambles for resources that exacerbate existing social tensions. While SLBEs are not pronounced (REDD goals contrast with government development policy, so creating some tension), LLSEs are mixed as winners and losers are created under the new REDD regime.

The Ilisu Dam development project, the subject of Chapter 7, reflects the other dam cases in this collection. As with the Belo Monte and TGD cases, the Ilisu will result in the displacement of tens of thousands of local people by submerging towns and villages under the reservoir. Similar to the Belo Monte, the winners and losers from the scheme are not only divided in terms of geography (local and rural losers; urban winners located far from the site of the development project) but in terms of ethnicity. Tribal groups in Brazil are mirrored in Turkey by the Kurds. Each group is able to mobilize global networks of support, so creating SLBEs in both cases: start-up delays resulting in economic loss, loss of political capital regionally and globally. So effective have been local groups in mobilizing against the government that the project has been delayed several times due to creditors pulling out of the project. Like China, however, the Turkish government is determined to fund the project with or without international financial support.

As with the Guarani Aquifer, so with the Jordan River Basin (JRB), the subject of Chapter 8: states in the basin are not interested in pursuing collective approaches to resource management. Whereas Brazil is the upstream basin hegemon in the Guarani, Israel is the downstream basin hegemon in the Jordan. Neither sees a need to collaborate with others at this time. Unlike the Guarani with its unratified GAA, JRB states have not attempted basin-focused collaboration. Granted the political situations are completely different, with the JRB being securitized and all questions of resource access, use and management being filtered through a high political lens. What does this mean for water and related resource security in the JRB in the era of climate change? As shown in the chapter, all states continue with the fiction that nationalist approaches will lead to resource security, with Israel in particular holding firm to the high-modern belief that technological innovation holds the key. In this way, Israel resembles India where money and technology make 'go-it-alone' policies, programmes and practices seem practical and sufficient.

Chapter 9 focuses on northern Ghana and presents a different sort of picture in relation to LLSEs. Here the real and potential negative effects manifest

within households (between men and women) and within and between communities (also in a highly gendered context). Government programmes in Ghana are being designed to facilitate climate-resistant agriculture. These are being rolled out with the assistance of state, civil society and private sector actors within Ghana, across sub-Saharan Africa and the wider world. As shown in this chapter, however, projects that focus on staple crop production favour men and discriminate against women. At the same time, the gendered nature of agricultural production reflects not only social relations, but the way livelihood practices are embedded within ecosystems. Shifting towards scaling up certain forms of production may in the long run have the opposite of the intended effect: jeopardizing, instead of supporting, long-term ecological sustainability. There are no discernible SLBEs, so providing little feedback to the state regarding the appropriateness of the programme.

Similar to the Ghana case study, Chapter 10 focuses on the gendered health- and livelihood-related LLSEs resulting from dam building in Ethiopia. The SLBEs resulting from the Gilgel Gibe III Dam on the Omo River are well known in relation to poor inter-state relations between Ethiopia (touting energy for development) and Kenya (concerned about the degradation of Lake Turkana downstream). Some of the LLSEs are also obvious: as with other dams, the displacement of people from their homes and lands as well as dramatic ecosystem change that stresses livelihoods. Less well-known are the health impacts related to the creation of large bodies of standing water. Canals and dams in particular environments act as disease vectors, in this case malaria. The gendered aspect of the threat relates to women's role as managers of household water and the fact that they are most often left behind when men migrate to find work in cities. These LLSEs go largely unnoticed except by health and community workers who are left with 'triage-oriented' approaches to personal, household and community security, e.g. highly localized and generally poorly funded WASH (water, sanitation and health) or anti-malarial (bed net) programmes. As with the rural and remote peoples in the other dam cases, the ill-health of communities located around the Gilgel Gibe III Dam appears to be an expense the state is willing to bear.

Lessons for research, policy, planning and practice

As shown by the case studies in this collection, development interventions – whether climate action-specific or not – create winners and losers. As the global governance architecture shapes itself around large-scale climate actions for planetary-wide impacts, the papers here serve as cautionary tales of the danger of failing to carefully consider the LLSEs and SLBEs that result from the rush to 'solutions'. The dam cases – Chapters 2 (TGD), 5 (Belo Monte), 7 (Ilisu), 10 (Gilgel Gibe III) – are particularly instructive in this regard, as the LLSEs and SLBEs are numerous and very serious. If one includes the Farakka Barrage (Chapter 4) case as well, there is strong empirical evidence showing that where money, power and interests coalesce, projects are pushed forward despite the evident LLSEs. In addition, the tolerability to state actors of the

(social/economic/ecological) costs to be borne by local communities varies directly with the distance between the site of the intervention and the primary beneficiaries (national, regional, global). This bodes ill for those resident at sites of intervention (e.g. carbon sequestration; renewable energy through wind, solar or hydro) meant to benefit 'the planet' (<2°C). At the same time, our case studies reveal that where there are SLBEs, the tolerability of these effects varies directly with the degree of difficulty in handling them. The Communist Party of China (CPC) seems unassailable in this regard. In contrast, the democratic character – however weakly embedded the democracy – of Brazil seems to provide space for social movements and civil society organizations to press for concessions that will in fact be attended to. This observation will come as cold comfort to those who have suffered at the hands of the dam builders and their supporters. It is also clear that where the intervention has been framed as necessary for state security (Chapters 4, 7 and 8) there is almost no room for reconsideration of the scope and form of the proposed project.

The evidence presented here is not all 'doom and gloom'. There is evidence that better outcomes may result when local, national and global interests are in alignment. Yet even here, the so-called 'local' rarely if ever presents as a unified entity, and activities undertaken – despite the best of intentions – will create winners and losers and sometimes reinforce existing animosities (Chapter 6). Based on the evidence drawn from the cases, recommendations for better climate action and development practice may be divided into four categories: (i) participation, planning, policy and institutions; (ii) perspective; (iii) alternatives; (iv) framings.

Participation, planning, policy and institutions

Many of the chapters argue for institutional and policy reform. Both Chapters 4 (Farakka) and 8 (Jordan) argue in support of a basin-wide management structure. Chapter 3 (Guarani) argues for ratification and operationalization of the GAA. Most chapters argue for meaningful participation in the planning process. Chapter 2 (TGD) authors suggest that policy-making will improve through more democratic and transparent processes. The authors also argue that the media and civil society could play important watch-dog roles. In Chapter 6 (Vietnam), the authors also argue in support of more transparent planning and policy-making processes, involving local communities, indigenous people and minority groups in meaningful ways.

Perspective

Several chapters critique existing approaches to planning and policy, suggesting that decision makers are hampered by their commitment to outmoded, 'high-modern' perspectives. What is needed is a commitment to integrated planning, so: integrated water resources management (IWRM) (Chapter 4); economic/ecological/social integration (Chapter 2); a holistic perspective (Chapter 5);

a regional approach (Chapters 3, 4, 8 and 10) and a commitment to complementary activities (Chapter 9) steeped in different ways of knowing and knowledge gathering (Chapters 2, 6, 7, 9 and 10).

Alternatives

Such an approach to planning and policy-making would reveal, in the opinion of many of the authors, alternatives to ‘inflexible infrastructure’ with exorbitant sunk costs at a time when flexibility and adaptability are central to ‘climate-proofing’ the national and regional environment. For example, in Chapters 2, 5, 7 and 10, the authors argue for localized solutions that should be multiple and at small scale.

Framings

It is clear from the cases presented here that how a project is presented – to ‘beneficiaries’, to funders – matters a great deal. In some cases, dominant discourses obstruct actors’ abilities to move beyond the status quo. The Jordan River Basin case (Chapter 8) shows this most clearly, but it is evident throughout the ‘big infrastructure’ chapters. Often times the dominant framing forces those who are unsatisfied with the status quo to take the opposing position: i.e. dam/no dam; canal/no canal. Thus the parties remain locked in a contest presented as zero-sum. The challenge is to rearticulate the opportunities available to dominant decision makers. This is an important lesson for all who are interested in climate change mitigation and adaptation policy and practice. Just because it is ‘good for the planet’, does not mean that it is fair and equitable and hence the right thing to do.

At the outset we articulated five questions regarding project planning and implementation. They are summarized in Table 1.2 below. In short, it can be seen that the drivers behind the projects described above are arrayed around the ‘usual suspects’ – development, profit, sustainability, social benefit – but only tangentially speak to power projection by the state, or in the case of Brazil, India and Israel, the demonstration of hegemony in a particular basin.

Analysis of the decision-making processes reveals an absence of meaningful participation by those most seriously affected by the project. Thus, there are numerous LLSEs that are probably unintended but possibly anticipated and deemed tolerable by the state. While there were many traceable SLBEs, they all appeared to be not serious enough to derail a state from its intended course of action. At best, some alteration to a project – e.g. the Belo Monte Dam – was evident.

As we have also shown here, there are better ways of making plans, policy and carrying out projects. Whether these will be mainstreamed into climate action-oriented projects is not clear to us.

Table 1.2 Matrix of impacts and opportunities

<i>Research question</i>	<i>Observation</i>
Drivers behind a particular development or climate intervention?	<ul style="list-style-type: none"> – development – profit – sustainability – projection of power by the state – social benefit
Decision-making process that led to this specific climate action or development intervention?	<ul style="list-style-type: none"> – top down – in some cases process was more open and inclusive – mostly lacking in transparency and accountability
LLSEs (social/economic/ecological/political) of the action and are any of these unintended and/or unanticipated and negative in consequence?	<ul style="list-style-type: none"> – many social, economic, ecological and political impacts across the different cases – majority unintended but probably easily foreseen and deemed tolerable by government
Boomerang effects felt by the state?	<ul style="list-style-type: none"> – yes, many economic, social, political and ecological at different scales and intensities – all regarded as ultimately tolerable by state
Better processes to minimize negative impacts?	<ul style="list-style-type: none"> – more participatory and open planning processes – institutional and policy reform – alternatives to the preferred option considered and weighed by all affected by the project/programme – appropriately framed to affect positions, interests and needs of all stakeholders

Conclusion

For those at the frontline of environmental change, improving livelihoods and alleviating poverty are the appropriate frameworks for dealing with complex vulnerabilities, including environmental insecurity (Deligiannis, 2012). From the evidence amassed here, it is doubtful that development and/or climate action-oriented policies and plans put people before profit, or align what's good for the planet so that it is good for the people, particularly those most seriously affected by the planned intervention. We are saying that as global development and climate governance continues with top-heavy approaches to managing both 'sustainable development' and 'two degrees', it is especially important to organize appropriate adaptation and mitigation responses from the grassroots and to then reach up and out to all relevant stakeholders. No other approach will yield sustainable co-benefits.