

**Article Title:** The politics of water: A review of hydropolitical frameworks and their application in China

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**Abstract**

Academic literature on the politics of water encompasses hydrosocial relations at different scales, the role of technology in hydropolitics, and the various rationalities and discourses behind the governance of water. In this advanced review we outline the key hydropolitical frameworks, tracing the development of scholarship that examines the relations between power, water, society, and technology. We then synthesise the literature on hydropolitics in China, which boasts both the world's largest dam (by installed capacity) and the world's largest interbasin transfer project. We consider the extent to which different frameworks have been productively applied in a Chinese context, not just to understanding big infrastructure, but to questions of water pollution, agricultural water use, and water scarcity. In doing so we find that critical scholarship on hydropolitics in China has a number of significant gaps. These gaps constrain our understanding of the inherently political nature of the many acute water challenges China currently faces, challenges that have impacts well beyond its borders.

**Introduction**

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Since Wittfogel<sup>1</sup> scholars have drawn links between China's imperial and later authoritarian regimes and their management of water, and been captivated by 'modernist' water control projects such as the Three Gorges Dam. While a significant body of work has coalesced around these ideas, such readings of the politics of water in China are increasingly insufficient for two reasons. First, hydropolitics in China extends well beyond large dams. It encompasses interbasin transfers, transboundary issues, the management of water pollution, and the supply and use of water in varied agricultural environments. Political negotiation over water shapes the access and consumption practices of more than a billion citizens in an increasingly unequal society. All of this takes place in a complex, hierarchical governance system with a multiplicity of actors who draw on both market and non-market instruments to achieve their goals. Second, there are many ways of thinking about the relations between power, society, water, and technology. Such hydropolitical frameworks help us to understand how water and society co-constitute each other, to consider the spatial implications of changing hydrosocial relations, and to identify the different techniques of government that are mobilised in the governance of water. These frameworks have evolved considerably in the past decade, but have not always been used in the Chinese context.

The aim of this article is therefore two-fold. First, we identify the major frameworks used to analyse hydropolitics, with a particular focus on different treatments of power and technology (we see 'hydropolitics' as a broad grouping of scholarship that tries to understand how water and power interrelate). By tracing the evolution of hydropolitical thinking we offer our own assessment of the state of the field and the contradictions within it. Second, with these frameworks in mind, we review the literature on hydropolitics in China. In this second section we outline five key gaps, proposing a research agenda for future scholarship that will advance our understanding of Chinese hydropolitics. At a time when China is grappling with extensive water pollution but also exporting its particular approach to water management well beyond its borders, such theoretical and empirical endeavours matter more than ever.

## **HYDROPOLITICAL FRAMEWORKS**

### **Hydraulic societies**

Early literature on hydropolitics focused on characterising different societies according to their approach to water management, the most obvious example being Wittfogel's<sup>1</sup> *Oriental Despotism*. Wittfogel's basic hypothesis is that where large quantities of water had to be manipulated to develop agriculture in semi-arid and arid environments, the state came to have a monopoly over water management and the coercion of labour, and tended towards total, despotic power<sup>2</sup>. China was the prime example of this 'Asiatic' hydraulic society. Later, Worster<sup>3</sup> identified three main modes of water control in irrigation societies: the local subsistence mode (where authority over water lies within the local community), the agrarian state mode (with an incipient state capable of designing and administering a water system) and the capitalist state mode (new modern hydraulic societies with a powerful private sector and a bureaucracy that monopolises hydraulic expertise). In

his analysis of the hydraulic society of the American West, Worster describes “a coercive, monolithic, and hierarchical system, ruled by a power elite based on the ownership of capital and expertise” (Ref 3, p. 7).

While there is an appreciation for the dialectical relationship of society and water in Wittfogel’s work – a recognition that societies remake themselves in trying to remake nature<sup>3</sup> – the treatment of power is largely instrumental. Political rule is explained as domination and is assumed to be located in the central state. The variety and strength of local water management institutions in places like the North China Plain<sup>4</sup> reveals the empirical weakness of Wittfogel’s argument in relation to China. There is also little to be said about infrastructure other than as an embodiment of state power.

Bridging this work on hydraulic societies with later developments is a small number of studies that catalysed new approaches to water and politics by engaging with the role of water infrastructure in modernisation. They avoid the determinism of earlier work, and start to ask new questions about the relationship between water, society, power, and infrastructure. This includes Swyngedouw’s<sup>5</sup> analysis of the water politics and engineering in Spain’s modernisation process, and Kaika’s<sup>6</sup> work on water engineering as a key pivot for modernisation in Athens, which gave rise to hydrosocial approaches.

### **Hydrosocial approaches**

By hydrosocial approaches we mean a collection of work on the hydrosocial cycle and hydrosocial relations. These overlapping concepts address how water and power interrelate, but they do so with different emphases. The most recent of this scholarship (on waterscapes and hydrosocial territories) has more explicitly drawn out the implications of hydropolitics for territory and scale. But the key contributions of this collection of work have been to break down the nature-society dichotomy evident in hydraulic societies, to highlight the politics of access and exclusion, and to introduce into hydropolitical scholarship a more nuanced understanding of power relations by examining various forms of state- and market-driven water management.

Swyngedouw<sup>7-10</sup> has been instrumental in this regard, drawing on different heuristic devices at different times, but always advancing ideas of the hybridity of water and social power. In challenging notions of hydrology that exclude the social, he conceptualises the circulation of water as a hybridised socio-natural flow that fuses together nature and society, thereby transcending nature-society binaries: “society and nature, representation and being, are inseparable, integral to each other, infinitely bound up”<sup>10</sup> (Ref 10, p.66). Scholars such as Linton<sup>11</sup> and others<sup>12-14</sup> still draw on the concept of a hydrosocial cycle, defined as a “socio-natural process by which water and society make and remake each other over space and time” (Ref 11, p.175). It is a cycle because it is iterative: changes to the management or governance of water produce changes in social relations, which

produce certain kinds of water, and so on. In general though, a broader hydrosocial relations approach, not restricted to the heuristic of a cycle, has gained more traction.

Some of Swyngedouw's earlier scholarship focuses more intently on the politics of access and exclusion, seeing water circulation as "part and parcel of the political economy of power that gives structure and coherence to the urban fabric" (Ref 9, p. 2). Socio-environmental processes can therefore be enabling for some, and disabling for others.<sup>15</sup> This is taken up by Linton<sup>16</sup> in exploring the role of infrastructure in hydrosocial relations: because concrete technologies fix certain ideas and meanings in particular times and places, they perform political work by strengthening some social relations while marginalising others. It is important to note this thread in hydrosocial approaches and its historical-geographical origins, and that other frameworks do not engage as deeply in this political economy.

Another thread of the literature is its examination of different kinds of water management. Various studies trace a shift from centralised governance (the focus of hydraulic societies) to more complex power geometries of institutions and actors at multiple scales. In these studies hydrosocial relations are seen to be reconfigured through processes of privatisation, commercialisation and commodification, with access to water organised through market mechanisms and the power of money.<sup>7, 17-19</sup> Nonetheless, Bakker<sup>18</sup> in particular notes the difficulties of fully commercialising water, arguing that water's biophysical characteristics make it a highly localised resource, susceptible to monopolistic control. This enduring focus on centrally organised water infrastructures means that while power is not always thought to be located in the state,<sup>20</sup> much less is said about the polyvalent, quotidian practices through which people access water.<sup>21, 22</sup>

More recently, two heuristic devices grounded in a hydrosocial framework have further articulated the spatial and scalar dimensions of hydrosocial relations. The first is the idea of a 'waterscape'<sup>23</sup>: "a sociospatial configuration that is constituted by social and ecological processes, which become manifest through the particular nature of flows, artefacts, institutions and imaginaries that characterise a particular context" (Ref 23, p.125). Its proponents argue that a focus on waterscapes better captures the multiscale processes through which water is co-produced, well beyond the watershed. Some have used the concept to highlight how everyday practices of water use are both productive of local social relations and also reproduce certain forms of capital accumulation, thus reflecting global processes.<sup>24</sup> Others have considered the co-production of water science and waterscapes, understanding waterscapes to be time-specific images of the continual reworking of society and water.<sup>25</sup>

The second device is hydrosocial *territories*<sup>26</sup>, where 'natural' and 'social' boundaries "are conceptualized and materialized through interlinked natural, social and technological elements" (Ref 26, p.3). Here, various interests are seen to compete in transforming a territory's hydraulic grid, which can result in overlapping, contested hydropolitical projects.<sup>26, 27</sup> These "'territories-in-territory' are structured by different rules and normative frameworks, sources of legitimacy, forms of

authority and related discourses” (Ref 27, p.93). One application is Hommes and others<sup>28</sup>, who see hydraulic projects such as Turkey’s Ilusu Dam as “means to configure and re-configure hydrosocial territories, altering the physical-ecological, socio-economic, cultural-symbolic and political spaces where they are realized”. The authors argue that counter-imaginaries challenge the government’s hydro-political imaginary of the dam region as fully enrolled in the Turkish nation-state; overlapping hydro-territorial regimes can therefore co-exist in the same location. These kinds of concepts still rest on the theoretical developments of earlier hydrosocial scholarship, but take it in more explicitly geographical directions.

### **Socio-material approaches**

Another collection of studies draws more heavily on socio-material approaches and actor-network theory in examining hydropolitics. These studies are characterised by attempts to dissolve the nature-society dichotomy, focusing instead on how the two are stitched together<sup>29, 30</sup>. They mark a shift between “the study of how the distribution of water has been shaped by relations of power and an analysis of how water *itself* shapes those relations” (Ref 30, p.954). This includes the agency of water, and of water technologies, broadly defined.

This collection of studies makes a number of related arguments: that technologies of water infrastructure have the capacity to shape the direction and character of socioecological change<sup>31</sup>, that infrastructure plays a role in delimiting or cultivating state power<sup>32</sup>, that water can exceed the technopolitical systems that govern it and destabilise distribution regimes<sup>21</sup>, that non-human entities such as water meters can acquire power over people’s lives<sup>30</sup>, and that users can be configured and produced through the design of mediating technologies<sup>33</sup>. Compared to other frameworks these studies attribute far greater agency to water technologies: Meehan<sup>32</sup> suggests that objects are capable of affecting and producing the world in sometimes forceful ways; that they are wellsprings of power. Similarly, Sultana<sup>34</sup> considers how tubewells in the Bengal Delta make arsenic-contaminated groundwater accessible, thereby participating in the production of waterscapes of power and health. A key insight here is that it is not just large dams and canals that reflect, embody, or delimit power and social relations, but equally more mundane objects.

Compared to hydrosocial approaches and of course hydraulic societies, this relational-dialectical approach shifts the examination of hydropolitics into the realm of actor-network theory. There are a number of risks to such a shift, notably that “a rather passive human subject fades perhaps too quickly into the general network”<sup>35</sup>. Contrary to Swyngedouw’s historical-geographical emphasis, water with agency prioritises the hybrid over the process of hybridisation<sup>36</sup>, and is therefore poorly equipped to bring nuance to questions of uneven access. As others have noted, the enduring qualities and power relations of certain networks must be recognised.<sup>35</sup> That said, what Meehan offers is somewhere in between: an object-oriented approach that recognises that infrastructure requires infrastructural work or allies in brokering power.<sup>32</sup> This demands a focus on practices, and on networks of expertise, something that hydrosocial approaches do not always do. A further set of

studies has delved into these questions of expertise and practices in more detail, drawing on Foucauldian notions of governmentality and biopolitics.

### **Governmentality**

Governmentality is not widely recognised as a hydropolitical framework, but we include it because it offers an alternative way of thinking about power in hydropolitics. It takes up some of the challenges presented by socio-material approaches, and addresses some of the limitations of hydrosocial approaches, but employs different theoretical tools. Briefly, a governmentality analytic sees power as generalised and dispersed, and to understand it one must consider the rationalities, practices and spaces involved in attempts to produce or control different kinds of subjectivities.<sup>37</sup> In relation to water, an analytic of governmentality involves a focus on less obvious manifestations and practices of power in water management, an examination of how water issues are discursively defined and intervened upon (and by whom), and the biopolitics of water issues. Such a framework has important implications for hydropolitics, drawing attention away from large water infrastructure as a manifestation of centralised power, to the multiple ways in which states attempt to govern people and space through water. And in doing so, it does not necessarily lose sight of the politics of access and exclusion.

Gandy<sup>38</sup>, for instance, uses a Foucauldian reading of power to examine how technologies such as water metering extend control over everyday life. Alatout<sup>39</sup> analyses the discourse of water scarcity in Israel and how it is used to justify the construction of a centralised technopolitical apparatus to make water management more 'efficient', while Boelens<sup>12</sup> considers how water reality, knowledge and truth claims are put to work in shaping Andean water users' conduct. Hellberg<sup>40</sup> examines the regulatory and controlling technologies used in South Africa's eThekweni and how different techniques of water management have created distinctions in the subjectivities of those who pay for water, and those with free, but restricted access. Finally, Bakker<sup>41</sup> argues that water is not just political but can be biopolitical, in that governments "seek to optimize both water resources and our individual water-use practices in order to secure the health and productivity of the population" (Ref 41, p.619).

In these kinds of studies, the technologies of government (which include water infrastructure) have spatial, discursive, and material dimensions. For Larkin<sup>42</sup>, infrastructures can reveal forms of political rationality that underlie technological projects as part of an apparatus of governmentality. For Kooy and Bakker<sup>43</sup>, Jakarta's water circuits and networks embody successive relations of power by enabling or disabling specific patterns of water supply and water use practices in 'developed' and 'undeveloped' parts of the city. But this relationship between power and technology is not a one-way process. As Hommes and others<sup>28</sup> argue, power is not fixed in technology, but "acts as a mediating force and is reshaped and redistributed through inter-human and human-nature-technology interaction" (Ref 28, p.18). Given the disparate nature of these studies there is no single approach: governmentality and biopolitics are sometimes merged, and sometimes not. Unlike

Bichsel<sup>44</sup>, we see this emerging hydropolitical framework as much more than simply discourse analysis; rather, it offers a particular way of thinking about power and technology.

### Technopolitics

A small collection of studies has begun to focus more intently on the role of technology (both physical and non-physical) in enacting political goals, taking the materiality of some of the socio-material literature and combining it with a focus on political practices. While this literature is not solely focused on water, we consider it to be another emerging hydropolitical framework. Hecht<sup>45</sup> defines technopolitics as the “strategic practice of designing or using technology to constitute, embody, or enact political goals” (Ref 45, p. 256). She goes on to discuss technopolitical *regimes*: the “linked sets of people, engineering and industrial practices, technological artefacts, political programs, and institutional ideologies which act together to govern technological development and pursue technopolitics” (Ref 45, p.257). Technology is broadly conceived here. It refers “not just to a [material] device in isolation but also to the forms of knowledge, skill, diagrams, calculations and energy which makes its use possible”<sup>46</sup> (Ref 46, p.9).

There is some tension in this emerging literature about the qualities of technology and infrastructure. Drawing on Hughes<sup>47</sup>, Hecht argues that large technological systems are durable and have a ‘momentum’ derived from their embeddedness in social relations, and from their materiality.<sup>48</sup> Infrastructures are seen to fix water: “choices tend to become strongly fixed in material equipment, economic investment, and social habit”<sup>49</sup> (Ref 49, p128). If technopolitical systems are conceived of as centrally controlled and defined by the extent of such control, there is a risk that technopolitics will fall back on earlier deterministic approaches to water and power. But other perspectives are also evident. Sneddon<sup>50</sup> argues that technologies work as part of an assemblage of relationships, practices, knowledges, biophysical dynamics, humans, and things, while Mitchell<sup>51</sup> emphasises the unintentional, arguing that technopolitics emerges from a process of manufacture whose ingredients “are both human and nonhuman, both intentional and not, and in which the intentional or the human is always somewhat overrun by the unintended” (Ref 50, p.42-3).

So while technopolitics places technology at the centre of an analysis of hydropolitics, it does not preclude an understanding of techno-natures as hybrids. In addition, as Obertreis et al<sup>52</sup> have noted, there is a strong link between technopolitics and governmentality: power is not something held by human actors but is seen as a force that comes into effect through connections between human and non-human actors. These non-human actors include technologies that combine political rationalities, administrative techniques and material structures. While ‘thick’ with politics<sup>53</sup>, unlike in some socio-material studies, they are not conceived of as working autonomously.

We have so far traced changing conceptualisations of hydropolitics within a large and sometimes diffuse body of literature, from the limits of a hydraulic society framework, to the continually evolving hydrosocial literature. Governmentality offers a lens through which to examine the diverse

practices, spaces and subjectivities implicated in hydropolitics, while socio-material approaches remind us of the potential agency of water and water technologies. Overall it is evident that the water-society dichotomy has been well and truly dismantled, and much more nuanced understandings of power introduced. The next section considers the extent to which these theoretical advances have been put into practice in analysing Chinese hydropolitics.

## CHINA'S HYDROPOLITICS

For what is a sizeable body of work on water-related topics in China, a vast majority of studies fail to engage with the political in any way. Beyond environmental science and water engineering, the focus tends to be on economic concerns<sup>54, 55</sup> and risks to water security.<sup>56, 57</sup> The literature on China's water policy<sup>58-63</sup> also shies away from explicit engagement with hydropolitics or any consideration of hydrosocial relations. As such we discuss only a small collection of studies that do engage with hydropolitics in China and ask what aspects of hydrosocial relations, power and technology have been examined, at what scales, and which frameworks or approaches have been mobilised toward these ends?

It is interesting to note that Wittfogel's idea of China as hydraulic state still echoes today in the suggestion that there is something unchanging and pre-modern about hydropolitics in China. For instance, McCormack<sup>64</sup> sees China's water management approach as dictated by the central government's commitment to a development path that combines, "... the centralizing tradition of empire with the Western nature-dominating and exploiting paradigm of modernism that comes to China through its Russian communist form" (Ref 64, p.24). In his critique of the Three Gorges Dam, Webber<sup>65</sup> argues that China's use of technology to control water toward human ends, "...reflects social and environmental attitudes that long predate modern senses of development" (Ref 65, p.157).

With this mind it is not surprising that much of the literature pays particular or even exclusive attention to the high-level institutional landscape and central-level political actors, drawing conclusions about the legitimacy of China's authoritarian state. Moore<sup>66</sup> focuses on big politics: how national political characteristics (in this case, authoritarianism) contribute to environmental change. He concludes that China's South-North Water Transfer Project (SNWTP) is yet another manifestation of authoritarian governance in China. While Moore notes that the SNWTP is a testament to "the technocratic ethos" (Ref 66, p.959) at the heart of the Chinese political system, he does not unpack the relationship between hydropolitics and technology, nor does he consider how such a project may reshape hydrosocial relations.

Magee and McDonald<sup>67</sup> examine the links between dam building and state legitimacy on the Nu River in southwest China. The authors argue that the institutional landscape has shifted in unexpected ways through recent processes of decentralisation and corporatisation, which means that new actors such as dam developers are asserting influence. But because this occurs at a

distance, these new actors do not directly contest central government legitimacy. Pohlner<sup>68</sup> similarly focuses on how mega-projects like the SNWTP drive high-level institutional change. A hydrosocial relations approach would be useful here in fleshing out this institutional dynamism as an iterative process shaped by water and society, but neither study engages with such a framework.

This institutional and political landscape is further elucidated by Nickum<sup>69</sup>, who describes how power circulates (sometimes at cross-purposes) within a vertically and horizontally articulated bureaucratic structure, noting that this structure has undergone significant change in the past several decades through decentralisation and increased marketisation. Moore<sup>70</sup> and Habich<sup>71</sup> also point to the fragmented nature of Chinese governance and political negotiations between central and local governments. Both apply Lieberthal and Oksenberg's<sup>72</sup> fragmented authoritarianism heuristic, which describes the complex, multi-tiered bureaucratic arrangement by which policy is made at the central level and then reshaped by the interests of those who implement it. In all these studies, power is conceived as being held by formal political and economic institutions, however fragmented they may be. And while fragmented authoritarianism introduces scales of analysis beyond the central state, the many insights of hydrosocial approaches, technopolitics, and governmentality are missing.

Other studies place more emphasis on a plurality of actors at different scales. For instance, Mertha<sup>73</sup> points to the post-2000 emergence of new dynamics in Chinese water politics that require an acknowledgment of and engagement with a range of political actors, including, non-governmental organisations, scholars, the media, local-level government officials, and the public. Tilt<sup>74</sup> also considers government agencies and officials at multiple scales, hydropower corporations, non-governmental organisations, multinational agencies, scientists, and local communities in Chinese dam building, and how they further their values, goals and objectives. He sees state-making as both a material and normative process in which water is "a medium through which social and political relations are negotiated" (Ref 74, p. 5). This goes some way towards an understanding of water and social power as co-constituted, but does not extend to the spatial implications of these relations.

One concept that does attempt to engage more critically with the spatialities of hydro politics is the powershed<sup>75, 76</sup>. McNally and others suggest that a powershed be thought of "first as an ensemble of processes (investment, design, construction, generation, consumption) and then as the ensemble of associated places" (Ref 76, p. S290). This concept, Magee notes, is a hybrid, combining biogeophysical and political elements. But because water as a material entity is not the focus here, Magee and later his collaborators are not able to fully extend this concept. Instead, water is viewed as an input in the production of electricity, which occurs within a larger political structure and therefore remains only indirectly linked to power.

Clarke-Sather<sup>77, 78</sup> is one of the few scholars who takes an explicitly hydrosocial approach to water, politics and scale in China. He demonstrates how the institutions (political, economic, social, and technical) that link people and water in northwest China have been rescaled through a suite of government interventions in the agricultural hydrosocial cycle, including policy and technology shifts

related to irrigation, climate-appropriate crop selection, and hybrid seeds and mulches<sup>77</sup>. Clarke-Sather uses the idea of hydrosocial governance—defined as “the political mediation of human-water relations” (Ref 77, p.99)—to carve out space in water governance for considering not only what people do with water, but *without* it. By opening up the idea of hydrosocial relations beyond the biophysical flow of water, a number of new actors come into play, for instance poverty alleviation authorities.

In addition to engaging with hydrosocial approaches, geographers are beginning to bring a governmentality lens to bear on Chinese hydropolitics. Rogers and others<sup>79</sup> examine multiple aspects of the SNWTP, from its machinery and spatiality to its techniques of government and assemblages, presenting the project “as a programme of government that attempts to render water and space governable and administrable” (Ref 79, p.429). In contrast to other studies of the SNWTP<sup>66, 80, 81</sup>, the governmentality lens moves the discussion away from state-centred power and questions of legitimacy to focus on generalised, dispersed practices of governing. By ‘decentring’ the central state in China’s hydropolitics, a governmentality with multiple centres and diverse practices and techniques emerges.

Also with a Foucauldian slant, Clarke-Sather<sup>82</sup> shows how the concept of the aleatory— “events which arise from change, risk, or contingency” (Ref 82, p.1)— aids in an understanding of the role of state power in the political ecology of water. He demonstrates how, by engaging with the aleatory, we gain insight into “how circuits of state power create a calculable political economy of risk surrounding environmental issues” (Ref 82, p. 2). He explores this idea in Gansu Province, where shifting practices of rainwater harvesting and water piping work to reconfigure the risk and responsibility of water shortage, while also forging new links between households and local water markets. State power in this case operates not only through mechanisms of discipline, but also of security, which works to diffuse power away from a centralised state.

Crow-Miller’s<sup>81</sup> work on the SNWTP and its discourses of deflection is underpinned by Foucault’s idea of the ‘art of government’, in which discourse is both a reflection of power and a tool by which power may be wielded and fortified. Crow-Miller argues that while the SNWTP is being presented by the government as politically neutral through the deployment of strategic storylines, including narratives that naturalise regional water stress, the ultimate motivation for the project is the central government’s concern over economic growth and legitimacy. Crow-Miller’s focus on power is state-centred, but her examination of counter discourses suggests there could be an important role for other interests to play in articulating counter narratives.

While socio-material approaches are conspicuously absent from the literature on China, technopolitics has been used to varying degrees. Webber<sup>65</sup> argues that as a physical artefact, the Three Gorges Dam “asserted the power of the central state” (Ref 65, p.157), but also that projects on this scale can have long-term effects on structures of political power. Pietz<sup>83</sup>, on the other hand, advances the idea of a technology *complex*, encompassing “administrative organization,

technological form, and cultural imaginary that can be used to legitimize the means and ends of water management projects” (Ref 83, p. 5). He pays particular attention to the technology complex at work in the early days of the People’s Republic, and discusses the symbolic and material importance of the Yellow River in the political project of crafting China into a nation. Webber et al<sup>84</sup> use technopolitics as a framework for analysing how the SNWTP remakes the geography of China by altering flows of water, pollution, power, production, and people. The authors argue that the project exemplifies a technopolitical regime, which “privileges concrete over management, capital-intense over small-scale projects and targets [water] shortages rather than pollution” (Ref 84, p.373). They see the SNWTP as a hybrid of technology and politics that does both political and hydrological work, and in doing so not only represents current socio-environment relations, but also catalyses changes in those relations. Finally, at a different scale, Boland<sup>85</sup> delves into some of the key questions raised by technopolitics and hydropolitics more broadly by examining the development of premium water systems in Chinese cities. The uneven distribution of new pipe networks reflects a political project of separating premium water as a luxury commodity (available to certain residential communities) and tap water as a basic public good.

So while the literature on Chinese hydropolitics is largely characterised by an emphasis on centralised control of water and power and the machinations of high-level bureaucratic institutions, in recent years more nuanced analytical framings – hydrosocial approaches, governmentality, technopolitics – have begun to be applied. This has opened up far more nuanced discussions of Chinese hydropolitics at different scales, but significant gaps nonetheless remain.

### Discussion and Conclusion

In tracing the evolution of approaches to hydropolitics from water as an object of politics, to hybrid water, to agential water, the first section of this paper highlighted the wealth of theoretical tools available to scholars examining the politics of water. While the precise approach to politics, water, society and technology may differ, theory has moved well beyond the nature-society dichotomy, and much more nuanced approaches to power have been introduced. Given the richness of this literature it is curious that both the notion of a hydraulic society and the link between large water infrastructure and modernisation still have such purchase in relation to China. Such frameworks are relatively limited in what they can tell us about the politics of water in China, and tend to favour a focus on the central state and on large infrastructure projects. These limits are underlined by the rich analysis made possible by mobilising other hydropolitical frameworks.<sup>65, 75, 77, 78, 82, 83</sup>

Governmentality and technopolitics also offer new perspectives on the nature of power and large infrastructure projects<sup>79, 81, 84</sup>: in fact, a marriage of these frameworks could be particularly powerful in the Chinese context. Overall though, critical geographical scholarship on hydropolitics in China remains relatively underdeveloped. This leaves unanswered questions about water management issues that affect more than a billion people in diverse and often sensitive ecosystems. It also leaves unanswered questions about how we theorise hydropolitics in both non-Western and authoritarian

contexts. To conclude then, we outline five key gaps in the literature on China's hydropolitics which we hope will catalyse future research.

First, engagement with the everyday politics and practices of water in China is limited. Some light has recently been shed on the practices of local water officials by Pia<sup>86</sup>, but many gaps remain. How does China's institutional landscape shape everyday water supply and use, for consumption, for irrigation, or for cultural and religious practices? What assemblage of institutions, technology, social relations and imaginaries are evident in China's waterscapes, and what state-sanctioned or subversive hydrosocial relations do they reveal? What is the nature of uneven access to water, how is this produced and contested, and at what scales? How do articulations of discursive power by politically/economically dominant groups interact with counter-discourse put forth from the margins? And given that a large proportion of China's water is severely polluted, how does the materiality of this water shape everyday encounters? These questions are particularly pertinent at a time when China's agricultural sector is being fundamentally reorganised<sup>87, 88</sup>: how will water and water technologies be distributed between larger-scale farms, agribusiness, and household farms, and how is the logic of capital reconfiguring rural hydrosocial relations?

Second, this lack of engagement with the everyday politics of water reflects a broader problem with how power is conceived. In the China literature, power is largely understood as something that is held and exercised over water and society, or over techno-natures. It is seen as residing primarily if not entirely in formal state institutions, typically the central state. The mechanisms by which it moves across (and produces) scales, geographic space, and subjects are not well defined. How do the state and market interact in the production of power? What are the dispersed practices of governing, the different modalities of power, and the processes of subject-making evident in China's waterscapes? How are certain practices of water governance and associated truth claims legitimised? How does power circulate through myriad hydrosocial relations? This is where Chinese hydropolitics can be usefully brought into conversation with other strands of research on diffuse forms of power in contemporary China, particularly those that draw on an analytic of governmentality.<sup>89-91</sup>

Third, the nature-society dichotomy persists in the literature on Chinese hydropolitics, evident in studies such as Moore<sup>66, 70</sup>, Magee and McDonald<sup>67</sup>, and Pohlner<sup>68</sup>. These studies suggest that the link between politics and water is unidirectional rather than relational, and reveal a lack of engagement with the materiality of water. They fail to take the theoretical advances of hydrosocial relations and apply them to China. The question should not be: what effect does China's existing governance structure or institutional landscape have on water? Rather, we should be asking: how is politics—broadly conceived and at multiple scales—co-produced with material flows (or absences) of water? Hydropolitics does not mean 'water' and 'politics'; it must be a politics *of* water.

Fourth, while large dams and other water infrastructures loom large in studies of China's hydropolitics, we find the role of technology as it relates to hydrosocial relations to be poorly

explained (a notable exception is Boland<sup>85</sup>). It is widely accepted that techno-natures like dams, irrigation canals, and water bureaucracies are hybrids, and as such can resist incorporation into political projects<sup>8</sup>. Further, power is not fixed in technology, but acts as a mediating force and can be reshaped through human-nature-technology interactions<sup>28</sup>. A more nuanced approach to power, brought into conversation with technopolitics, would better illuminate how material and immaterial technologies reproduce hydrosocial relations.

Finally, while there has been some critical engagement with scale in considerations of Chinese hydropolitics, much more work could be done. Scale in China's water governance is different from other places: the river basin/watershed is not a powerful delineator of governance, as river basin commissions are politically weak; nor is a neoliberal decentralisation of environmental governance evident. On the surface the current scalar politics of water in China seem to have centralising effects, most obviously demonstrated by the SNWTP — a centrally managed project that jumps basins, rivers, provinces, and regions. But rescaling does not only happen in one direction, and is not necessarily deliberate<sup>78</sup>. Here we do not mean just identifying the scales at which hydropolitics takes place, but understanding scale as contingent, contested, and produced through the practices of water governance<sup>92</sup>. How do specific spatial scales promote particular notions of authority and efficiency<sup>93</sup>, and how are particular scales of governance and action fought over, implemented, and changed over time<sup>8</sup>? The idea of overlapping and competing hydrosocial territories or waterscapes made up of interlinked natural, social and technological elements<sup>23, 26</sup> could be highly productive in China. These more critical approaches to scale and territory would add nuance to the fragmented authoritarian framing typically cast over China's water governance.

By identifying these five areas we hope new insights into the inherently political nature of China's many water challenges will be revealed, and that our understanding of changing hydrosocial relations will advance. Developing more substantive dialogue between the broader hydropolitical literature and the China-specific scholarship would be mutually productive: the China-focused literature can expand its theoretical repertoire and bring new ideas to bear on pressing real-world water challenges, while the complexities and particularities of Chinese hydropolitics may push existing frameworks in unexpected directions.

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