Reflections

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Editorial

Reflections: Contested Epistemologies on Large Dams and Mega-Hydraulic Development

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The contributions to the Special Issue on *Contested Knowledges: Water Conflicts on Large Dams and Mega-Hydraulic Development* have looked at the politics of contested knowledge as manifested in the conceptualization, design, development, implementation and governance of large dams and mega-hydraulic infrastructure projects in various parts of the world. The contributing authors have amply demonstrated that the mega-hydraulic developments all over the world involve profound socio-technical, ecological and territorial transformations. The contributions have also abundantly shown how multiple knowledge claims are constructed using different grounds for claiming the truth about water design, development and implementation, and how both dominant and 'local', 'vernacular', or 'indigenous' knowledge frameworks underlying (or disputing) hydraulic projects and water control regimes, are not neutral nor 'independent', but culturally and politically laden and historically produced—and often, co-created. In this concluding chapter we aim to give an overview and also briefly discuss and summarize the main findings of the contributions addressing the core question: Which knowledge regimes and claims on mega-hydraulic projects are encountered, and how are they shaped, validated, negotiated and contested in concrete contexts? For that, the authors have focused also on the issue of whose knowledge counts and whose knowledge is downplayed in water development conflict situations, and how different epistemic communities and cultural-political identities (including class, ethnic, gender or professional forms of identification) have shaped the practices of design, planning and construction of dams and mega-hydraulic projects. They also scrutinized how these epistemic communities interactively shape norms, rules, beliefs and values about water problems and solutions, including notions of justice, citizenship and progress that subsequently are to become embedded in material artefacts.

The introductory article has laid out the theoretical and conceptual groundwork for examining the following issues, for instance: The notions of the dark legend of ungovernance; hydromodernity and modernizing paradigms; the depersonalization by objectifying and universalist water governance models and how they construct 'otherness' and manufacture ignorance; the issue of governmentality, power, epistemological contestations and subjugated water knowledges; the questions of constructing 'risk', commensurating values and (mis)calculating societal values; the contested reconfiguration of hydrosocial territories; the problem of reifying local and indigenous water ontologies and epistemologies; the multiple 'modes of power and response'; and multi-scalar mobilizations and the co-production of alternative knowledges. For conceptual elaborations we refer to this editorial paper [1].

Below we further discuss the findings of the contributions to this special volume in more detail. A number of articles pointed out the adverse hydrological and ecological impact of dam building and how these threaten the livelihood of especially marginal communities in and even beyond the river basin and watershed. Large dams profoundly transform local and regional hydrosocial territories, impounding water from the surrounding watersheds, their rivers, springs and aquifers, and often expropriating water resources that were previously, and are currently, used by subsistence communities, indigenous peoples, local fishermen and peasant families to satisfy their food security and livelihood needs. Frequently, such customary uses are brushed under the carpet to allow corporate profits. In this respect mega-hydraulic projects and large-scale river diversion schemes are frequently seen as representing the interests of powerful stakeholders from outside the project area, such as mega-cities and industries. To this respect, several authors have discussed how this increased understanding of the adverse consequences has not only had minimal impact on the state officials' decision-making and hydropower developers' design and construction practices, but also how these actors have increasingly turned to engineering expertise and technological assessments to further justify dam construction. Coleen Fox and Christopher Sneddon [2] indeed ask the question: Why does engineering/technological knowledge retain so much legitimacy and authority in the face of mounting knowledge about ecological change? In addition, how is engineering and technical knowledge elevated by powerful political and economic interests to serve a particular development agenda, despite the challenges that ecologists, scholars, and locally affected communities pose to these forms of epistemological knowledge?

These pertinent questions are further explored in the volume. Karen Bakker and Richard Hendriks [3] analyze the contested knowledge regimes in the regulatory review process of the Site C Project on the Peace River in north-eastern British Columbia, Canada, and argue that the regulatory approval of such projects involve what is termed as "pervasive appraisal optimism"—which entails under-estimating risk by relying on overly positive assessment of future gains and benefits while, at the same time, under-estimating and/or externalizing environmental and social-cultural costs [3]. In fact, academic research on the adverse environmental and social impact of the Site C Project was not even referenced in the government's public announcement, and the Project was pushed ahead on the ground that it was too far advanced to halt. Bakker and Hendriks refer to the Site C Project as an example of what we have discussed at length in the introduction paper as "manufactured ignorance" [1].

Barbara Lynch [4] and Amelie Huber's [5] contributions to this volume also show how systematic production of ignorance (Lynch), on the one hand, and willfully ignoring risks (Huber), on the other, were integral parts of the making of mega-hydropower knowledge paradigms. Lynch critiques heterodox and pioneering development economist Albert Hirschman's argument that the "accidental" and "benevolent ignorance"—what he called "hiding hand", a feature of the development of project processes especially in Latin America, Africa, Asia and southern Europe—makes it possible to conceal the difficulties and uncertainties inherent in such planning processes, and that such ignorance is benevolent in fostering "creativity". Hirschman argued that if the planners would know all the obstacles to a project's successful implementation they would not undertake such projects, but hiding uncertainties and difficulties would make them respond with creative solutions. Lynch discusses two projects, the San Lorenzo Dam in northern Peru (which was Hirschman's original case study) and the controversial Guatemalan Chixoy Dam, and argues that the hidden costs and suffering were not inadvertent, but came about as a result of a systematic production of ignorance. In the San Lorenzo case the planning staff deliberately ignored the potential impact of water diversion on peasants and herders, which resulted in a devastating social and cultural impact of displacement caused by the Project. In the case of Chixoy, although the state-sanctioned military violence against Maya communities in the Project area was well documented, these foreseeable impacts were also ignored by the World Bank and international contractors during the planning process. This manufactured ignorance was deliberately produced, as Lynch compellingly argues, for the planning actors to be absolved of any responsibility for the way the dam building would contribute to what was later seen as genocidal behavior by the Guatemalan state.

Based on the empirical research in the new hydropower hotspots in the Eastern Himalayan region of Northeast India, Amelie Huber [5] similarly argues in her article that a blind eye to environmental risks, which she calls strategic ignorance or manufactured production of risk, facilitates unequal distribution of benefits accelerating the process of social marginalization. She shows how experts and hydropower professionals manufacture scientific uncertainty to depoliticize and conceal the subject of risk in dam conflict. Huber further explores how influencing the production of knowledge about risk can create an opportunity to contest hazardous hydropower projects. She discusses the protracted conflict over the Lower Sabansiri Hydroelectric Project in Northeast India, and how it turned into a highly publicized controversy because civil society organizations were able to draw upon alternative knowledge sources to challenge the mainstream knowledge claims with powerful counter-claims. She shows that the successful challenge of this citizen-science alliance to institutionalized ignorance amounts to democratization of knowledge production.

Returning to the question that Fox and Sneddon ask, we think that engineering/technological narratives of mega-hydraulic projects have such legitimacy and authority because they are seductively coproduced with narratives of progress and development (see [1,2,6–8]). Tuula Teräväinen [8] analyzes multiple and contradictory expectations, socio-technical imaginaries and related knowledge regimes in the recently launched megaproject Coca Codo Sinclair in Ecuador, and shows how these imaginaries are performative in terms of creating actions, defining roles and responsibilities, and shaping political agenda. Teräväinen shows how the imaginaries of the Coca Codo Sinclair Project were deployed as a showpiece of national competence and pride and how they further nurtured the expectations that the hydropower project would ensure substantial economic benefits accompanied by enhanced energy security and self-sufficiency, climate friendliness, and local well-being—imaginaries that became seductively appealing. These dominant imaginaries, however, meet with counter-imaginaries of failed political promises, misleading information and secretive policymaking practices. In the similar vein, in another contribution to the special volume, Jeroen Warner and colleagues [9] use Lacanian psychoanalysis to describe the Grand Inga Hydroelectric Project on the River Congo as a grand fantasy rather than a reality. Going beyond the "pro" and "contra" arguments that lay behind the competing imaginaries for the Hydroelectric Project, Warner and colleagues argue that the Grand Inga as a fantasy instils agency and legitimacy to various groups working both for and against it. The idea of Grand Inga thus becomes an object; the desire for its existence or absence is "enjoyed" (a rough translation of the Lacanian concept of *jouissance*) equally by both sides proposing and opposing the dam. Warner and colleagues find the answer to the question why the idea of Grand Inga is so seductive in deeper psychoanalytical drives that produce "enjoyment" for imagined development projects among actors.

A number of papers also discuss at length the contestations to the techno-engineering knowledge regimes instigated by state, donor and private companies. Fox and Sneddon point at the key boundaries between the engineering and technological knowledge produced by consultants, state officials, hydropower companies and the knowledge produced by ecologists, engaged scientists, and local and affected communities. They discuss three contested dams in the Mekong basin in various stages of construction—the nearly complete Xayaburi Dam, the under construction Dan Sahond Dam, and the planned Pak Beng Dam—to show how contestations over the dams' shifting epistemological boundaries in meaningful ways create new spaces for knowledge production and transfer [2]. These new spaces, however, do not only imply new forms of relating to risks and uncertainties and hence new forms of knowledge production, but also new ways to relate to social context. To this respect, Bakker and Hendriks [3] show how in the regulatory decision-making process multiple contestations over knowledge production arise between opponents and proponents and how these contestations involve differing social values.

The contributions to the special volume have also shown how these contestations involve multi-scalar, multi-actor networks. Paul Hoogendam and Rutgerd Boelens [10] discuss the case of the Misicuni Multipurpose Hydraulic Project in Bolivia to show how the political processes and demands for fair compensation for the affected communities involved divergent knowledge systems.

The confrontations on these knowledge frameworks were embedded in wider struggles over territorial control and natural resource governance while they were simultaneously characterized by highly unequal economic, political, and discursive power relationships. This unequal epistemological arena defined what counted as compensation, and how it should be counted. The affected indigenous communities remained invisible in the compensation process while their demands were disregarded. Despite the relatively progressive nature of the Misicuni Project, described as an example of "vernacular modernism" by Bolivia's pro-rural-community and popular government, the decisions regarding compensation were taken top-down, valuing expert understanding only. During the whole process of negotiations, the affected communities were forced to prove negative consequences and accept the suggested "appropriate framework for compensation". Hoogendam and Boelens show that the issue of "compensation" is politically contested and fiercely fought, in particular because the issue of "commensuration of incommensurables" is at the core of the epistemological and material conflict. This raises many fundamental questions: Who has the authority and legitimacy to define the standards? What is the "common metric" to "measure" the value and meaning of social, material and cultural assets and socio-environmental relationships, and how is this decided? Clearly, different from the World Commission on Dams (WCD) principles, the harsh reality of affected communities shows that the issue of compensation is not a matter of shared and objective decision-making but a hard wrought contestation over meaning, values and worldviews.

The local epistemological alliances that challenge dominant knowledge regimes are, however, not without contradictions. Rinchu Dukpa, Deepa Joshi and Rutgerd Boelens [11] examine how in India's Eastern Himalayan state of Sikkim, indigenous local communities have successfully contested all proposed hydropower projects and sustained anti-dam opposition in their home region. Based on a detailed ethnographic exploration of such oppositional movement, they argue that the traditional system of self-governance—"vernacular statecraft"—known as Dzumsa, prevalent among indigenous Bhutia communities, played a central role. This form of self-organization mobilized people's attachment to their place and the corresponding notions of territoriality, in order to forge "agonistic unity" against large dams. The system of Dzumsa is often eulogized as an egalitarian and democratic institution, but Dukpa and colleagues argue that in its structure and operation the system is rather hierarchical, masculine and exclusionary. The authors here make a novel point stating that the successful resistance to dominant forms of knowledge regimes contributing to democratization of knowledge traditions may come from highly undemocratic forms of collectivity. A similar issue is raised by Juan Pablo Hidalgo-Bastidas and Rutgerd Boelens [7] when discussing the processes of organization and contestation led by the people of Patricia Pilar and neighboring communities against the construction of multipurpose Baba Dam in coastal Ecuador. These protracted local protests had significant impact on the development and designs of the Baba projects—the dam site was changed and height was reduced which, in consequence, reduced the submerged area significantly, thus benefitting the local communities. However, such a far-reaching decision to implement an alternative dam design was not based only on the local protests, but was also informed by the rent-seeking relations between government officials and the construction company. In addition, the impact of changing the dam's technological designs was multiple and ambivalent, the authors argue, because the negative impact was now displaced on the most vulnerable members of the social movement—the Afro-descendant community. Both these articles raise questions regarding the character and eventual impact of the protest movements against large dams.

The contributions to the special volume also engaged with the questions: How is citizen, vernacular or lay-expert knowledge deployed to produce alternatives for mega-hydraulic projects and/or strengthen anti-dam opposition? How is such oppositional action organized? But also, how do anti-dam alliances confront internal contradictions? Bibiana Duarte-Abadia, Rutgerd Boelens, and Lucas Du Pré [6] analyze how in late 19th early 20th century Spain "hydraulic utopianism," dominated by positivist scientific-technological knowledge, framed the way rivers, territories and people were to be controlled, and how this was key to reconfiguring most of Spanish river basins,

as in the case of the Guadalhorce basin in Malaga. They explain how this triggered resistance in the neighboring Rio Grande valley, whose river was equally threatened to become dammed, dominated and diverted by a powerful coalition of engineering experts, politicians, bureaucrats and capitalist firms. Duarte-Abadía and colleagues explore how alternative bodies of knowledge have emerged and revitalized, now joining together to reject the technocratic management of the hydrosocial territory. These social contestations first emerged from smallholder peasants and local residents whose ideas about the river regime were rooted in longstanding agricultural and irrigation practices, and who mobilized vernacular grassroots knowledge and customary organizational forms and norms to defend their livelihoods. Their efforts were later joined by engaged scholars, ecologists, and NGOs from other parts of Spain who mobilized alternative forms of scientific know-how. This multi-actor, multi-scalar alliance between the vernacular and scientific forms of knowledge combined with legal action and trans-local communication, successfully stopped dam construction. However, while the struggle against the common threat of mega-hydraulic intervention in their territory enabled a strong opposition alliance that united diverse bodies of knowledge, the new policies to modernize traditional irrigation systems and to 'save water' subtly constitute a fundamental threat to these grassroots struggles and their knowledge.

In the end, we want to highlight that the contributions to the special volume have shown a diversity of knowledge contestation and co-production strategies (see [1]). Here we especially want to present following inferences on how power is deployed, manifested and contested in mega-hydraulic development projects. Firstly, we think that there has been a clash of expertise in which the dominant 'visible' power deployed through formal rules and hierarchical expert institutions has been characteristically challenged by the forms of counter-expertise emerging from the same systemic context that aim to delegitimize the hegemonic knowledge claims. Secondly, dominant 'hidden' power that is manifested through overstating positive results and underplaying negative socio-environmental impact—for instance, in terms of "manufactured ignorance" or "pervasive appraisal optimism"—is typically contested by the marginalized actors who have been empowered by means of producing alternative knowledge regimes based on grassroots epistemologies and ontologies brought to the arena of contestation. We find considerable evidences in the contributions to this special volume that the dominant 'manipulative' power that controls the production of mega-hydraulic knowledge by constructing favorable narratives is increasingly being contested by means of oppositional strategies that have raised questions about not just the mega-hydraulic projects but have also altered the understanding on wider processes of water knowledge production itself. Thirdly, we also think that the dominant 'normalizing' (Foucauldian disciplining) power that links knowledge, power and truth to unconsciously shape the legitimacy of mega-hydraulic order through processes of subjectification is increasingly responded by oppositional and advocacy alliances that have not only questioned the normality of mega-hydraulic development, but also have extended their critique to the related discourses of modernity, progress, and development.

In sum, to highlight, all contributions to this special volume have shown how the production of knowledge of mega-hydraulic structures and their impacts on local water cultures and societies constitute fierce contestations over interests, values and worldviews of diverse actors and divergent hydro-territorial objectives and projects. From these contestations hybridization of knowledge takes place, grounded in multiple social realities. These contributions have challenged the myth that knowledge on dam-development is a rational buildup of facts, or a coherently ordered water governance reality. They have further shown how, as part of epistemological contestations, multi-actor, multi-scalar alliances are formed that seek to challenge dominant forms of power, mega-hydraulic-territorial objects, hydro-political institutions and their claims to truth, and how they in turn have shaped new hydro-territorial subjects and realities. This way, alternative knowledge is co-produced, critically entwining positivist engineering, activist, grassroots and other knowledge systems, providing an important platform for those who suffer from the impacts of large dams and

mega-hydraulic development. These challenges to the mega-hydraulic rationality have re-politicized large dam regimes, offering new inspiration for the democratization of the sector.

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