Review

Research Focuses and Evolution Trends of River Chief System: A Review of Papers Published from 2009 to 2022

Fang Chen

Graduate School of Global Environmental Studies, Kyoto University, Kyoto 606-8216, Japan; chen.fang.82r@st.kyoto-u.ac.jp

Abstract: This article presents a systematic review of studies of the River Chief System (RCS). It utilizes a dataset comprising 363 high-quality papers published between 2009 and 2022, sourced from the Web of Science and the China National Knowledge Infrastructure (CNKI), as the foundation for analysis. The primary research method employed is a literature review. Additionally, CiteSpace bibliometric software (v6.2.R2) is used to perform keyword analysis of RCS research. The key research findings include the following points. Firstly, research into RCS has undergone two phases. Secondly, the review presents several points emergent in the literature that have been the focus of much study, including governance logics, theoretical foundations, operational mechanisms, policy effects, and current challenges. Furthermore, the author identifies key trends in the evolution of RCS, such as public participation, the utilization of information technology, and the implementation of the Lake Chief System, Forestry Chief System, and Field Chief System, as well as the construction of a rule of law. Finally, the author suggests that international comparative studies and an inquiry into long-term mechanisms for the implementation of the RCS are needed. This paper provides the first systematic review of the growing literature on RCS, based on papers written in both Chinese and English. It maps out key research points, identifies research trends, and provides a deeper understanding to guide future research.

Keywords: Chinese water governance policy; environmental governance; River Chief System

1. Introduction

The River Chief System (RCS) stipulates that the main leaders of the party and government at all levels serve as ‘river chiefs’ for important rivers within their administrative jurisdictions, and they are responsible for water resources protection, water coastline management, water pollution prevention, water environment governance, and water ecological restoration. Furthermore, local officials’ promotion opportunities are linked to water quality results [1]. Despite RCS being a terminology specific to the context of China, it has garnered significant interest in both Chinese- and English-speaking academic communities. Scholars published a considerable number of papers related to RCS from 2009 to 2022. However, the availability of comprehensive literature reviews is limited, particularly in English, with only one review paper specifically referring to RCS. This prior review critically examines RCS through the lenses of power, bureaucracy, and public participation, prompting a re-evaluation of RCS in China [2]. The scarcity of comprehensive reviews makes it challenging for English-speaking readers to retrieve and access detailed information about RCS. Therefore, this paper aims to bridge this gap, providing convenience to those individuals, enabling them to gain a comprehensive understanding of the research progress on RCS in both Chinese and English.

This study, by selecting high-quality literature in both Chinese and English related to RCS from the CNKI and the Web of Science databases, found that the quantity of the literature on RCS experienced two distinct phases. A notable shift occurred in 2016, marking a transitional period. Key research focuses in RCS include governance logics, theoretical foundations, operational mechanisms, policy effects, and contemporary challenges. Emerging
research trends encompass public participation, the development of new technologies related to RCS, its extension into other governance domains, and the rule of law construction within the system. Future research should emphasize international comparative studies of RCS and explore long-term mechanisms for its implementation. By examining the research context, identifying research hotspots, and tracing the evolutionary trends of RCS, this study aims to shed light on advanced governance methods and exemplary practical experiences while effectively understanding future research directions and trends. The goal is to provide readers with a detailed understanding of the current research status of the RCS and offer a valuable reference for future research and the system’s further development, assisting its successful establishment and growth across various regions in China. It may also serve as a crucial reference and source of experience for water management in other countries.

2. Background

The development of RCS has gone through three stages, which are defined as follows. The first stage was the period of establishment and formation. RCS originated in Chang Xing County, Zhejiang Province [3]. At the beginning of the 21st century, disparities in the standards of river and lake governance among villages and towns throughout the county, accompanied by the absence of a unified criteria for the implementation and indistinct assignment of responsibilities, led to a sustained degradation of the state of rivers and lakes. In June 2003, Chang Xing County promulgated the RCS, disclosing the list of river chiefs along with their associated duties, thereby signifying the official emergence of the RCS. However, during this phase, a comprehensive framework for systematic water governance by river chiefs had yet to be established. In 2007, the Wuxi City (belonging to Jiangsu Province) issued a document titled “Wuxi City’s Water Quality Control Objectives and Evaluation Methods in Rivers (Lakes, Reservoirs, Springs)” in response to the outbreak of blue-green algae in Tai-hu Lake and the ensuing water supply crisis [4], which designated the mayor of Wuxi City as the chief river chief for a total of 64 rivers within their jurisdiction. Additionally, the governors of each district (county) were assigned the role of river chiefs for their respective districts [3]. The RCS in Wuxi engendered innovative diffusion effects, thereby furnishing an experiential foundation for the nationally endorsed water governance framework.

The second stage was the pilot and diffusion phase. RCS has garnered considerable attention due to its remarkable accomplishments in water pollution control. In 2008, Jiangsu Province decided to implement the RCS across the entire province, and within five years, the RCS was extended to encompass nearly all rivers in Jiangsu. This local innovation in watershed governance led to swift adoption in numerous provinces and cities. In 2014, the Ministry of Water Resources issued the “Guiding Opinions on Strengthening River and Lake Management” document, encouraging the implementation of RCS across various regions. By the end of 2016, a total of 25 provinces had embarked on the exploration of the RCS. RCS emerged as a popular phrase in the context of local government’s dedication to environmental protection and the development of ecological civilization.

The third stage was the reinforcement phase. In December 2016, the “Opinions on the Comprehensive Implementation of River Chief System” (referred to as “Opinions”) were formulated and issued jointly by the General Office of the Central Committee of the Communist Party of China and the General Office of the State Council. The document outlined the objective of establishing the RCS across China by the end of 2018. This development represented the official transformation of the RCS from a localized pilot exploration to a nationally implemented framework [6]. In 2017, the RCS was formally incorporated into the revised “Water Pollution Prevention and Control Law”. By June 2018, a total of 31 provinces in China, including provinces, autonomous regions, and municipalities, had fully established the RCS. The “14th Five-Year Plan and 2035 Long-term Goal Outline” of China clearly stated that the RCS should be strengthened to improve the management and protection mechanism of rivers.
As an institutional innovation implemented by local governments during crisis situations, the RCS is not the result of comprehensive demonstration by the academic community [7]. Regarding the future direction of the RCS, there is a skeptical stance. Some scholars have raised questions about its long-term effectiveness, as they perceive the RCS as a new system aimed at improving water environment quality in the context where existing systems and measures fail to effectively address water pollution. It is considered a temporary measure outside the conventional system. For instance, Hu [8] points out that the RCS heavily relies on strong administrative implementation, indicating a certain degree of passiveness. The RCS is viewed as an effective short-term institutional arrangement rather than a sustainable long-term solution, deviating from the normative state of river governance. Zhang [9] believes that the RCS functions as a closed environmental governance system, and the absence of societal and public involvement directly impacts the actual effectiveness of performance appraisal and accountability. Shen [10] argues that in the medium and long term, the RCS is a product of a specific historical stage. With the improvement in modern water governance systems and mechanisms, the RCS will eventually transition out of this historical stage.

The other perspective is optimistic. Li [11] argues that the RCS has achieved remarkable results in past practices. Wang [12] concludes that the diffusion mechanism of the RCS is worth advocating. Li [13] believes that the RCS should utilize multiple tools and co-governance methods to establish a long-term mechanism for river and lake governance. Deepening the reform of the RCS involves transitioning from responsibility contracting to a responsibility chain, strengthening organizational foundations, enhancing institutional supply, mobilizing multiple forces, and optimizing the combination of policy tools [14]. Huang suggests that the further innovative direction of the RCS should focus on the orderly dissipating of its characteristics as a power institution, moderately pursuing its legal institutional construction, and gradually strengthening its moral institutional development [15].

Regardless of the future prospects of the RCS, several scholars have proposed suggestions for its development and improvement. Firstly, local governments should establish legal systems and supporting rules and regulations that align with the actual situation to ensure the effective implementation of “one river, one policy”. Secondly, there is a need to enhance the accountability framework, improve the incentives of assessment results, and enhance the supervision mechanism and the system of rewards and penalties. Thirdly, it is crucial to strengthen the construction of information systems and promote information disclosure and sharing during the implementation of the RCS. Lastly, there is a need to enhance public participation, particularly in remote and rural areas, to enable the full engagement of the public and society in all aspects of the RCS’s operation, thus achieving long-term governance [16,17].

3. Materials and Methods

The primary research method employed in this study was a comprehensive literature review. This review was conducted through systematic searches of electronic databases encompassing relevant journals and publications. Specifically, the Chinese core journals and the Chinese Social Sciences Citation Index (CSSCI), available in the China National Knowledge Infrastructure (CNKI), were explored to encompass the research conducted in China. Furthermore, the Web of Science database was utilized to identify pertinent articles in the English-speaking academic community.

The retrieval was conducted on 1 September 2023. In the CNKI database, a search was performed with the title ‘River Chief System’, using the search criteria ‘exact’. The document type was restricted to ‘journal’, and the journal sources were limited to ‘core’ and ‘CSSCI’ categories. The publication year range was set from 2009 to 2022. This search yielded 349 papers. Manual sorting of these results was restricted to journals, and irrelevant documents such as conference proceedings, news reports, and those unrelated to the subject were identified and eliminated. As a result, a final set of 326 valid documents on the RCS was obtained, and the process and pathway for selecting papers are depicted in Figure 1. In
the Web of Science database, articles were identified using keywords like ‘river chief’, ‘river leader’, ‘river-director’, ‘captain of the river’, and ‘he-zhang’, etc., in combination with search restrictions to peer-reviewed articles that were published between 2009 and 2022. After the manual sorting of these results, 37 valid papers were ultimately obtained. In the case of studies that were only published in Chinese, each study was studied as carefully as possible to determine the researchers’ different opinions and minimize the impact of translation. 

![Diagram](image.png)

**Figure 1.** Example of the process and pathway for selecting papers.

Furthermore, the author engaged in discussions with relevant scholars through participation in academic conferences. Interviews were conducted with over 50 river chiefs and civil servants involved in the implementation of the RCS across various provinces, such as Hunan and Guangdong. These interviews provided valuable insights into the functioning of the RCS. The author also had the opportunity to visit rivers where the RCS are implemented, which facilitated firsthand observations and further contributed to the understanding of RCS’s operation. Therefore, through a combination of a literature review, discussions, interviews, and field observations, this study endeavors to present a comprehensive analysis and interpretation of the RCS.

4. Results

4.1. Research Periods on RCS

The variation in the number of academic publications was a significant indicator for assessing the development of a field of study. Plotting the annual distribution of academic publications offers valuable insights into evaluating the research stage, predicting development trends, and understanding the reasons for fluctuations in the field. Based on the search results, it can be observed that scholarly investigations concerning RCS began in 2009, yielding a total of 363 related papers. Among these, 326 papers (limited to papers included in Chinese core journals and CSSCI) in Chinese were sourced from CNKI, while 37 papers in English were obtained from the Web of Science. The annual publication trend of RCS-related papers from 2009 onwards is depicted in Figure 2, showing consistent growth in the number of papers focused on the RCS since 2016. Notably, in 2017, the number of articles experienced a substantial surge, reaching 36, and further increased to 57 by 2022. Although there are minor annual fluctuations, the overall trend demonstrates sustained high research activity. These findings indicate that the RCS has emerged as a prominent and extensively explored research topic, commanding continuous attention from the academic community in China during recent years. In contrast, the number of publications in English related to the RCS is smaller compared to the Chinese publications. English-language research into RCS commenced in 2017. While the number of English-language articles remains limited, it presents an avenue for further exploration. Substantial potential exists for enhancing the global visibility and understanding of RCS.
Research into the diffusion process of RCS can be delineated into two main stages. The first stage, spanning from 2009 to 2016, can be characterized as a preliminary exploratory stage. During this period, only 29 relevant papers were identified, accounting for approximately 9% of the total retrieved papers. Perhaps, during this stage, the RCS initially functioned as a localized model for water management and was merely regarded as an exploratory pilot strategy employed by some local governments to address water pollution control. Consequently, limited scholarly attention was directed towards the RCS during this stage. The second stage, spanning from 2017 to 2022, is characterized by a pronounced and continuous growth trajectory in research output. This period witnessed a substantial surge in scholarly interest, with 37 papers on RCS being published in 2017, surpassing the cumulative total of previous years. The sharp increase in scholars’ attention to the RCS can be attributed to the publication of the ‘Opinions’ document in 2016, which proposed the nationwide establishment of the RCS by the end of 2018. This signifies the transition of the RCS from a localized pilot initiative to a national water governance strategy. The two-stage diffusion trajectory of the RCS reflects the process of a policy from local implementation to national adoption, and research into the RCS has gradually grown from a sporadic state.

4.2. Research Topics on RCS

Table 1 presents a list of summary information for the top 10 most cited papers from CNKI that were included in the literature review, while Table 2 provides summary information for the top 10 most cited papers from the Web of Science.

Combining Tables 1 and 2, the Chinese study that received the highest number of citations is “River Chief System: A Case Study of Cross-departmental Coordination in Chinese Government River Basin Governance”, with a total of 415 citations. The most cited English-language study is “Is China’s River Chief Policy Effective? Evidence from a Quasi-natural Experiment in the Yangtze River Economic Belt, China”, with a total of 83 citations. Overall, although the number of papers on the RCS is substantial, their research themes mainly focus on governance logics, theoretical analyses, operational aspects, effectiveness evaluation, advantages and disadvantages, and public participation. These research themes effectively encompass the current hotspots of RCS research.
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Perspective</th>
<th>Times Cited</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ren (2015)</td>
<td>cross-departmental coordination</td>
<td>415</td>
<td>The RCS improves the efficiency of coordination in the short term but faces the challenges related to the capability dilemma, organizational logic dilemma, and responsibility dilemma [18].</td>
</tr>
<tr>
<td>Shen, et al. (2018)</td>
<td>effects</td>
<td>352</td>
<td>The RCS has achieved initial results in controlling water pollution, but it has not significantly reduced the level of pollutants in the water, which may reveal the whitewashing pollution control behavior of local governments that treats symptoms rather than root causes [10].</td>
</tr>
<tr>
<td>Wang, et al. (2011)</td>
<td>new institutional economics</td>
<td>292</td>
<td>The RCS has many institutional shortcomings, such as the inability to eliminate the problem of entrustment agency, the risk of collusion for interests; neglecting social forces; and difficulties in holding river chiefs accountable [12].</td>
</tr>
<tr>
<td>Zhu (2017)</td>
<td>development and promotion</td>
<td>218</td>
<td>The RCS is facing challenges such as undefined responsibilities, unequal distribution of power and responsibilities, the failure of the coordination mechanism, and inadequate evaluation methods [19].</td>
</tr>
<tr>
<td>Zhou, et al. (2017)</td>
<td>continuous innovation</td>
<td>162</td>
<td>The RCS needs to bridge the gap between crisis institutional design and conventional river governance and solve problems such as the responsibility dilemma, organizational logic dilemma, and insufficient absorption of non-institutional forces [14].</td>
</tr>
<tr>
<td>Zuo, et al. (2017)</td>
<td>Theoretical basis and support system</td>
<td>157</td>
<td>The author proposed the theoretical foundation of the RCS based on hydrology, water resources, water environment, and water law. The supporting system was established based on technical standards, administrative management, policy, and law [20].</td>
</tr>
<tr>
<td>Wang (2015)</td>
<td>paradox and resolution</td>
<td>154</td>
<td>The RCS presents conflicts between the rule of law and the rule of man, centralization and democracy, temporary and long-term governance, and unity and diversity. These conflicts can be addressed through procedural enhancements, improved rule of law, effective government leadership with public participation, the legalization of the target responsibility system, and the structural optimization of legal relationships [21].</td>
</tr>
<tr>
<td>Huang (2015)</td>
<td>institutional form and innovation trend</td>
<td>153</td>
<td>The further innovation trend of the RCS should be positioned as the orderly elimination of its power system characteristics, moderate pursuit of its legal system construction, and gradual strengthening of its moral system construction [15].</td>
</tr>
<tr>
<td>Jiang (2016)</td>
<td>management system</td>
<td>150</td>
<td>The RCS has produced five major results: promoting the understanding of basic conditions of major rivers, increasing efforts in the restoration of rivers, implementing long-term management of rivers, forming a joint force to manage the rivers, and improving the water environment [22].</td>
</tr>
<tr>
<td>Liu, et al. (2012)</td>
<td>institutional logic and practical dilemma</td>
<td>147</td>
<td>RCS’s increasing of river chiefs authority by creating positions based on specific incidents is flawed and makes it difficult to establish a long-term mechanism. It also has many negative effects that will affect the normalization and regular construction of the water pollution prevention and control system [23].</td>
</tr>
</tbody>
</table>
Table 2. Summary information for articles included in the literature review from the Web of Science.

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Perspective</th>
<th>Times Cited</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>She, et al. (2019)</td>
<td>effectiveness</td>
<td>83</td>
<td>The RCS substantially improves water quality, and the RCS is more effective in reducing water pollutants in cities with higher GDP levels and more rigorous environmental regulations [24].</td>
</tr>
<tr>
<td>Li, et al. (2020)</td>
<td>effects</td>
<td>69</td>
<td>Local economic development still takes precedence over environmental governance, and the implementation of the RCS is not as effective as the government claims [25].</td>
</tr>
<tr>
<td>Wang, et al. (2020)</td>
<td>collaborative governance</td>
<td>48</td>
<td>The RCS provides effective water resource management and addresses collaborative issues in the context of China’s environment. However, its long-term impact and sustainability are still to be determined [26].</td>
</tr>
<tr>
<td>Liu, et al. (2020)</td>
<td>economic model</td>
<td>35</td>
<td>River chiefs and local governments should be stakeholders, and the main members of the RCS should be the local governments influenced mostly by sustainable water resource management-related issues. The RCS should actively promote the benefits and cost-down of sustainable water resource management issues [27].</td>
</tr>
<tr>
<td>Liu, et al. (2019)</td>
<td>a case study of Foshan</td>
<td>33</td>
<td>The RCS remains a temporary management practice, and its outcomes partially depend on the commitment and capability of each river chief. The imperfect evaluation and accountability mechanisms also weaken its long-term effectiveness in terms of improving river water quality. Therefore, there is a need for corresponding policy tools to ensure the smooth implementation of the RCS [28].</td>
</tr>
<tr>
<td>Liping Dai (2015)</td>
<td>water governance</td>
<td>30</td>
<td>This study aims to understand water governance and the role of formal laws in China’s transitional phase through the perspective of the “captain of the river” [29].</td>
</tr>
<tr>
<td>Li, et al. (2021)</td>
<td>water pollution control</td>
<td>29</td>
<td>The RCS has shown limited effectiveness in addressing water pollution caused by fertilizers. Additionally, under the current system, cooperation among river chiefs only occurs within a province [30].</td>
</tr>
<tr>
<td>Wang, et al. (2019)</td>
<td>coordination governance</td>
<td>27</td>
<td>The RCS operates effectively in the short term. However, the hierarchical system based on power for vertical coordination remains unchanged, resulting in organizational logic issues and accountability dilemmas. Tasks such as improving laws, comprehensive basin management, and public participation still need to be completed [31].</td>
</tr>
<tr>
<td>Tang, et al. (2020)</td>
<td>ecological security assessment</td>
<td>27</td>
<td>The overall water ecological security level of the Chao-hu Lake Basin has been raised from the lower limit of the generally healthy category to the upper limit, which initially reflects the effect of the RCS [32].</td>
</tr>
<tr>
<td>Huang, et al. (2019)</td>
<td>public participation</td>
<td>26</td>
<td>Although the RCS encourages public participation to some extent, “government-dependent” public participation makes it difficult to ensure genuine public involvement and oversight [2].</td>
</tr>
</tbody>
</table>

Keywords are essential for summarizing the core content of the literature and reflecting the focal points and characteristic distribution of a specific research field. To achieve this, after a process of screening and refinement, a total of 200 high-quality Chinese papers were selected from CNKI, along with 30 high-level English papers chosen from the Web of Science based on the number of citations. Through the utilization of Cite Space to analyze and sort keywords, it was revealed that, in addition to the five aforementioned prominent areas, other keywords encompass the latest developments in the field of the
RCS. Consequently, these data provide valuable materials for exploring the hotspots and trends within RCS research. Tables 3 and 4 present the keywords extracted from the highly cited and high-quality literature indexed in Chinese and English, respectively.

**Table 3.** Key words indexed in RCS in Chinese papers from 2009 to 2022.

<table>
<thead>
<tr>
<th>Key Words</th>
<th>Count</th>
<th>Key Words</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>River Chief System</td>
<td>165</td>
<td>water governance</td>
<td>3</td>
</tr>
<tr>
<td>public participation</td>
<td>11</td>
<td>long-term management</td>
<td>3</td>
</tr>
<tr>
<td>river and lake management</td>
<td>10</td>
<td>Jiangsu Province</td>
<td>3</td>
</tr>
<tr>
<td>water environment</td>
<td>8</td>
<td>water pollution</td>
<td>3</td>
</tr>
<tr>
<td>watershed governance</td>
<td>5</td>
<td>environmental governance</td>
<td>3</td>
</tr>
<tr>
<td>river and lake governance</td>
<td>4</td>
<td>one river one policy</td>
<td>3</td>
</tr>
<tr>
<td>institutional logic</td>
<td>4</td>
<td>big data</td>
<td>3</td>
</tr>
<tr>
<td>informatization</td>
<td>4</td>
<td>collaborative governance</td>
<td>2</td>
</tr>
<tr>
<td>system</td>
<td>3</td>
<td>rule of man</td>
<td>2</td>
</tr>
<tr>
<td>innovation</td>
<td>3</td>
<td>countermeasures</td>
<td>2</td>
</tr>
</tbody>
</table>

**Table 4.** Key words indexed in RCS in English papers from 2009 to 2022.

<table>
<thead>
<tr>
<th>Key Words</th>
<th>Count</th>
<th>Key Words</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>River Chief System</td>
<td>19</td>
<td>city</td>
<td>2</td>
</tr>
<tr>
<td>basin</td>
<td>5</td>
<td>decentralization</td>
<td>2</td>
</tr>
<tr>
<td>pollution</td>
<td>5</td>
<td>challenges</td>
<td>2</td>
</tr>
<tr>
<td>management</td>
<td>5</td>
<td>perspective</td>
<td>2</td>
</tr>
<tr>
<td>water pollution</td>
<td>4</td>
<td>river chief policy</td>
<td>2</td>
</tr>
<tr>
<td>water governance</td>
<td>4</td>
<td>sustainable management</td>
<td>2</td>
</tr>
<tr>
<td>river chief</td>
<td>3</td>
<td>collaborative governance</td>
<td>2</td>
</tr>
<tr>
<td>governance</td>
<td>3</td>
<td>framework</td>
<td>2</td>
</tr>
</tbody>
</table>

The results indicate a certain similarity in the hot keywords between the two language studies, signifying their high research value and academic significance. In summary, these keywords can be categorized into three main groups. The first category includes terms such as ‘river chief system’, ‘water governance’, and ‘water pollution’, reflecting the research focus on the concept, definition, and object of governance within the RCS. The second category comprises keywords like ‘river and lake governance’, ‘collaborative governance’, and ‘sustainable management’, highlighting the principal tasks of the RCS. The third category consists of terms like ‘challenges’, ‘perspectives’, and ‘countermeasures’, which have received continuous attention in recent RCS research. Given the complexity and diversity of water problems in different river basins and regions, it is essential to explore targeted measures for the RCS based on specific challenges.

It is worth noting that new keywords, such as ‘public participation’, ‘one river, one policy’, and ‘informatization’, have emerged in recent years, demonstrating the latest development trend of the RCS. Furthermore, the ‘Lake Chief System’, as an extended concept of the RCS, has gradually gained scholarly attention within the broader context of ‘river and lake management’, enriching and complementing the understanding of the RCS. In conclusion, the connotation of RCS is continuously evolving based on realistic dilemmas, practical requirements, and in-depth research, providing better guidance for environmental and social governance in practice.
5. Discussion
5.1. Research Focus
5.1.1. Governance Logic

The ‘River Chief System’, as officially defined in the ‘Opinions’, possesses a clear definition that encompasses its core concept, involving the participation of party and government leaders as river chiefs. Scholars have extensively examined the operating logic of the RCS, providing a well-founded comprehension and explanation of its essence. The RCS can be regarded as a form of water-based environmental responsibility contracting system. It establishes the responsibility of leaders at all levels to manage the water ecological environment, including rivers and lakes within their jurisdiction, through the designation of river chiefs [9]. An alternative viewpoint posits that the RCS operates as an administrative contracting system, with assessment and accountability being pivotal mechanisms. The RCS, as a governance framework characterized by a vertical division of power, achieves its goal of river governance through a top-down mechanism of power operation. In this model, the central government delegates the direct governance of societal affairs to local governments (primarily at the county level and below) [33]. Furthermore, RCS functions as a mechanism that exerts pressure to meet standards [34] and operates as a system for target-oriented environmental protection responsibilities [35].

5.1.2. Theoretical Basis

The RCS emerged as a reactive institutional framework in response to water pollution emergencies, aiming to establish a sustainable governance mechanism; thus, it is imperative to seek theoretical foundations and employ theoretical guidance to inform its implementation. According to relevant studies, ‘holistic governance’ is the essence of the RCS [36]. The concept of holistic governance represents a novel paradigm in public administration, as posited by scholars like Perry, aimed at addressing the deficiencies inherent in government bureaucracy. It places a distinct emphasis on the resolution of public concerns, harnessing contemporary information technology and platforms to facilitate equitable collaboration across hierarchical strata within departments, as well as fostering horizontal collaboration among different departments and facilitating mutual cooperation among the public, private, and civil society sectors [37]. Li and others [6] argue that the implementation of the RCS in China encompasses various measures, including vertical administrative delegation, inter-regional coordination, cross-sectoral resource integration, and public participation. These measures serve as exploratory practices of holistic governance within the realm of water management. Zhan [38] posits that holistic governance has the capacity to address the fragmented intrinsic barriers and offer valuable guidance in terms of tackling contemporary cross-domain water environmental challenges. Ding [39], Wang [34], and other researchers employ the holistic governance theory to illustrate the applicability and feasibility of the RCS. They contend that the RCS and holistic governance are intertwined in terms of governance concepts, goal orientation, governance structure, operational mechanisms, and governance approaches. Some scholars have validated the significant role of holistic governance in the implementation of the RCS through the examination of local case studies. Zhan [38] provides an example of the RCS in the Yangtze River Basin, Zhao [40] focuses on the transboundary governance of the Tai-hu Lake Basin, and Kan [41] takes Jiangsu province as an example. Drawing on the theory of holistic governance, they have provided relevant recommendations for the reform and innovation of the RCS.

‘Collaborative governance’ is the inevitable path for addressing water governance [42]. Ansell and Gash, along with other scholars, posit that collaborative governance constitutes a formal, consensus-driven, and judicious collective decision-making process involving one or multiple public institutions alongside non-governmental stakeholders. Its objective is to establish institutional arrangements for the formulation or execution of public policies, the administration of public projects, and the management of public assets [43]. Yan [42] has developed an analytical framework for water governance based on collaborative governance theory. This framework enables the analysis of the challenges faced by the
RCS in water environmental governance innovation, as well as the underlying deep-rooted reasons behind these challenges. Wang conducts an analysis examining the institutional context, motivations, collaborative governance regime, and outcomes of the RCS, utilizing a framework rooted in collaborative governance theory [26]. Xu [44] conducts an in-depth analysis of the innovative governance experiences of the Zhejiang Province. This analysis identifies underlying deeper-level issues within the current governance model and proposes directions for improving future collaborative water governance models.

5.1.3. Operating Mechanisms

As an institutional arrangement, numerous studies have focused on the operating mechanism of the RCS. These studies primarily encompass research into the comprehensive management of RCS, the information sharing mechanism within the RCS, and the application of new technologies in the RCS.

In relation to the comprehensive management of the RCS, Gao conducts an analysis of the RCS implementation process by utilizing the Smith policy implementation model. This analysis encompasses various aspects, including the policy itself, implementing agencies, target groups, and the policy environment. Strategies for optimizing the implementation of the RCS are proposed from the perspectives of enhancing institutional design, improving the quality of implementation personnel, and expanding channels for public participation [45]. Cao examines the practical application of the RCS using PDCA (Plan-Do-Check-Act) cycle management [46]. Guo adopts internet thinking to develop an O2O (Online to Offline) linkage system for the RCS [47].

The River Chief Information-Sharing System is an institutional innovation created by the government to promote collaborative water governance in the era of big data. This system is established through the implementation of a cross-departmental information-sharing system. It encompasses the development of a dynamic sharing notification mechanism that spans both upstream and downstream areas, as well as the left and right banks of the river. The primary objective is to facilitate seamless information exchange between river chiefs at various administrative levels while also promoting broader information dissemination to the public. Zhang establishes a theoretical analysis framework from the perspective of government data governance and conducts an analysis of the system, and he finds that the system has significant advantages in terms of coordinated river management [48]. Zhou conducts research into the development of an “Internet+” information platform by utilizing PC, mobile terminals, and WeChat public accounts [49]. Meanwhile, Yang analyzes the management model of the “Internet+ River Chief System” in Beijing City, Jiangsu Province, and Zhejiang Province to drive the establishment of an information system within the RCS [50].

In addition, new technologies, such as unmanned aerial vehicles (UAV) and remote sensing, have been combined with RCS, becoming a research hotspot. Li [51] and Li [52] utilize advanced technologies, including cloud computing, big data, and the Sirius UAV technology, to demonstrate the feasibility and effectiveness of the new technology in RCS. Drone technology is equipped with real-time and efficient sensors that enable panoramic monitoring and the management of rivers and their surrounding environments. It helps researchers to acquire river data, reduces the workloads of manual investigations, and improves the efficiency of river work. Remote sensing technology is also widely used in the RCS. For example, the integration of Geographic Information Systems (GIS) with the RCS not only reduces the difficulty of storing data but also achieves the dynamic management of river channels from an informatization perspective. This technology can promote the widespread application of the RCS. However, unforeseen issues arising during the implementation process need to be further explored and improved to make these technologies a powerful tool for future RCS work [53].
5.1.4. Policy Effects

The RCS has led to a substantial improvement in water quality [28,54]. Furthermore, it has played a significant role in mitigating the issue of black and odorous water bodies and achieving initial success in water pollution control [10]. Ren argues that the primary advantage of the RCS lies in resolving incentive problems within the system [18]. By designating local party and government leaders as the primary individuals responsible for river governance, assigning river pollution control rights to corresponding government department leaders, clarifying their rights and obligations, and eliminating the multi-government structure, the RCS integrates the executive power of party committees and governments at all levels to a greater extent, effectively enhancing water governance efficiency [12].

The RCS incorporates river and lake governance within the framework of legalization. There exist multiple legal foundations and institutional support for the RCS [55,56], which provide regulations for the governance of rivers and lakes. These regulations are formally established in the Water Pollution Prevention and Control Law, preventing the arbitrary rule of individuals and the uncertainty of outcomes. Lv [57] argues that given the trend towards a unified national river chief organizational system, it is necessary to clarify the specific responsibilities of river chiefs at different levels through legislation. The governance of rivers and lakes is not accomplished overnight. The implementation of the RCS has played a crucial role in providing institutional guarantees and legal norms for the establishment and enhancement of a long-term mechanism for river and lake governance [58].

Scholars have emphasized the role of RCS in enhancing ecological civilization. Tang [59] and others assert that the RCS is imperative for the development of a green ecological civilization, and the establishment of a long-term RCS mechanism will significantly contribute to improving the quality of the water ecological environment. Yin [60] conducted on-site investigations and demonstrated the positive effects of the RCS on ecological environment improvement, highlighting the creation of various models for ecological civilization construction in different regions. Additionally, Liu [61] argues that the RCS has the potential to address the challenges of water pollution control in China and has greatly enhanced the ecological environment surrounding rivers.

Promoting the process of policy diffusion, ensuring the quality of policy implementation in this process, and ultimately achieving favorable policy effects are significant topics within the field of public administration. The RCS originates from local government innovation. Previously, the innovation promotion mechanism involved showcasing local innovative achievements to central government departments and then implementing a centralized administrative order-style system change approach, urging other local governments to learn from it. This process not only delayed pollution control efforts but also failed to maximize the desired outcomes. The spread and diffusion mechanism of the RCS were successfully innovated by the Wuxi government, and other local governments adopted and assimilated it directly, reducing intermediary steps and significantly improving efficiency. This demonstrates the increasing learning and innovation capacity of local governments, and it is crucial to promote and safeguard this trend [12]. Wang, drawing on the perspective of policy diffusion theory, analyzes the implementation and changes in the RCS in 31 provincial administrative units, summarizing the spatiotemporal evolution mechanism and diffusion path of the policy. Practice has proven that the RCS is a policy innovation that aligns with the current state of river basin governance in China [62].

5.1.5. Current Challenges

Unable to Eradicate the Principal-Agent Problem

The multi-task principal-agent theory proposes that when an agent is confronted with multiple target tasks, they tend to prioritize goals that are easily measurable for the principal while neglecting goals that are more challenging to measure. In the case of local governments, the responsibility for economic development outweighs the responsibility for water control [12]. Shen [10] argues that the RCS has not effectively reduced the presence
of deep pollutants in the water, indicating that in the local implementation of the RCS, the local government may have engaged in superficial pollution control measures that only address the symptoms rather than the root causes. It is only through truly prioritizing environmental protection within the RCS that substantial institutional innovation can occur. Otherwise, although movement-style governance may temporarily alleviate the issue of black odorous rivers, it will be challenging to ensure a healthy and sustainable future of development.

The Conflict between the Rule of Man and the Rule of Law

The RCS primarily relies on an authoritative governance model, emphasizing the rule of man rather than the rule of law. This aspect has drawn significant criticism in current discussions. Currently, only a few regions, such as Kunming, have assigned river chief responsibilities through local regulations, while Wuxi has implemented it through government orders. However, there is still a lack of legal mechanisms for enforcement. In most areas, the RCS is primarily driven by administrative orders and external pressures, leading many to view it as temporary and characterized by transient efforts. Additionally, many river chiefs lack enduring internal motivation [19]. Liu [23] and Qian [63] argue that the dual role of local party and government leaders may result in situations of self-determination, self-execution, and self-supervision, making it challenging to ensure long-term effectiveness and consistency. Zhu [5] also highlights that the RCS exhibits a significant inclination towards the ‘rule of man’. He further notes that the distinction between the ‘rule of man’ and the ‘rule of law’ does not imply a question of good or evil. The RCS is considered a practical and viable approach given the current circumstances of severe water environment pollution and the urgent need for remediation. However, the ‘rule of man’ is characterized by decision-making uncertainty and unpredictability regarding behavioral consequences. The effectiveness of water environment governance often relies on the attention devoted by river chiefs, the administrative resources at their disposal, and the level of supervision and accountability.

Low Public Participation

The transformation of the RCS from a government emergency management system design to a long-term institutional practice necessarily requires effective public participation [64]. Li’s survey reveals that the RCS lacks adequate publicity, leading to limited understanding among most residents regarding its fundamental aspects and evaluation criteria. The insufficient mobilization of social forces is evident, with rural residents exhibiting a weak sense of environmental responsibility and some farmers perceiving environmental protection as solely the government’s responsibility [65]. The RCS has failed to actively engage citizens and neglected the enthusiasm of civil environmental protection organizations. Consequently, the government-led RCS exhibits a significant disparity in terms of the breadth and depth of public participation.

After analyzing the texts of 31 provincial government documents related to the RCS, Zhao [66] concludes that the current model of public participation is primarily limited to reporting, monitoring, and evaluation. These forms of participation are symbolic and typically occur after policy formulation. Similarly, Ye [67] and other scholars emphasize the lack of awareness among rural residents regarding the RCS. Although village committees and villagers show significant support, the actual level of participation remains low. Based on these findings, Zheng [68] argues for the need to clarify the responsibilities of river chiefs in facilitating public participation, leveraging community expertise, mobilizing collective efforts, and attracting private investment. The absence of societal involvement and public engagement directly impedes the effective implementation of performance appraisal and accountability mechanisms.
Difficulties in Assessment and Accountability

Although the RCS has undergone more than ten years of development, its assessment mechanism is still imperfect, making it difficult to establish administrative accountability. The current assessments primarily rely on self-assessments within a top-down system, which has resulted in a tendency towards self-praise [12]. According to Liu [23] and Hu [8], the key components of an accountability system for the RCS are the local Commission for Discipline Inspection, the supervision bureau, and the river chief management office. However, this assessment mechanism involves subordinate functional departments assessing their superiors, creating numerous conflicts of interest and raising concerns about the fairness of the accountability results. Even when the subject of accountability is a superior, who has responsibility for their subordinates, ensuring fairness in the accountability results becomes challenging [5]. The assessment of local river chiefs primarily adopts a result-oriented approach, focusing on the goals of water quality improvement. However, it is important to recognize that the improvement in water quality cannot be achieved overnight. Solely measuring short-term results in water quality may, to some extent, yield the opposite effect and even diminish the motivation of local river chiefs. The assessment process should consider regional variations, economic factors, and social conditions [19]. Consequently, the assessment of river chiefs depends on several factors, including the individuals being assessed, the criteria for assessment, the assessment methodology, and the application of the assessment outcome [69].

Insufficient Cooperation in River Basin Governance

During the implementation of the RCS, the authority of river chiefs is confined to specific areas, namely upstream, middle-stream, and downstream. It is crucial to recognize that governance efforts in the upstream region will undoubtedly exert a direct influence on the middle-stream and downstream governance. If the upstream region fails to develop a comprehensive river management plan or faces an unexpected environmental damage event, delays in the overall river management process will occur. Liu [17] concludes that the overall coordination of river basin governance is weak. Some local government leaders lack comprehensive and specific plans for regional water environment prevention and control, thus failing to grasp key aspects of governance. While certain regions have established joint systems for the prevention and governance of river basins, their implementation is insufficient, and their impact is not evident. Consequently, forming a cooperative governance alliance between upstream and downstream areas becomes challenging, as rivers flow regardless of administrative boundaries, hindering the effective implementation of relevant policies. Wen [70] raises concerns regarding the coordination of river governance across multiple provinces and suggests that China should enhance cooperation and coordination between provincial river chiefs. This should be carried out by building upon the existing administrative levels of provinces, municipalities, counties, and townships while emphasizing the role of the RCS in water pollution control in important inter-provincial river basins. Yu [71] believes that monitoring and management may have loopholes and blind spots, resulting in difficulties in promoting coordinated river governance. Improving the ecological compensation mechanism between upstream and downstream areas in RCS implementation requires long-term exploration and practice.

5.2. Current Trends of RCS Research

5.2.1. Public Participation

An official once pointed out that insufficient public participation in democratic legal mechanisms is a significant factor contributing to the lack of adherence to environmental protection laws and lax law enforcement in China. Furthermore, it is crucial for sound political ideologies to rely on implementation through public participation [72]. Based on field investigations into public participation in water environmental governance in rural areas of Jiangsu Province, it is proposed that only through the effective integration of government leadership and public participation, a constructive interaction between government power
and public rights, and a moderate balance between formal and informal channels can the RCS continuously attract meaningful public engagement during its implementation [73]. Chen [74] conducted a field survey using 677 questionnaires in Jiangsu Province and Hubei Province, and he utilized the Logit model to analyze the influencing factors of farmers’ participation in river governance and employed the propensity score matching (PSM) model to examine the effects of farmers’ participation in the RCS as a social public. The study compared the impacts of participation in decision-making, maintenance, and supervision. Similarly, Zhu [75] utilized a sample of 580 valid questionnaires from the Yangtze River Basin to study the influence of psychological factors and government behavioral norms on the willingness and behavior of the public regarding participation in the RCS. In another study, Wang [64] investigated the implementation of the ‘River Chief Assistant’ role in Xiangtan City. The findings indicated that public participation can partially compensate for the lack of social mobilization, short-term, and formalized approaches; high governance costs; and insufficient legitimacy and validity during RCS implementation.

5.2.2. New Technology Development

Unmanned aerial vehicle (UAV) remote sensing technology is an emerging technology that integrates various advanced technologies. It offers the advantages of automation, intelligence, and swift acquisition of space remote sensing information, including land, resources, and the environment [76]. The utilization of UAV technology for coastline supervision can effectively address the challenges associated with conventional daily supervision methods. This application holds significant importance for river coastline supervision and exhibits promising prospects for broader implementation [77]. Zhu [78] discusses the application of UAV mapping technology, target positioning, and tracking technology in the RCS and analyzes the feasibility of incorporating UAV and remote sensing technology into the work of river chiefs. Wang [79] highlights that the Beijing Water Affairs Bureau employs modern high-tech tools, particularly remote sensing information technology and UAV technology, for regular monitoring of the RCS in Beijing. Li [52] provides specific engineering cases to demonstrate the feasibility and effectiveness of Sirius UAV aerial survey technology in river and lake demarcation. The study concludes by emphasizing the advantages of image-free Sirius UAV in river and lake demarcation work and the significance of high-precision aerial survey results for multiple purposes. Leveraging the advantages of remote sensing technology to facilitate the implementation of the RCS constitutes the focus and challenge of future research [80].

The integration of Geographic Information Systems (GIS) and the RCS not only reduces the difficulty of data storage in the past but also enables the dynamic management of river channels from an informational perspective. Currently, the RCS in China is still in its early stages, with varying levels of software and hardware. Technologies such as real-time transmission and high-precision sensors need to be upgraded to meet the requirements of the big data era. This technology can enable the promotion and application of the RCS. However, unpredictable problems that arise during the practical implementation still require further exploration and improvement, striving to become a true tool for the next step in the RCS’s work [53].

5.2.3. The Extension

Building on the experience of the RCS, China has successively implemented natural resource management systems, such as the Lake Chief System, Forestry Chief System, and Field Chief System. The River Chief System and Lake Chief System were introduced at the national level in 2016 and 2017, respectively, and the Forestry Chief System was fully deployed by the national government in 2021. Increasingly, more regions are promoting the Field Chief System at the provincial or municipal level. The River Chief System, Lake Chief System, Forestry Chief System, and Field Chief System are essentially “contract-based” governance systems implemented by the Chinese government. The establishment of these four systems is based on the fundamental, large-scale, weak, and external nature of their
main management objects: rivers, lakes, forests, and farmland. Through vertical and horizontal comparisons, it is believed that the innovation and practice of these four systems have achieved significant results [81].

Rivers and lakes are closely related, and they share similar management problems. Drawing lessons from the RCS and establishing Lake Chief System offer a new line of thinking for the protection of water resources, which holds practical significance. Lakes are an important component of water resources, possessing irreplaceable ecological, resource, and economic functions. It is of great importance to thoroughly investigate the influence and mechanisms of the Lake Chief System on water environmental governance, as it contributes to advancing the capabilities and the modernization of the governance system for water environments. Ma and other scholars [82], utilizing data from the Wuhan Environmental Status Report and Wuhan Statistical Yearbook for the years 2007 to 2017, employed a difference-in-differences approach to demonstrate that the Lake Chief System significantly improved the comprehensive water quality of pilot lakes and reduced the total value of pollutant exceedances. Li [83] proposed the “Lake Chief System” as an upgraded and innovative system based on the RCS in China’s management and protection of lakes. By analyzing the current issues regarding lakes in China, the necessity of the Lake Chief System is examined.

Forests are the mainstay and crucial resources of terrestrial ecosystems, with important ecological functions such as sand fixation, soil conservation, water conservation, climate regulation, pollution mitigation, and biodiversity maintenance. In order to address the long-standing issues of inadequate coordination and fragmented management in the process of forestry development and reform, drawing on the reform experience of the RCS, Jiangxi and Anhui provinces have taken the lead in proposing the implementation of ‘Forestry Chief System’ reform, aiming to establish a new mechanism for forest resource management [84]. Based on the operation mechanism of the Forestry Chief System in Anhui, Guo [85] examines the historical context and current challenges of the Forestry Chief System from the perspectives of policy documents and practical investigations. It also presents a brief overview of some proposed countermeasures and suggestions. ‘Field Chief System’ has fully drawn on the experience of ‘River Chief System’ and is an important innovative institution that localities have achieved in the practice of farmland protection in recent years [86]. It also serves as an important policy tool to ensure China’s food security. Zhang has put forward corresponding thoughts and suggestions in terms of improving the institutional system, scientific monitoring, and control; exploring financial support; popularizing knowledge of arable land redlines; and promoting technological innovation in land, among other issues [87].

5.2.4. Rule of Law Construction

Scholars primarily focus on the enhancement of RCS by exploring the direction of its legal construction. In order to further institutionalize and standardize RCS, legislative measures are imperative. This involves aligning relevant environmental policies and laws, introducing a spirit of multi-stakeholder governance, clarifying the responsibilities of River Chiefs, and establishing a collaborative mechanism between party and government leadership and multi-stakeholder cooperation, as well as internal and external supervisory constraints. These legislative actions inject a greater degree of legal quality into the system and mitigate its inherent logical contradictions [58]. When legislating RCS, it is essential to analyze and address various challenging issues, including the rational determination of the legislative hierarchy for RCS, managing the relationship between law and policy, and systematically defining the responsibilities of River Chiefs in relation to administrative departments [88]. Some scholars have also proposed the need to strengthen ‘rule of law’ education among leadership cadres, advancing the legal construction of the RCS. This involves three key aspects: Firstly, it involves enhancing legislation to promote the institutionalization of RCS. Secondly, it involves fostering democratic consultations to facilitate
6. Conclusions

This study selected papers related to RCS published between 2009 and 2022 from CNKI and the Web of Science for analysis. Through a comprehensive literature review and keyword analysis, it explores research focuses and trends in RCS research. Our conclusions include the following: (1) RCS research can be divided into two stages, with a steady rise followed by explosive growth after 2016. (2) Hotspots in RCS research include governance logic, theoretical basis, operating mechanism, policy effect, and challenges, evolving with practical implementation. (3) Emerging frontiers in RCS research involve technological applications, public participation, extension of RCS, and rule of law construction. This study provides insights into the hotspots and trends of RCS research, offering directions for future investigation.

This study provides the first comprehensive systematic review of peer-reviewed literature on RCS from both Chinese and English-language sources, offering a holistic understanding of a system that originated in 2007 in one city and rapidly expanded to other cities across China. This review aims to provide scholars and government policymakers with insights into the evolving field of RCS research and practice. However, it is important to acknowledge limitations of this study. Firstly, the data utilized in this review were exclusively sourced from two databases: CNKI and the Web of Science. While these databases are renowned for their credibility, there is a possibility that some significant and valuable literature may have been inadvertently excluded. Secondly, the review focuses on peer-reviewed journal papers, excluding contributions from conference proceedings and book chapters. Future reviews should consider broader databases and document types to achieve a more comprehensive understanding of the RCS.

Most articles highlight regional practices and concepts, revealing opportunities for improving practical experiences and the theoretical framework of the RCS. As river and lake governance advances, future RCS research is expected to become more comprehensive and scientifically grounded. To ensure its sustainable development, the following recommendations are summarized:

(1) A more comprehensive analysis of the RCS is needed. Existing research primarily focuses on isolated provinces or cities, resulting in fragmented findings. Conducting comparative studies across regions would facilitate mutual learning, identify strengths and weaknesses, and promote collective development. Additionally, while research into RCS predominantly explores local practices in China, there is a lack of comparative research examining similar river and lake governance policies in other countries. Expanding the scope to include international comparative studies would provide valuable global insights.

(2) Gradual expansion of RCS participants is essential. RCS should not be limited to a government initiative but should encourage active participation and pluralistic governance. The growing research interest in public participation indicates a shift in the RCS, where the government is no longer the sole actor in water environmental governance. The public plays a crucial role in implementing the RCS and advancing water ecological civilization construction. While the appointment of folk river chiefs has occurred, the key challenge lies in establishing effective connections and collaborations between the government and the public. It is imperative to explore various modes and approaches for social participation and develop concrete operational systems, mechanisms, and methods. This will facilitate the rational allocation and mobilization of resources to achieve long-term governance objectives. For example, it is important to consider how to involve social capital in RCS implementation and utilize social forces to supervise its operation. In-depth theoretical research is needed to analyze the logical mechanisms governing the relationship between the government, enterprises, and the public in the operation of the RCS. Understanding the roles
of different stakeholders in ecological environmental protection can empower and activate relevant actors in practical contexts.

(3) A thorough examination of the institutional design of the RCS is necessary. The RCS encompasses a wide range of elements, including organizational structure, personnel selection, job responsibilities, performance evaluation, and training. Despite some scholars’ efforts to establish a comprehensive evaluation index system for RCS based on performance evaluation [10], the majority of studies still primarily focus on the macro level. Hence, future research should aim to comprehensively grasp the policy details and utilize field research to scientifically and normatively reshape RCS. This entails addressing system loopholes, enhancing flexibility, and improving the overall effectiveness of the RCS.

(4) It is essential to explore region-specific governance mechanisms that address the current situation and ecological challenges faced by rivers and lakes in different regions. This will enable the development of customized governance approaches with regional characteristics to effectively address the challenges encountered during RCS implementation. Additionally, the RCS can provide valuable lessons for other countries in water management. However, it is crucial to consider the unique national conditions and adapt the system accordingly to local circumstances.

(5) Researchers must emphasize regional characteristics in RCS research due to China’s vast territory, diverse climate, and complex terrain. Implementing the RCS in various regions should prioritize local adaptation. Exploring region-specific governance mechanisms is vital for addressing diverse ecological challenges in different areas. This allows for the development of customized governance approaches with regional characteristics to effectively address the challenges encountered during RCS implementation. RCS can provide valuable lessons for other countries in water management. However, it is crucial to consider the unique national conditions and adapt the system accordingly to local circumstances.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Acknowledgments: The author expresses sincere gratitude to Makoto Usami from the Graduate School of Global Environmental Studies, Kyoto University, for his diligent guidance and invaluable advice. Additionally, heartfelt thanks are extended to Xue Jian from the University of Tokyo for providing valuable comments and insights.

Conflicts of Interest: The author declares no conflict of interest.

References
25. Li, J.; Shi, X.; Wu, H.; Liu, L. Trade-off between economic development and environmental governance in China: An analysis based on the effect of river chief system. *China Econ. Rev.* 2020, 60, 101403. [CrossRef]
55. He, Q. River Administrator System from Perspective of Environmental Law. J. Jilin TV Radio Univ. 2019, 41–43. (In Chinese) [CrossRef]
64. Qian, Y. Exploration of Legal Issues Regarding the River Chief System. Leg. Vis. 2015, 2, 277+276. (In Chinese)


86. Qi, S. Practical Exploration and Reflection on the Implementation of the Field Chief System for Farmland Protection. *China Land* 2022, 5, 8–11. (In Chinese) [CrossRef]


Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.