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# The Rise and Transfer of the River Chief System: A Historical Review of a Chinese Phenomenon and Its Potential to Transfer to the Global Community

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*Article*

# The Rise and Transfer of the River Chief System: A Review of Chinese Water Governance and Its Potential to Transfer to the Global Community

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**Abstract:** China has enacted a range of policies to improve its water ecosystem since the middle of the 20th Century. Some of these measures include the creation of Seven River Conservancy Commissions, the development (combination and recombination) of series of ministries and departments to address environmental pollution and degradation, and recently the implementation of the river chief system. To understand if the river chief system can transfer to other political jurisdictions the authors gathered data using key word searches of the Web of Science and Google Scholar, official government sites, media sites and key international organizations. Based on this the authors review the development of the river chief system in the context of broader ecological reforms, place the rise of the river chief in the context of potential lessons for future improvement, and speculate on the possibility that China could transfer the river chief to countries facing similar challenges in their water governance regimes.

**Keywords:** river chief; water management; policy transfer; learning China

## 1. Introduction

Since the middle of the 20th Century, China has faced a growing problem of polluted water in its lakes, rivers, and minor waterways, reaching a point where policymakers within and outside China began to accept river and lake pollution was negatively impacting the nation's development (see China Water Risk 2011; Food and Agriculture Organization of the United Nations (FAO) 2008; United Nations 2007; UN-Water 2011). Some of the reasons given for the degradation of river and lake quality were the government's prioritisation of economic development over environmental protection; tensions between central and local government; and the continually changing structures surrounding the management of rivers and lakes across the country (China Water Risk 2024).

The problem of polluted waterways took on added importance in the earlier part of the 21st century as prior governmental attempts to address ecological issues going back to the 1950 creation of river basin commissions and the passage of the *First Water Law* in the 1980s, failed to improve the situation. By 2007 it was being argued that 'China's greatest development challenges…are in the areas where a dense population pushes up against the limits of water and what the land can provide' (Naughton 2007, 30). This view was reinforced in 2010 when it was found that just under half of China's water was too polluted to be 'made safe for drinking' while a quarter was so polluted that it was 'unfit even for industrial use' (Stanway 2010, 1). Confirming the severity of the situation in 2013 a local businessman in Zhejiang, Jin Zengmin, stated on Weibo that: 'If the environmental protection bureau chief dares to swim in [Ruian's] river for 20 minutes, I will pay [him] 200,000 yuan'. Not only were business owners starting to consider the negative impact water pollution was having for their business, but a series of public protests occurred across the country in response to ecological degradation and fears regarding industrial and agricultural waste polluting the water supply (see: Business for Social Responsibility 2009; Ministry of Environment and Ecology 2017; United Nations Environment Programme (UNEP) 2016)

A range of policies have been implemented to deal with this situation, including the development of ministries and departments to address environmental pollution and degradation. For this piece, the authors want to focus on one of the more recent attempts to address the nations

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polluted waterways and lakes; the rise and spread of the river chief system. More specifically, the authors will look at what occurred before and after December 2016, when the General Office of the Chinese Central Committee and the State Council issued *The Options on Full Implementation of the River Chief System (RCS) Across the Country*. The intent behind *Options* was not to implement the river chief system across the nation by 2018 in order to bring the nations drinking water supply quality to no worse than category III. To put this into context water bodies in China are divided into six classes. Class I is the purest and safest and is seen as suitable for human consumption and a source for nature reserves; Class II is considered safe for centralized drinking and in marine protected areas; Class III is appropriate to second class protected areas and centralised drinking water; Class IV is for industrial use and is not considered safe for human contact or drinking; Class V water is only considered safe for agricultural purposes; class V+ indicates the water is not suitable for any purpose (for more details see: The National Standards of the People's Republic of China 2024).

Based on the river chef model established in the *Options*, Erik Solheim, UN Under Secretary General and Executive Director of the UN Environment Programme, was quoted as saying 'I'm convinced that what I have seen in Pujiang County and Anji County will be the future of China, *even the future of the world*' (cited in Xianqiang 2021, 435; emphasis added). It is to this observation that the reminder of this article will be directed. Specifically. The first section will provide a brief history of water pollution in China over the course of the past 30-years. The second section will provide a summary of the transfer and spread of the river chief system before the passage of the *Options.* This section will include a brief discussion on the subsequent development of the national river chief system and some of the key issues that have emerged. The third section will discuss the likelihood of the river chief system transferring to other nations, particularly in light of the unique party-state structures that underpin the operations of the river chief. The conclusion will end by offering some advice on how the river chief might be sold to other nations.

## 2. Methodological Position

This article is based on a review of the existing literature regarding the rise of the river chief system in China. Articles were selected based on their appearance in Google Scholar and the Web of Science with the search terms limited to river chief, water management in China, lake chief, and Chinese administrative arrangements. The results were themselves restricted to articles appearing between 2007 and 2024. This resulted in approximately 250 articles being selected. Of these over 80% were by Chinese Scholars and placed in either specifically ecological focused journals or Asian studies journals. This has created a slight bias in the presentation of data and information as most of the articles consulted tended to portray the river chief in a positive light. However, some of this bias is counterbalanced in the more western focused journals which tended to place the river chief system in a broader context of overall environmental degradation since the end of the Maoist period. From here the authors conducted a review of the official Chinese government websites and the Chinese News Agency archives related to the nations water systems and river chief documents more specifically. This search went back to 2008 and forward to the passage of the updated *Options* documentation. The critical point here is that these sites were mostly the official English-speaking versions with a small selection (three) being AI translated versions of the Chinese site.

While the literature associated with the river chief available online and in news sites and journals forms the base of the documentation used in this historical review, the authors added information, and shaped the presentation of this piece, from their own studies and interviews with 56 individuals associated with the river chief system in Jiangsu and Zhejiang Provinces between 2019 and 2020 on the spread of the river chief system from Wuxi. This provided the authors with some of the data necessary to discuss the spread of the river chief within China and the potential for the river chief system transferring outside of China.

The authors want to stress that while we review some of the key changes in relation to the control and elimination of water pollution, we are not claiming to discuss every change and adaption that has been made to water related legislation and administration in China. Second, the authors collected statistical data from our own studies, the publications of other scholars, International

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Organizations and government websites to construct data which is not readily available due to much of the data on river quality in China being stored at the local level in hardbound volumes (or not stored in any form available to academic researchers).

## 3. Findings

### *3.1. The Base Problem*

By the later part of the 20th century many of China's rivers and lakes were facing an environmental disaster. This crisis encompassed multiple issues of water security, water shortages, degradation of the river and lake ecosystem, and the impact water pollution was having on the country's ability to provide safe drinking water. Rapid urbanisation and industrialisation partially led to a situation where 'Pollution in rivers and lakes in China is common, with 75% of the lakes showing varying degrees of eutrophication, and 30% of the water quality of the lakes in the V category, making it impossible to use directly' (Wang, Wan, and Zhu 2021, 1436; for more information see: China Water Risk 2024). In fact, in 2012 the state Council noted that only about 70% of the river water in the 10 core river basins reached level III water quality standards (State Council 2022c).

In addition to industrialization and urbanization adding new sources of pollution to the waterways 'inter-governmental rivalries [over water resources], corruption, and incentives that [traditionally] favor economic development over sustainable resource use' have also impacted on the nation's ability to manage the water environment (Moor 2013, 1). For instance, at a minimum, the National People's Congress has delegated issues of water management, pollution, and control to the: Ministry of Environmental Protection (MEP); Ministry of Ecology and Environment (MEE); Ministry of Water Resources (MWR); Ministry of Land Resources; Ministry of Natural Resources; Ministry of Housing and Urban-Rural Development; Ministry of Agriculture and Rural Affairs; and the Ministry of Finance.

This complex arrangement led to competition between ministries for jurisdiction and prestige, interfering with efforts to clean up rivers and lakes and complicating efforts to assign responsibility for specific water-related issues. This led to a range of policies regarding the same body of water which often it led to rules that contradicted each other. More problematically, when new ministries were created and old ones eliminated (or redesigned), responsibility for water regulation shifted around, making it even harder to hold somebody responsible for issues related to water management.

Complicating this even further within the ministries a range of departments had been developed at different levels of governance. These include but are not limited to the Water Resources Department, the Environmental Protection Department, the Agriculture Department, the Land Resources Department, Construction Department, Development and Reform Department, Forest Department, and the Financial Department.

Overall, this complex organisational matrix of responsibility led Silveira (2014) to conclude that fragmentation not only impacted on the nation's water policy but that it had a significant 'detrimental effect on the institutional capacity of the governance system to respond to water quality degradation'. The reason for this statement was not only that different units had responsibility for different aspects of water quality but that they tended to see their role differently and have different priorities when it came to water pollution alleviation. As a result when pollution events occurred in China, it often took considerably longer to respond than in nations with more integrated environmental protection systems (see Die 2019).

### *3.2. Role of the Bureaucracy in Fostering Water Pollution*

The Chinese party-state governing system operates (at least on paper) to ensure that the rules and guidelines passed by the Politburo Standing Committee of the Chinese Communist Party and the central ministries are effectively implemented by lower-level governing units. They do this via a hierarchy of power running from the central government to the townships (and in relation to the river chief system to villages in 29 provinces). The power relations in the hierarchy are partially maintained through the appointment and appraisal processes, whereby the leaders of lower level

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governing and party units are appointed (or removed) by the leaders of the superior level of government or party. Importantly of the analysis presented below, these decisions are made based on the assessment of performance targets set by the higher-level jurisdiction. This assessment structure can partially explain the poor conditions of the national water system as prior to the advent of the river chief the performance review was biased toward economic development (regional GDP growth). Thus, the environment in general, and water quality specifically, were rarely considered in performance reviews. Fortunately, as the authors will expand upon below, this system also helps to explain how the core of the river chief system has been linked to the promotion and reward process to help incentivise positive activities by officials in relation to water quality.

*3.3. The Rise of the River Chief*

For this article, one of the most recent drives to address China's water problems started with the 1988 *Water Law of the People's Republic of China*. The authors start with this law as it called for 'rationally developing, utilizing, and protecting water resources, preventing, and controlling water disasters' (*Water Law of the People's Republic of China* - 1988, Article 1). The core idea behind the *Water Law* was to create a system capable of managing and monitoring the nations waterways with legally binding enforcement mechanisms. In 2002, the *Water Law* was itself revised at the 29th Meeting of the Standing Committee of the 9th National People's Congress to including a provision designed to combine water resource management with river basin and regional administrative management. The overall goal was to better integrate water resource management into the systems associated with general ecological management (for a historic review see Global Water Partnership, 2015).

While there were other attempts to address water pollution before (and since) the passage of the *Water Law*, the pressure on officials to do something increased in 2005. At this time President Hu Jintao directly addressed the need to begin restoring the nation's ecology (including its waterways) at a symposium on population, resources and environment that was organised by the Central Committee of the Chinese Communist Party (CCP) Not only did Hu Jintao use his talk at the symposium to put the relationship between state supervision of ecological issues and local management directly on the agenda, but President Hu's call clearly indicated the party (and government) was going to start getting involved in issues of water quality. While Hu's focus might be considered an early attempt to put ecological issues on the agenda, two years later Premier Wen Jiabao, at the Sixth National Environmental Conference, solidified the importance of the environment for the Party and Government when he called for a 'fairer, greener economy'.

Partially in response to this high-level intervention, the Chinese government passed the 2008 *Water Pollution Law* (itself revised at the 28th Session of the Standing Committee of the Twelfth National People's Congress on June 27, 2017). This law (and its revision) was an attempt to strengthen legislation related to the control of water pollution using fines and penalties for businesses caught polluting waterways (2008 *Water Pollution Law*). In addition, the Ministry of Environmental Protection (MEP) established a series of *Regional Supervision Centers for Environmental Protection*, the goal being to improve vertical supervision of existing environmental related legislation. Interestingly (in the minds of the authors) the reform was itself partially a result of the United States Environmental Protection Agency (EPA) advising the Chinese government on how to structure the institutional environment surrounding environmental management. This included an early attempt to address coordination issues when the Ministry of Water Resources (MWR) established water quality bureaus within the existing river basin commissions, themselves dating back to the1950s (see US Environmental Protection Agency 2017).

While these events were occurring, Xi Jinping started to express concerns about the environment as provincial leader (Party Secretary) of Zhejang Province. In fact, On Aug. 15, 2005, Xi, while on a visit to Anji, was quoted as saying 'lucid waters and lush mountains are as invaluable as silver and gold' to China's future (quoted in Solheim 2023a, 1). This concern was carried forward to his Premiership where the Minister of Water Resources declared that 'The river chief system is a major reform measure Xi Jinping…planned, made decisions about, and promoted personally' including in his 2017 New Year's message (State Council 2022c).

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While the party and political focus helped bring water issues onto the agenda it was taken a step further in 2011 when the '*three red lines*' policy was passed, placing water at the core of the increasingly ecological focus of the government. The three lines were designed to 1) control the amount of water used in the country 2) increase the efficiency of water used 3) reduce and limit the discharge of sewage into the water supply. The overall goal was to ensure that that 95% of tested water met national water quality guidelines of no worse than Level IV criteria. Then in 2015 the new *Water Pollution and Control Action Plan (Water Ten Plan)* was passed. The goal of this plan (devised with the input of over 12 ministries and departments) was to establish 10 quality goals (and 38 sub-goals) with deadlines and specifically named units responsible for each assigned target (see China Water Risk 2015). The overall aim was to prioritize water conservation with a 'science-based' treatment of the water flowing in rivers, lakes and ultimately the coastal seas. As with other reforms, unlike the river chief system, the idea was to bring market actors and mechanism and advanced water treatment facilities into the pollution prevention and treatment program of the nation's waterways.

While these changes were occurring at the central level (and unlike the way many western academics and press portray China) local level experiments directed at addressing water quality issues were starting to emerge. While not a complete list of the problems, in general, the core issues local governments were facing in the area of water ecology can be divided into three categories 1) problems created by cross departmental responsibilities relating to water resource management 2) issues associated with intergovernmental disputes and 3) cross jurisdictional problems associated with rivers and lakes flowing across different jurisdictions (see China Water Risk 2011; China Water Risk 2024). All these issues have started to be addressed with the advent of the river chief system.

While the origin of the river chief (*He-Zhang*) system is slightly in dispute (see Xianqiang 2021), there is little doubt that in 2007 pollution flowing into Taihu Lake from feeder rivers caused a massive cyanobacteria (blue algae) outbreak that threatened Wuxi City's drinking water supply. In response the *River Cross Section Water Quality Control Goals and Assessment Method in Wuxi* (trial version) was passed. The core idea of the trial was to establish a river chief system that held named party and government officials (the chief executive of each county) accountable for monitoring, managing, and restoring the water quality in the river-cross sections that fed into the lake. Importantly, the named individual would for the first time have the results of water quality monitoring included in their performance evaluation by higher level governing authorities. This was one of the first experiments to link water quality to promotion up the party-government bureaucracy. More importantly, there was a provision in the pilot to ensure that in principle anyone who submitted an inaccurate report could be held accountable.

Based on interviews conducted between 2019 and 2020 throughout Jiangsu province, the authors confirm what others have noted: that the river chief system was deliberately designed in Wuxi to use the existing accountability system to compel provincial Governors and party leaders (in addition to lower-level administrators) to treat river pollution seriously. As such, the pilot (and those subsequently developed across Jiangsu province) was designed so that poor performance evaluations in relation to the improvement of the water ecology could lead to a loss of advancement and a deduction in wages. When the authors asked about the integration of water targets into the performance management system, officials reported that this was the most efficient way to incorporate water management into existing governing structures.

Unfortunately, by designing the system around named individuals the river chief replicated the issues associated with individual motivation found in other areas of state policy. The issue is that policies implemented at the local level tend to depend on the ability of those selected to head-up the jurisdiction and the attitudes of those responsible for implementing the policies. Thus, if career/party advancement pressures (such as salary or promotion) are not a motivating factor then it is hard to be sure that a river chief will be interested in the achievement of targets. This appears to be the case in relation to the river chiefs in Shijiazhuang and Dingzhou where the Ministry of Ecology and Environment reported that the cities river chiefs had not done enough to clean-up household and industrial waste in their river sections (Ministry of Ecology and Environment 2018).

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While this might be uniquely Chinese in nature, the structure of the local cadre system is also impacted by the length of tenure and age of many of the individuals selected as river chiefs. As one local official (acting as a river chief) was reported to have said that I am: 'too old for promotion, too young to stop working, but just right for mahjong and drinking' (Dai 2019, 77). Similarly, due to their desire to advance, many younger officials have reported that they are more motivated by GDP growth measures over the environmental measures used in their performance evaluations (Jin and Shen 2019). Adding to these findings, according to the Ministry of Water Resources, older officials have been found to be over motivated by the assessment procedures developed for the river chief. In these instances, the individuals acting as river chiefs appear to be ignoring issues outside the specific pollution control measures, they are evaluated on, such as flood control or expanding public participation in the system or their access to waterways. This is ominous for the future of the project in light of the fact that despite the revised *Environmental Protection law of the Peoples Republic of China* of 2014 (*Environmental Protection Law of People's Republic of China,* https://english.mee.gov.cn/), stipulating that the public, industry and other social actors should have an active role in environmental protection, to date this has been integrated into the river chief system at a fairly minimal level in many jurisdictions.

Despite required training, another issue to emerge with the appointment process that will be worth considering if the system is to transfer outside China is related to the administrative skills and abilities of the individuals selected as local leaders. Not only do these skills tend to be lower in poorly performing jurisdictions but because officials are regularly rotated out of a location, if the skills needed to be a good river chief are poorly developed during their tenure in one jurisdiction, when an official moves on, their lack of skills will likely be reflected in their new posting (though this might be partially addressed in the long-term by the Between Region Paring Assistance (BRPA) and the Inter-Regional Cadre Transfer system (IRCT).

Another issue that appears to have come to light in the author's own analysis is that in some instances the focus on specific pollution targets and pollutants has allowed some river chiefs not only to ignore other responsibilities but to game the review process by focusing only on the pollutants specified for reduction. This is part of the reason that the State Council and the Ministry of Water Resources developed a reward system where the 10 best performing cities and counties will receive 'more support from the central fiscal fund for water conservancy development' than other jurisdictions (State Council the People's Republic of China 2020).

Moving back to Wuxi, the elimination of the cyanobacteria was only one of the goals set under the trial legislation, in effect the chief administrative officer was held responsible of 64 major rivers sections in the area including the restoration of the overall ecology of the water environment. The assumption being that those who achieved their targets would be rewarded with money and/or promotion. Those who failed would be punished though fines or even the loss of promotional prospects. As stated by the CPC Wuxi Committee, for anyone not achieving their stated targets:

the Organizational Department (of the CPC), after an investigation, will veto the relevant leadership when they participate in a city-level competition for an effective leading group, or veto the relevant responsible officials when they participate in the competition for advanced or excellent individuals, or veto the promotion of those directly responsible officials. (Tai Hu Net 2016)

### *3.4. Movement of the River Chief System*

While this was occurring, the General Office of Jiangsu Provincial Government issued the *Notice on the Implementation of the Dual RLS in the Main Tributaries of Taihu Lake* in 2008. With this, the river chief system was officially promoted by the provincial government. In 2012, after multiple evaluations of the river chief system including those used in Wuxi, Suqian, Huaian, and Shzhou, Jiangsu Provincial officials went from promoting to requiring that the municipal governments in the province institute the river chief system.

While Jiangsu was the home of the river chief, other jurisdictions quickly adapted and implemented the river chief concept in their own jurisdictions, including Zhejiang and Jiangxi

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provinces (2007). In fact, as illustrated in Table 1, the river chief was entrenched across China at the local level by 2015.

**Table 1.** Spread of the River Chief.

| City | Year RC adopted |
|---|---|
| Wuxi | 2007 |
| Suzhou | 2008 |
| Suqian | 2008 |
| Huaian | 2009 |
| Shiyan | 2012 |
| Nanjing | 2013 |
| Zunyi | 2014 |
| Yichang | 2015 |

Source: Adapted from She, Liu, Jiang, Yuan 2019.

While the river chief was spreading endogenously from city-to-city and province-to-province, in 2014 the Ministry of Water Resources issued the *Guidance Opinions on Strengthening the Management of Rivers and Lakes.* This guidance was based on the collective experience of the emerging river chief system and made it a requirement that local governments offer their own ideas on rivers and lakes management and incorporate this into their river chief designs (*Guidance Opinions on Strengthening the Management of Rivers and Lakes 2014*). In total, the river chief system transferred from Jiangsu to 25 other provinces before it was taken up by the General Office of the CPC Central Committee of the State Council, which issued *Opinions on the Full Implementation of River Chief System* in November 2016. This was followed up a year later with the issuance of the *Guidance Opinions on Implementing RCS in Rivers and Lakes* that required all 31 provinces (including autonomous regions and directly administered municipalities) to develop a river chief system to be administered at the provincial, city, county, and township.

Overall, as can be seen in Table 2, the spread of the river chief system took only a decade of gradual recognition and adaptation by local governments before it was transferred up to the central government, which subsequently transferred it back down to all local governments.

**Table 2.** Spread of the River Chief post Options.

| Province | Date Recognised in Provincial Documents |
|---|---|
| Shaanxi | February 2017 |
| Shangdon | March 2017 |
| Shanxi | April 2017 |
| Ningxia Hui Autonomous Region | April 2017 |
| Henan | May 2017 |
| Inner Mongolia Autonomous Region | May 2017 |
| Qinghai | May 2017 |
| Sichuan | May 2017 |
| Gansu | July 2017 |

Adapted from: Zhang, Zou, Zhang and Sharifi 2023.

While the models being utilised across the country are not exactly alike all must incorporate a series of tasks and assessment measures. At a general level these require each chief (and their deputy), regardless of the level operating at, to maintain and protect the rivers and lakes in their

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jurisdiction. At a more detailed level river chiefs have been tasked with 1) the protection of water resource 2) prevention and control of pollution entering the water way 3) the restoration of the water 4) management of the shoreline 5) management of the 'water environment', and 6) the enforcement of water related laws. More specifically, the *'One River (or Lake), One Strategy'* document, indicates that water quality parameters, in relation to chemical oxygen demand (COD), total nitrogen (TN), ammonia nitrogen ($NH_3$-N), dissolved oxygen (DO), total phosphorus (TP), heavy metals, pH, turbidity, suspended solids, temperature be used to evaluate progress in cleaning up surface-water pollution levels.

At this point it is worth stressing that in China, the Provincial Party Committee Secretary, as the formal representative of the party, is technically the top-ranking official in a province with the Governor as the second ranking official, making the Party Committee Secretary the primary official responsible for the river chef system in the province. In addition, river chiefs at the provincial level assume overall responsibility for managing and protecting rivers and lakes in their jurisdiction. This provision includes prefecture-level cities. More specifically according to *Options*, units located at the county level and above must establish river chief system offices and infrastructure. These offices should themselves be designed to incorporate representatives from all the relevant departments and units involved in water management. The idea being to address the lack of coordination between departments involved in water management that characterised the situation in most provinces prior to the rollout of the river chief. It is important to note that in this the river chief office is:

responsible for the coordination, supervision, guidance, inspection, and communication of work, rather than replacing existing water-related functional departments. Through the regional water resources management committee or the inter-departmental joint meeting system, river chiefs at all levels can solve transfer problems and responsibility, policy goals and conflicts, lack of communication, and service omission of the watershed environment between different administrative departments (finance, water, environmental protection, agriculture, forestry, etc.), thereby reducing the obstacles from the fragmentation of bureaucratic management. (Wang, Wan, Zhu 2021, 3)

While the office of river chief helped bring horizontal coordination to the water management system, these offices only indirectly addressed problems of cross-jurisdictional coordination. As can be seen in Figure 1, not only were issues of left vs right bank pollution sources not directly addressed by the river chief office but as a result of the segmented nature of the Chinese governing system the lowest section of the rivers often have to take responsibility for pollution issues that originated upstream despite having little to no power over the process, industries, or decisions that led to the pollution being released into the river.

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**Figure 1.** Chishui River Basin. Source: Xianqiang 2021, 10.

To start addressing some of these issues, *Guidance Opinions on Implementing RCS in Rivers and Lakes* mandated that for rivers and lakes spanning several jurisdictions, river chiefs would be held responsible for developing mechanism for the effective management of the entire river. More specifically the legislation mandates that river chiefs are responsible for the coordination of 'joint prevention and control' measures where pollution and ecosystem restoration impact on the upper and lower parts of a river or a lake, and where restoration impacts on the left and right banks in a river basin (*Environmental Protection Law of People's Republic of China*). To do this, some jurisdictions developed what has become known as the 'conference system', where the different jurisdictions associated with a river basin engage in direct consultations with their counterparts (though few of the conferences involve all the actors involved in cross basin water management).

The core idea was to encourage river chiefs to communicate with each other and department leaders in adjacent regions to coordinate their actions. Looking back at Figure 1, officials in Sichuan, Yunnan, and Guizhou made such an agreement. Specifically, the Governors of the provinces signed an *Agreement on the Coordination of Chishui River Basin Environmental Protectio*n'. The goal of the agreement was to 'jointly promote the ecological environment protection of the Chishui River Basin and strengthen the management of cross provincial waters' (Xianqiang 2021, 10). This was further strengthened with the signing of the *Cooperation Framework Agreement for the Protection and Restoration of Aquatic Resources in the Chishui River* in 2023.

A conference (type) system has itself been embedded at the national level by the State Council of China which:

initiated an inter-ministerial joint conference on the comprehensive implementation of the system, established and improved mechanisms covering the fulfillment of responsibility by river and lake chiefs, supervision and inspection, evaluation and accountability as well as positive incentives to promote the implementation of the system. (State Council the People's Republic of China 2021)

Even city-level river chief system offices are starting to engage in cross-jurisdictional agreements, such that between, Luzhou, Zunyi, and Bijie (*Agreement on the Coordination Working Mechanism of Fishery Administration in Co-managed water within Chishui River*).

All told while there are clear variations in the impact of the river chief system across the country – particularly between Eastern and Western provinces and rich and poor jurisdictions - overall the river chief system is making a difference in the quality of the water ecosystem across China. As reported by the Ministry of Ecology & Environment in 2023, not only have the number of rivers reaching category I- III status improved to over 89 percent since the passage of the *Options*, but all of China's seven major river basins have met their 'Water Ten targets' (i.e. having at least 70 percent of

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their rivers graded at levels I-III while having less than five percent of their water graded at V+) with the Yellow river basin exceeding its target with 81.9 percent of its water meeting grades I-III (Ministry of Ecology & Environment 2023).

The World Bank's most recent analyses of the effects of the river chief system in the Yellow River Basin supports the reports issued by the Ministry, concluding in 2024 that 'the implementation of the river chief system has played a significant positive role in improving the water environment quality of the Yellow River basin...[it] has achieved remarkable results in the short term' (World Bank 2024; for more specific information on Yangtze and Yellow river basins see: State Council the People's Republic of China 2022a: State Council the People's Republic of China 2022b). Antidotally Erik Solheim, the former executive director of the United Nations Environment Programme supported this analysis when he stated:

visited Pujiang County…saw the wonderful transformation of rural Zhejiang... Pollutants in the rivers dyed the water white, so they were called "milky rivers" due to pollutants. Now over 97 percent of the surface water in Zhejiang is of excellent quality. The West Lake in Hangzhou and other lakes have been restored to their former beauty. No wonder the ancient Chinese said that "above is heaven, on Earth is Suzhou and Hangzhou." (Solheim 2023a, 1)

As such, while there is a lot more work to be done before all of China's rivers and lakes are rated between Category I and III (see decision by the State Council the People's Republic of Chian to shift some of the focus of the river chiefs from pollution abatement to overall water ecology), since the initial pilot program was introduced in Wuxi, surface water quality across the nation has seen a dramatic improvement, and one where China is seen as being among the leading nations in addressing water pollution in the world (see State Council the Peoples Republic of China 2023).

### *3.5. Can the River Chief System Move Out of China?*

Given the early success that China has experienced with the spread and national implementation of the river chief system, the question that must be asked is if it can be moved out of China. The answer to this depends on what one looks at. At the base level ideas can and do travel. As such, the ideas underpinning the river chief system can be moved to other locations. More specifically, idea that there is a link between a population's health and the maintenance of its water supply is something that many governments can utilise when considering how to get the issue of water ecology onto the agenda. For example, in the United States there is growing awareness of the need to utilise green infrastructure and the natural water ecology in the management of stormwater (Dolowitz 2017). It would be a short step to link this to the ideas of improving overall water ecology. Similarly, the idea of being able to hold agents (or agencies) accountable for the condition of local lakes and rivers should be movable, even if it would need to be tailored to meet the different political structures associated with the locality.

Another idea that is embedded into the river chief system is the awareness of increasing public participation in the monitoring process of water ecology. The idea of encouraging and finding ways to better integrate the public to help monitor and report on the visible (and if appropriate chemical) state of rivers and lakes is transferrable. In fact, we can see just such an approach being utilised in a small way by the UK Rivers Trust which runs a bi-annual 'Big River Watch' project designed to get the public involved in monitoring the state of the rivers in the UK and Ireland over a five-day period (The River Trust 2024).

While not an idea, one area where the river chief system is likely to offer a 'best practice' model is in the adoption and adaptation of technology in the monitoring and cleaning of rivers by both officials and public participants. This was seen internally when researchers found that:

based on the panel data of 108 prefecture-level cities in the Yangtze River Economic Belt (YREB) from 2004 to 2019. The results of this research show that: (1) GTI in the YREB shows a rapid growth trend, and the lower reaches are generally higher than the middle and upper reaches; (2) RCS can improve the local GTI by 19.43% and has a significant positive incentive effect on adjacent regions' GTI, while the GTI itself can generate a positive spillover effect for adjacent regions. (Ding and Sun 2023)

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The movement of monitoring technology is considerably easier than some of the other aspects of the system to be discussed below, due to the very nature of technology being universally available on the ground (if a jurisdiction can afford it). In fact, while not necessarily a result of policy transfer, subsequently to its use in areas of the Yangtze river basin, as part of the Big River Watch, a phone application was utilised to facilitate the publics participation in the monitoring exercise in the 2024 exercise (The River Trust 2024.). In addition to the use of the phone app, as in many of the river chief systems, the 2024 Big River Watch also used social media to deliver information and collect data back from the public.

A second example could be the adaptation of the technology that underpins much of the water quality evaluations. This technological approach might be 'exported' to inform the UKs recent announcement regarding the Natural Capital and Ecosystem Assessment Program, which according to the UKRI is designed to investigate and integrate natural capital approaches into the governing processes of the marine environment (UKRI 2024). Making this movement possible can be seen in statements such as that made by Lord Benyon (Minister of State for Climate, Environment and Energy) when he noted that 'It is more important than ever that we invest in advanced technology such as artificial intelligence, drones and molecular tools to bolster our capabilities to monitor biodiversity in our seas' (UKRI 2024), all of which have been used in the application of the river chief system in China.

In a similar fashion, as a result of a Supreme Court decision in Sakett v. EPA, which substantially reduced the Environmental Protection Agency's ability to protect streams that only flow during 'rainy seasons' or as a result of snow melt, there is a growing concern about the state of 'about half of the nation's [USA] wetlands and up to four million miles of streams that supply drinking water for up to four million people' (Jacobo 2024; see also Supreme Court of the United States 2023). Clearly, while the situation is different, the experience of the more arid regions in Western China in implementing and operating river chief systems under similarly arid conditions might offer valuable lessons for many of the streams and wetlands impacted by the Sackett decision. Overall, as technology spreads and makes the monitoring of rivers easier and more interactive, it is likely that Chinese experiences will have a lot to teach the rest of the world.

Once we move outside of the arena of the ideas and technologies it becomes more difficult to see the river chief being moved as a 'model' to other nations. First, it is not just about the ecology of rivers and lakes. Rather, it is an institutional solution designed specifically to take advantage of the review/reward system underpinning the Chinese party-state. In most nations local leaders are elected and directly accountable to the people or are part of a merit based civil service where promotion and assessment is by an independent review committee. Or as stated by the US Office of Personal Management the hiring and promotion processes for civil servants is 'designed to ensure fair and open recruitment and competition and employment practices free of political influence or other nonmerit factors' (US Office of Personal Management 2024). However, in China, where local leaders are appointed, the principle-agent connection becomes more complex. This is doubly true when it is realised that as a party-state many of the municipal positions are held by individuals selected to govern while corresponding acting as party officials.

**Conclusions**

What started as a solution to an emergency arising out of a blue green algae bloom impacting the drinking water of Wuxi has grown to be a national policy. In this, policy learning and transfer were involved at all levels (for more see Dolowitz and Marsh 2000; Dolowitz 2017). First horizontally between cities both within and outside of Jiangsu Province, and then vertically to several other Provinces. From here the transfer and learning processes were a mix of horizontal and vertical transfers (both up to and down from higher level jurisdictions) and involved elements of both soft and hard learning. At this point the river chief system was adopted as policy and sent down from the central government to the provinces for implementation.

Early results, seem to indicate that the river chief system is making a difference in the quality of surface water. Despite this positive evaluation of the river chief system, it is hard to see the overall

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river chief system being transferred outside of China. However, while the overall system is unlikely to travel well it is it is possible to see the underlying ideas and technologies being developed and used to improve the water environment, and the efforts seen in some provinces, cities, towns, and villages to increase citizen participation making their way onto the global stage. Not only are regions and nations across the globe facing similar issues with water quality and ecological degradation, but the combination of awareness of the problem, technological solutions, and public participation clearly offer others with ideas and potential solutions to pollution contamination of rivers, lakes, and shoreline environments.

To facilitate the learning and transfer processes, the authors offer five core recommendations. In the first instance China must sell the policy to the rest of the world directly and via other organisations, such as the World Bank or IMF, who have been monitoring and sponsoring different river chief projects since its launch in 2007. In this it is important to understand that the river chief system, as it is designed and institutionalised in China, is not likely to travel as a single package. Rather, in marketing the river chief officials would do better to tie it into the larger ecological and river restoration efforts that have been taken by Chinese officials over the past 20 years. The idea being to highlight how the river chief fits into the system and has helped to stabilize and reverse the deteriorating ecological situation faced by many of the primary water bodies in China. In doing this, officials can show how the river chief ideas can find their way into many nations facing general issues of water pollution and conservation.

Second, it is vital that if China wants to transfer the river chief it will need to understand and engage with the factors motivating the developers of the river chief system, those who want to sell it to others, and those wanting to import the policy. The issue is that *why* one engages in the development of a system based on the experience of others is often a core factor explaining *how* and *what* are done with the information. Thus, some might engage with the process with the goal of rejecting the river chief due to ideological opposition to the Chinese governing Party rather than the concept of the river chief specifically. Others might be interested in selling the river chief idea to draw attention to themselves in hopes of impressing higher level authorities. When this occurs, it is less likely that issues and problems will be highlighted which could lead to misrepresentation and poor knowledge transfer. In a similar way motivation can overcome institutional differences between jurisdictions if the goal is to engage in the learning process. As such, what gets transferred and how the system is subsequently developed to fit the needs of a new jurisdiction are often hidden in the motivations of those involved.

Third, while it is vital to engage in the learning process when trying to transfer the river chief from China, it is equally as important that those involve not get caught up with the technical details. Many nations might see the Chinese cadre system, its hierarchical structure running from the centre down and the fact that at the local level the prime decision-makers are typically the party secretary and party committee members as being too different from western style civil service to consider the river chief. While institutional differences matter, they should not be seen as a barrier to learning or transfer. As discussed, many of the technologies and ideas that underpin the river chief are movable and can fit into many existing bureaucratic settings if the time needed to adjust the policy to the setting is taken and needs of the rivers in the region are properly assessed.

Fourth, despite the passage of the revised *Environmental Protection law of the Peoples Republic of China* in 2014 (*Environmental Protection Law of People's Republic of China,* https://english.mee.gov.cn/), stipulating that the public should have an active role in environmental protection, with few notable exceptions (Shanghai and parts of the Yellow river system), the public are still not well utilised in the monitoring or feedback mechanism associated with the river chief or their evaluations. Despite the issues of public involvement some Chinese cities have actively worked to involving businesses and the public in their river chief systems. This involvement illustrates that public participation can work in the monitoring and reporting processes associated with surface water and river environments. Regardless of the jurisdiction, China should show the world that any solution to water pollution is likely to benefit from a clear role for the public in helping to clean, monitor, and report misuse of their river environments.

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This leads to the authors last recommendation, take advantage of the windows and other opportunities that open to sell the river chief. At these junctures (such as a court case, or a change in administration), it is far more likely that a receptive ear can be found or that someone will be looking for solutions that the river chief might well fit. For example, the Big River Project is a regular event that could be used by Chinese policymakers to link the concepts of the river chief to an active and influential organisation in the UK. In a similar way, many events naturally occur that lead to ongoing surface water problems (such as stormwater overflows), where new solutions are going to find an easier way onto the agenda. All told, while many events can open windows for the movement of the river chief, it is going to take effort (such as by an entrepreneur) to put the river chief on the agenda of policymakers outside China.

**References**


32nd Session of the Standing Committee of the 10th National People's Congress. (2008), *Law of the People's Republic of China on the Prevention and Control of Water Pollution*, https://english.www.gov.cn/archive/laws_regulations/2014/08/23/content_281474983042375.htm (accessed 08/11/2023

Business for Social Responsibility (2009), *Water Quality and Environmental Health in Southern China*, Business for Social Responsibility: Shanghai.

China Water Risk (2024), 'Big Picture', https://chinawaterrisk.org/big-picture/ (accessed 21/07/2024).

China Water Risk (2015), 'New 'Water Ten Plan' to Safeguard China's Waters', https://chinawaterrisk.org/notices/new-water-ten-plan-to-safeguard-chinas-waters, (accessed 08/08/2024).

China Water Risk (2011), *China Water Risk: A Portrait*, CWR: Hong Kong.

Dai, L. (2015), 'A New Perspective on Water Governance in China: Captain of the River', *Water International, 40*(1), 87–99.

Dai, L. (2019), 'Implementing the Water Goals—The River Chief Mechanism in China'. In: *Politics and Governance in Water Pollution Prevention in China. Politics and Development of Contemporary China*. Cheatham: Palgrave, 69-82.

Dolowitz, D., Marsh, D. (2020), 'Learning from Abroad: The Role of Policy Transfer in Contemporary Policy-Making,' *Governance* 13:1 (2000), 5-23.

Dolowitz, D. (2017), 'Does Transfer Lead to Learning? The international movement if information': CEBRAP Review *Novos Estudos*, 17:1, 35-56.

Ding, R. and Sun, F. (2023), 'Impact of River Chief System on Green Technology Innovation: Empirical Evidence from the Yangtze River Economic Belt', *Sustainability*, 15: 6575, 1-22.

Environmental Protection Law of People's Republic of China, https://english.mee.gov.cn/ (accessed 10/04/2024).

Food and Agriculture Organization of the United Nations (FAO) (2008). *Coping with Water Scarcity: An Action Framework for Agriculture And Food Security*, Water Reports: Rome.

Global Water Partnership. (2015). *China's Water Resources Management Challenge: The 'Three Red Lines'*. Sweden: Elanders.

Hao, Y., and Wan, T. (2023), *The River Chief System and An Ecological Initiative for Public Participation*, Singapore: Springer Nature.

Jacobo, J. (2024), 'Streams that supply drinking water in danger following 2023 Supreme Court decision that stripped wetlands Protections', *ABC News online* (16 April), https://abcnews.go.com/US/streams-supply-drinking-water-danger-2023-supreme-court/story?id=109139758 (accessed 16/04/2024).

Jin, G., & Shen, K. (2019). Promotion Incentives for Local Officials and the Evolution of River Chief System: A Perspective Based on Officials' Age. *Finance and Trade Economics*, 4, 20–34, (English translation).

Li, Y., Tong, J. and Wang, L. (2020), 'Full Implementation of the River Chief System in China', *Sustainability*, 12:3754, 1-16.

Liu, H., Chen, Y., Liu, T., and Lin, L. (2019), 'The River Chief System and River Pollution Control in China: A Case Study of Foshan', *Water*, 11: 1606, 1-14.

Ministry of Ecology and Environment of the Peoples Republic of China (2023), '2023 State of Ecology & Environment Report Review', https://chinawaterrisk.org/resources/analysis-reviews/2023-state-of-ecology-environment-report-review/ (accessed 28/07/2024).

Ministry of Ecology and Environment of the Peoples Republic of China (2022), 'In-depth Action Plan for the Protection and Restoration of the Yangtze River', https://www.mee.gov.cn/xxgk2018/xxgk/xxgk03/202209/t20220919_994278.html (accessed 7/7/2024).

Ministry of Ecology and Environment of the Peoples Republic of China (2017), '2017 State Of Ecology & Environment Report Review', https://chinawaterrisk.org/resources/analysis-reviews/2017-state-of-ecology-environment-report-review/ (accessed 20/07/2024).

 doi:10.20944/preprints202406.0184.v2



Ministry of Ecology and Environment of the Peoples Republic of China (2018), 'MEP adopts in principle the programmes of action for "Green Shield 2018", environmental protection of centralized drinking water sources, and treatment of black and odorous waters', https://english.mee.gov.cn/News_service/news_release/201802/t20180227_431831.shtml (accessed 20/06/2024).

Ministry of Water Resources of the Peoples Republic of China (2014), 'Guidance on strengthening the management of rivers and lakes', http://www.gov.cn/gongbao/content/2014/content_2707859.htm (accessed 07/09/2024).

Ministry of Water Resources of the People's Republic of China (2018), The Guide for 'One River (or Lake), One Document' Programming, http://www.mwr.gov.cn/zwgk/zfxxgkml/201805/t20180514_1037385.html (accessed 18/10/2022).

The National Standards of the People's Republic of China (2024), 'Environmental Quality Standards for Surface Water', https://english.mee.gov.cn/SOE/soechina1997/water/standard.htm (accessed 14/06/2024).

She, Y., Liu, Y. Jang, L., Yuan, H. (2019), 'Is China's River Chief Policy Effective? Evidence from a quasi-natural experiment in the Yangtze River Economic Belt, China', *Journal of Cleaner Production*, 220, 919-930.

Silveira, A. (2014). China's Political System, Economic Reform, and the Governance of Water Quality in Pearl River. In D. E. Garrick, D. Connell, & J. Pittock (Eds.), *Federal Rivers: Managing Water in Multi-layered Management Systems*, Cheltenham: Edward Elgar.

Solheim, E. (2023), 'A watershed moment for China's green leap', *Sri Lanka Guardian*, http://www.srilankaguardian.org/2023/08/a-watershed-moment-for-chinas-green-leap.html (accessed 02/03/2024).

Solheim, E. (2023a), 'Guest Opinion: A watershed moment for China's green leap', http://www.china.org.cn/world/Off_the_Wire/2023-08/16/content_103215816.htm (accessed 04/03/2024).

State Council The People's Republic of China (2023), 'National water strategy to focus more on conservation', https://english.www.gov.cn/news/202304/24/content_WS6445eec6c6d03ffcca6ec949.html (accessed 07/082024).

State Council The People's Republic of China (2022a), 'Yellow River War-Action-Plan for Ecological and Management' https://www.gov.cn/zhengce/zhengceku/2022-09/07/content_5708710.htm (accessed 07/20/2024).

State Council The People's Republic of China (2022b), 'In-depth Action Plan for the Protection and restoration of the Yangtze River', https://english.www.gov.cn/policies/policywatch/202209/28/content_WS63339e76c6d0a757729e09ab.html (accessed 07/08/2024).

State Council The People's Republic of China (2022c), 'River Chief System Advances Conservation Effort', https://english.www.gov.cn/statecouncil/ministries/202209/14/content_WS63210c0ec6d0a757729dff12.html (accessed 12/08/2024).

State Council The People's Republic of China (2021), 'China's designation of river, lake chiefs yields notable results', https://english.www.gov.cn/policies/policywatch/202112/13/content_WS61b6b9f3c6d09c94e48a2259.html (accessed 07/27/2024).

State Council The People's Republic of China (2020), 'China ups incentive for local river, lake protection', https://english.www.gov.cn/statecouncil/ministries/202002/13/content_WS5e45145ec6d0595e03c20a27.html (accessed 20/07/2024).

Supreme Court of the United States (2023), 'Sackett v. Environmental Protection Agency, 598 U.S.', https://supreme.justia.com/cases/federal/us/598/21-454/ (accessed 20/07/2024).

Tai Hu Net. (2016). *Modern River Chief Mechanism Expended to Nationwide from Here*, http://www.tba.gov.cn/tba/content/TBA/xwzx/slyw/0000000000011409.html (accessed 12/01/2018)

The Rivers Trust (2024), https://theriverstrust.org/take-action/the-big-river-watch (accessed 20/04/2024).

UKRI (2024), 'Funding to improve biodiversity observation capabilities in UK waters', https://www.ukri.org/news/funding-to-improve-biodiversity-observation-capabilities-in-uk-waters/?utm_medium=email&utm_source=govdelivery (accessed 14/04/2024).

United Nations Environment Programme (UNEP) (2016), *A Snapshot of the World's Water Quality: Towards a Global Assessment*, UN: Nairobi.

UN-Water (2011), *Policy Brief on Water Quality*, UN-Water.

US Environmental Protection Agency (2017), 'EPA Collaboration with China', https://19january2017snapshot.epa.gov/international-cooperation/epa-collaboration-china_.html (accessed 5/04/2024).

US Office of Personal Management (2024), 'Merit System Principles and Performance Management', https://www.opm.gov/policy-data-oversight/performance-management/reference-materials/more-topics/merit-system-principles-and-performance-management (accessed 14/5/2024).

 doi:10.20944/preprints202406.0184.v2



Wan, B., Wan, J, and Zhu, Y. (2021), 'River Chief System: an institutional analysis to address water shed governance in China', *Water Policy*, 23:6, 1435-1445.

Wang, Y., and Chen, X. (2020), 'River Chief System as a Collaborative Water Governance Approach in China, *International Journal of Water Resource Development*, 36:4, 610-630.

Water Law of the People's Republic of China - 1988, Article 1. https://lehmanlaw.com/resource-centre/laws-and-regulations/environment/water-law-of-the-peoples-republic-of-china-1988.html (accessed 18/02/2024).

World Bank (2024), 'Ecological Protection in China's Yellow River Basin to be Enhanced with World Bank Support', https://projects.worldbank.org/en/projects-operations/project-detail/P178401 (accessed 28/07/2024).

World Bank (2007), *Water Pollution Emergencies in China*, World Bank: New York.

Wu, C., Ju, M., Wang, L., Gu, X., and Jiang, C. (2020), 'Public Participation of the River Chief System in China,' *Water*, 12: 3496.

Xianqiang, T. (2021), 'The River Chief System in China', In: Ferrier, R.C. and Jenkins, A. (eds), *Handbook of Catchment Management*, Singapore: John Wiley.

Zhang, Z., Xiong, C., Yang, Y., Liang, C., and Jiang, S. (2022), 'What Makes the River Chief System in China Viable? Examples from the Huaihe River Basin', *Sustainability* 14:10, 1-25.

Zhang, Z., Zou, X., Zhang, C., and Sharifi, S. (2023), 'Has China's River Chief System Improved the Quality of Water Environment? Take the Yellow River Basin as an Example', *Polish Journal of Environmental Studies*, 32:5, 4403-4416.