High-level Promotion, Policy Authentication, and Happy Rivers and Lakes: The Institutional Logic and Environmental Effectiveness of the River Chief System

Shengning Liu *

School of Philosophy, Renmin University of China, Beijing 100080, China

* Corresponding Author Email: 2023202469@ruc.edu.cn

Abstract. The River Chief System (RCS) is a significant institutional innovation in China's water environment governance. After its success in local government practice, it expanded to multiple regions and eventually became a state policy, yielding remarkable results. However, existing research lacks an integrated analysis of its systemic institutional construction and substantial environmental improvements. The reform of the RCS organizational system has achieved collaborative governance through the innovation of the "River Chief Plus" mechanism, multi-stakeholder governance, and cross-departmental collaboration, while establishing a stringent assessment and accountability mechanism, ensuring policy support. Its institutional construction has guided the achievement of environmental protection goals, reaching short-term water pollution control targets, long-term ecological restoration plans, and further elevating the value of ecological governance through the promotion of "Happy Rivers and Lakes." This study points out that this institutional construction successfully realized the progressive governance goals from pollution control to ecological restoration and value realization. Not only has it reshaped the incentive structure for water environment governance, but it also offers a Chinese model with both political momentum and institutional resilience, contributing to global complex environmental governance.

Keywords: River Chief System, Environmental governance, Institutional innovation, collaborative governance, Policy diffusion.

1. Introduction

As a significant practice in local government ecological governance, the River Chief System has successfully strengthened both governance effectiveness and administrative coordination, providing a robust institutional guarantee for the sustained improvement of regional water environments. In the new era, the governance of water environment, water resources and water ecosystems has become an important task and challenge. The River Chief System is a favorable policy tool designed to address new challenges. Following the 2007 Taihu Lake blue algae incident in Wuxi, the municipal government appointed political organization and government leaders at various levels as responsible river chiefs, responding to the demand for efficient and systematic environmental governance. Over decades of rapid economic and social growth in China, the process of industrialization has placed unprecedented pressure on river and lake ecosystems. The complex water environment issues not only threaten regional ecosystems but also constrain sustainable economic and social development, impeding the enhancement of public welfare. Given that the causes involve multiple pollution sources, administrative regions, and management departments, the complexity of governance far exceeds the capacity of individual departments or regions to respond independently, necessitating the establishment of a cross-regional, collaborative, and system-integrated governance framework.

However, traditional models of river and lake water environment governance have encountered several issues. First, there is fragmentation in governance, with core functions scattered across multiple departments, leading to high coordination costs. Second, the territorial-based segmentation creates a fundamental conflict between administrative divisions and the natural attributes of river basins, making it difficult to address cross-regional and cross-basin ecological imbalances at their root. Third, campaign-style governance measures are often introduced in response to the concentrated eruption of environmental issues, typically implemented as special rectification efforts, which lack a

normalized, long-term responsibility transmission and supervision mechanism. Reform of the river and lake management system has become imperative. Over the past decade, the River Chief System has been continuously improved and innovated, evolving from a local practice into a state policy. By employing the political organization-government joint responsibility model and leadership by top officials, the system breaks through the limitations of traditional governance, establishing a governance framework with unified leadership, hierarchical management, and clear individual responsibilities. This system not only takes into account the natural integrity of river basins but also strengthens the collaborative participation of multiple stakeholders, effectively addressing gaps in governance. In June 2025, the *"Opinions on Fully Promoting River and Lake Protection and Governance"* emphasized the need to fully leverage the role of the River Chief System and comprehensively advance the construction of "Happy Rivers and Lakes."[1]

Existing research primarily focuses on the dynamic process through which the River Chief System evolved from a local practice to a state institution. Scholars mainly examine two diffusion pathways: "upward diffusion" and "parallel diffusion." [2] The first pathway refers to the process in which policies are absorbed by higher-level governments due to notable achievements at the local level, thereby driving the policy's expansion to other regions. The second pathway involves local governments actively learning and competing, thus promoting the policy's diffusion within their own regions. In the early stages of diffusion, the River Chief System mainly manifested as parallel diffusion [3], where local governments voluntarily imitated one another. Later, upward diffusion began to emerge. The diffusion of the River Chief System follows a pattern that combines both vertical absorption and horizontal learning and competition. However, there are structural limitations in terms of insufficient policy reproduction. [4] Beyond diffusion within the policy field, the River Chief System has also spread across different contexts [5], giving rise to systems such as the Lake Chief System and Island Chief System, which are seen as a form of positive feedback-driven policy spillover [6].

Furthermore, existing studies have approached the system from the perspective of institutional development, analyzing how it reshapes governance incentives and collaborative structures. The core mechanism involves a four-level system of political organization and government officials assuming graded responsibilities, strict assessment and incentive measures, and cross-departmental coordination that integrates multiple stakeholders [7]. The River Chief System is a form of responsibility-based governance aimed at leadership cadres. By transforming collective responsibilities into individual accountability and linking these responsibilities to performance assessments, the system addresses the incentive challenge at the institutional level [8]. At the same time, it constructs a "vertical qualification tournament" mechanism through the operational logic of a "compliance pressure-based system" and relies on the authoritative positions of political organization and government leaders and the organizational authority of coordination bodies to effectively solve the problems of authority deficits and departmental shirking in cross-regional governance [9].

In addition to macro-level research on policy diffusion and institutional construction, there is a substantial body of research that adopts a micro-level perspective. Many case studies have delved into the governance effectiveness and implementation efficacy of the River Chief System in specific contexts. On one hand, some scholars have raised questions about the long-term sustainability of the system. For example, in Shanghai, the lack of effective constraints may lead to deviations in local implementation from central objectives, thereby affecting policy continuity. [10] On the other hand, empirical research on Hangzhou has pointed out issues such as over-reliance on administrative authority, insufficient information disclosure, and a rigid assessment mechanism within the River Chief System. [11] Against the backdrop of global rivers facing threats such as pollution and overdevelopment, Western scholars have proposed that rivers should be viewed as living entities with rights, closely intertwined with society as public subjects. These rivers should be subject to cross-regional commons governance to defend social justice [12]. Similarly, the relevant responsibility holders for water environments need to be incorporated into this consideration. Water is not only a

natural element, but also carries the respect of indigenous peoples for spirituality and personhood. Therefore, water governance rights should be decentralized to promote pluralistic governance [13]. In terms of governance approach, collaborative governance is the primary method. The governance structure should be aligned with the structure and processes of the ecosystem, as effective governance depends on the complex interactions between network structure, ecological context, and leadership [14].

Although existing research provides a solid foundation for understanding the River Chief System, most studies either treat it as a typical example of the policy process or focus on analyzing its political and organizational mobilization logic, while relatively neglecting to view it as a comprehensive systemic institutional framework. Moreover, there is a lack of integrated evaluation of its contributions to environmental protection. Specifically, existing research leaves room for further development in two areas: First, at the level of institutional construction, the core innovation of the River Chief System lies not only in the establishment of the "River Chief" position but also in the creation of a complex institutional system encompassing organizational structures, coordination mechanisms, and other aspects. The logic of this system's formation, the interrelations of its internal elements, and its contribution to the evolution of China's modern environmental governance system require further integrated analysis. Second, in terms of environmental governance, existing studies lack a detailed focus on the specific outcomes in various areas and need to be subjected to a more comprehensive evaluation within a unified, scientific assessment framework. This study aims to address these research gaps. The success of the River Chief System lies not only in its innovative policy diffusion model and the efficient drive of political momentum but also in its ability to transform political advantages into sustainable institutional efficacy by building a highly coordinated, institutionalized governance system, ultimately translating into measurable environmental benefits.

Based on the above approach, this study follows the research path outlined below: From the perspective of institutional construction, it analyzes how the River Chief System systematically reshapes the water environment governance structure through three major pillars—organizational systems, mechanism innovation, and policy safeguards—thereby achieving the foundation for systematic governance. In terms of environmental outcomes, the study explores the extent to which the River Chief System has achieved substantial environmental benefits across three dimensions: water quality improvement, ecological restoration, and the construction of "Happy Rivers and Lakes." This research aims to reveal the intrinsic causal connections between these two dimensions: institutional construction serves as both the premise and guarantee for environmental outcomes, while environmental outcomes provide the final test of the system's effectiveness and reinforce it in reverse. Together, they form a complete logical cycle that underpins the River Chief System as a systemic innovation.

The following sections will unfold according to the analysis framework outlined above: Section Two will elaborate on the River Chief System as the institutional cornerstone and construction logic of a modern water environment governance system. Section Three will focus on the specific contributions of the River Chief System in ecological environment improvement and ecological restoration. Section Four will provide a comprehensive discussion based on the previous analysis, summarize the research findings, offer policy insights, and outline future research directions.

2. Institutional Cornerstone: Constructing a Modern Water Environment Governance System

The fundamental contribution of the River Chief System lies in its ability to transform the political advantages of political organization and government joint responsibility into sustainable governance effectiveness through a well-designed institutional framework, systematically addressing the long-standing fragmentation problem in China's water governance. This section will delve into the construction logic of this institutional cornerstone from three perspectives: organizational systems, institutional innovation, and policy safeguards.

2.1. Organizational System Revolution: From “Multiple Authorities Over Water” to “Closed-loop Responsibility”

In cross-departmental collaboration, there are two main types of coordination paths: vertical and horizontal. The vertical coordination mechanism manifests in two forms: one based on "positional authority" and the other on "organizational authority." Horizontal collaboration is often carried out through mechanisms such as inter-ministerial joint meetings [15].

In China’s current water environment governance, vertical governance plays a crucial role. The River Chief System exemplifies the characteristics of a vertical coordination mechanism, with "leadership responsibility" serving as the core source of authority.First, the mechanism explicitly requires the heads of local political organization committees or governments at all levels to serve as the chief river chiefs for their respective administrative regions, and to directly assign river and lake management responsibilities within their jurisdiction to specific political organization and government leaders. This system transforms the collective responsibilities previously scattered across multiple departments into individual, traceable leadership responsibilities, establishing a top-down pressure transmission path within the hierarchical system.Second, the system’s organizational structure spans five levels, from the central government down to the village level—province, city, county, township, and village—and the River Chief System Office or management department is set up within provincial and autonomous region water conservancy departments. For example, the Water and Lake Management Office in Tibet’s Water Conservancy Department has established 61,500 water ecology protection and village-level water managers, with Nyingchi City setting up 1,493 river chiefs, achieving full coverage of all rivers and lakes in the city. This system effectively overcomes the challenges of extensive river and lake distribution and difficult supervision. It breaks through the constraints of traditional administrative levels, ensuring that governance directives are vertically transmitted and efficiently implemented.

Building upon the vertical system, the River Chief System establishes an independent, dynamically updated digital file for each river and lake through the "One River, One File" mechanism. This transforms river and lake management into precise, quantitative scientific governance, achieving comprehensive horizontal coordination. The system systematically collects foundational information on rivers and lakes, while also including details about the river chiefs at various levels, existing "One River, One Policy" governance plans, and records of past inspections. This provides both experiential reference and data support for governance strategies.In Zhejiang Province, information about each river’s river chief, governance timeline, and measures taken are made publicly available, facilitating responsibility tracing and accountability assessments. The "One River, One Policy" approach tailors governance measures to local conditions and offers point-to-point solutions, which is particularly advantageous for dealing with emergency situations. For instance, in January 2024, a tailings pond leak occurred in Song County, Luoyang City. The local government employed the "One River, One Policy, One Map" emergency response plan to seal the leak’s source, managing the pollution within the DeTing River in just nine days, thereby preventing further contamination of downstream river sections.Traditional river and lake management often relies on administrative boundaries, but "One River, One Policy" shifts the focus to river basin management, thus driving regional governance from a watershed perspective [16]. This approach leverages the characteristics of different river sections to address issues with precision. The "One Policy" is continuously updated according to planning periods, with periodic reassessments and re-diagnoses of the rivers.

2.2. Institutional Innovation and Integration: From "Siloed Efforts" to Collaborative Governance

In practice, the River Chief System has surpassed the traditional administrative management model, evolving into a highly open and flexible institutional platform. This platform characteristic has fostered a series of innovative "River Chief Plus" (RCS+) collaborative governance mechanisms, which systematically integrate the resources and efforts of diverse stakeholders—including administrative, judicial, market, and social sectors—through institutionalized channels.

The River Chief System has introduced judicial power into governance practice through the "River Chief Plus" mechanism, systematically integrating administrative oversight with criminal justice and legal supervision, thereby strengthening institutional rigidity, law enforcement authority, and governance effectiveness. The "River Chief + Police Chief" mechanism assigns police authorities as river police chiefs, whose core function is to combat water-related crimes in accordance with the law, providing robust judicial protection for routine river management enforcement. This design directly addresses the common problem of weak enforcement and insufficient constraints in past environmental law enforcement, upgrading the soft constraints of administrative orders to the hard constraints of criminal justice. The "River Chief + Procurator-General" mechanism involves the collaboration of procuratorate heads, who supervise the administrative departments responsible for river and lake management. The procuratorate can promptly initiate legal procedures and hold entities accountable according to the law. This mechanism effectively resolves the regulatory difficulties encountered in cross-departmental collaboration. In the case of Longyan City in Fujian Province, the deepened "River Chief + Police Chief + Procurator-General" collaborative mechanism has established regularized systems for information sharing, joint inspections, case transfers, and collaborative investigations, forming a complete governance loop that integrates administrative enforcement, criminal justice, and prosecutorial supervision. This approach creates a well-rounded, tri-functional governance structure that enhances the overall effectiveness of the River Chief System.

The institutional innovation of the River Chief System goes beyond the traditional government regulatory governance model by creating an open participation platform that connects social networks and actively guides and institutionalizes the inclusion of diverse social forces. This multi-stakeholder governance breaks the binary governance model of "government vs. market,"[17] with new roles such as "Corporate River Chiefs," "Veteran River Chiefs," and "Women River Chiefs" emerging in practice. These roles extend the supervisory and participatory rights from within the government structure into the broader society. These civilian river chiefs, drawn from all walks of life, are not only responsible for monitoring and reporting issues. Their more profound function lies in promoting the concept of ecological civilization at the grassroots level, subtly raising public awareness of environmental protection, and cultivating a social culture that values and protects water resources. Ultimately, this model has established a modern water environment governance system that is government-led, with active participation from businesses, the public, and social collaboration. This mechanism not only fills the gaps in administrative supervision at the operational level but also reshapes the water ecological responsibility ethics of the entire society at the value level, providing a vibrant practical model for modernizing governance capabilities.

The River Chief System also addresses the fragmentation problem through inter-departmental coordination meetings. Fragmentation is a core issue in cross-regional governance, with one major cause being the horizontal division of management authority, which leads to the dilemma of "multiple sources of government orders." In practice, regional management, based on administrative boundaries, dominates, leaving a lack of horizontal connection mechanisms. [18] The inter-departmental meetings, institutionalized and convened by the River Chief System Office, effectively address this fragmentation problem. This mechanism brings together functional departments such as water resources, environmental protection, and agriculture into a regularized deliberative framework, systematically addressing the complex, cross-departmental issues related to rivers and lakes. In some regions, cross-regional collaboration has been achieved. For example, in Xiaoshan District of Hangzhou and Keqiao District of Shaoxing City, joint defense and control actions have been carried out, including joint river patrols and inter-departmental roundtable discussions. In the case of Huzhou, Suzhou, Wuxi, and Changzhou, these four cities have established the Lake Taihu Four Cities River Chief System Cooperation Mechanism, effectively breaking down the policy barriers inherent in the hierarchical system. This has facilitated the interconnection of critical governance information, coordinated planning, and the synchronization of specific actions. As a result, at the operational level, the scattered departmental authorities have been integrated into a unified governance force, achieving horizontal collaboration.

2.3. Policy Safeguard System: From "Flexible Guidance" to "Rigid Constraints"

The effective and sustainable operation of an institutional framework requires rigid mechanisms of constraint. To ensure the proper implementation of policies and clear delineation of responsibilities, the River Chief System has established a robust system of incentives and constraints. Built on the foundation of legal development and driven by high-level promotion, the system ensures effective execution through a tightly knit network of responsibility and rigid supervisory assessments.

"High-level promotion" has injected significant "political momentum" into the River Chief System, and the continued success of this momentum requires a comprehensive institutional framework to support it. First, the River Chief System has transformed from a policy initiative into a solid institutional arrangement, with its core centered on the legal construction driven by high-level promotion [19]. Under the central government's guidance, the River Chief System was established nationwide in 2018. Second, at all levels of government, from the central to local, policy regulations have been introduced to ensure the implementation of the River Chief System. The Guangdong Province River and Lake Chief System Regulations clearly define the establishment of river chiefs at all five levels, from provincial to village, along with their duties and the functions of the River Chief System Office, ensuring that the system is backed by law.Third, political momentum assigns individual responsibility. The highest-level river chiefs issue authoritative documents such as the "Chief River Chief's Order" to deploy annual key tasks and initiate special governance actions. For example, the Guangdong Province 2025 No. 1 Chief River Chief's Order comprehensively outlines the tasks for advancing the River Chief System with high quality. This high-level, top-down mobilization approach provides powerful political momentum for policy execution, ensuring that officials at all levels take the system seriously and give it due attention.This framework, combining high-level political support, legal structure, and strict enforcement, ensures that the River Chief System operates with both flexibility and rigor, offering a comprehensive policy safeguard that strengthens governance accountability and effectiveness.

The River Chief System has established a strict assessment and accountability mechanism, directly linking the effectiveness of river and lake governance with the performance assessments, appointments, and punishments of local political organization and government leaders. Unlike the profit-driven incentives of businesses, the RCS incentivizes governance through strengthening the responsibility assessments of local political organization and government officials, thereby motivating collaborative governance. [20] The supervision of river chiefs at all levels is carried out in three ways. First, at the administrative level, responsibilities are detailed down to individuals. In Songyang County, for example, a system of "weekly reports and monthly evaluations" has been implemented, with a "Four-in-One" inspection mechanism establishing a three-tiered system for addressing issues with river chiefs. Second, at the judicial level, the system establishes cooperation between river chiefs and procurator-generals to supervise departments that fail to perform their duties effectively. Third, public participation is encouraged for supervision. In Songyang County, the public water protection program called the "Green Water Coin" system broadens the channels for social oversight. This "command stick" effect has completely transformed the previous incentive structure, which was more focused on economic growth than on environmental protection, thus energizing river chiefs at all levels.

Through this systematic construction, the River Chief System has laid a solid institutional foundation for the improvement of China's water environment. Through the integration of these three levels of systems and mechanisms, the RCS has evolved from a temporary, crisis-response governance tool into a long-term governance system with clear responsibilities and powers, strong collaboration, tight supervision, and well-defined rewards and punishments.

3. Institutional Effectiveness and Environmental Outcomes: Empirical Evidence of the River Chief System's "High-level Promotion- Policy Authentication" Effect

3.1. Water Quality Improvement and Pollution Control: The Effectiveness of "Hard Constraints" Under High-level Promotion

The centralization and decentralization characteristics of the River Chief System, along with its accountability and incentive mechanisms, directly drive pollution prevention and control. Environmental governance models generally include both centralized and decentralized approaches, each with its advantages and disadvantages. Centralization facilitates coordinated, large-scale governance but often suffers from poor policy adaptability and unclear local responsibility. Decentralization, on the other hand, activates local innovation but can lead to pollution shifting, free-riding, and other undesirable behaviors. The River Chief System exemplifies a hybrid of centralization and decentralization. On one hand, it decentralizes responsibility to local leaders, while on the other, it monitors and regulates through a pressure-driven system that combines accountability assessments and promotion incentives. Within this complex institutional framework, accountability mechanisms act as a core element, transforming flexible environmental goals into hard, enforceable targets that local leaders must meet. This shift in the incentive structure completely alters the dynamics of pollution control. Compared to economic growth incentives, the strengthened ecological accountability in officials' assessments more effectively enhances the governance effectiveness of the River Chief System [21]. The political momentum generated by high-level promotion injects authority into the system. The "Chief River Chief's Orders" issued by central and provincial governments set clear governance goals and timelines, creating strong top-down pressure. Meanwhile, the rigid five-tiered River Chief responsibility system ensures that pressure is transmitted without weakening, with responsibilities reaching down to the "last mile." Daily patrols by village-level river chiefs make pollution sources hard to hide, facilitating the early detection and rapid response to environmental issues.

Ultimately, this governance model—driven by accountability, combining both centralization and decentralization—has resulted in significant environmental improvements. Water quality enhancement and pollution prevention are primary objectives of the River Chief System and the most directly visible outcomes. As one of the originators of the River Chief System, the Taihu Lake Basin has seen key pollutants like ammonia nitrogen and total phosphorus steadily decrease under strong high-level promotion and strict cross-regional coordination. The water quality, previously dominated by inferior Grade V standards, has improved to predominantly Grade III-IV quality, with the frequency and intensity of cyanobacterial blooms being effectively controlled. The proportion of surface water sections meeting Grade I-III quality standards is now 90.4% [22]. In the case of transboundary river management, the 25 transboundary river monitoring sections in the Sichuan-Chongqing region have achieved a 100% compliance rate for state water quality standards.The River Chief System's integration into local environmental governance has brought about significant improvements in water quality.

3.2. Ecological Restoration and Systematic Governance: "Holistic" Reshaping under Collaborative Governance

The collaborative governance mechanism has driven the River Chief System to extend its pollution control efforts into ecological restoration. Water ecological restoration refers to specific technical and engineering measures taken to restore polluted or degraded water bodies, relying on the water body's self-restoration capacity to recover its original ecological structure and function. Systematic governance aims to ensure the long-term functionality of water bodies through fundamental measures. Once river pollution prevention and control are initially achieved, ecological restoration measures must be implemented to ensure the sustainability of governance outcomes. Due to the emphasis on accountability and incentive mechanisms, the River Chief System has primarily focused on pollution

control, with less attention paid to the longer-term process of ecological restoration, which may take time to show tangible results [23]. However, in recent years, the reduction in pollution has driven many regions to further develop ecological restoration projects, aiming to sustain short-term governance achievements.Through institutionalized collaborative governance mechanisms, the River Chief System has effectively overcome the long-standing challenge of fragmented governance, propelling a fundamental shift in governance paradigms from merely managing water quality to embracing the holistic, integrated approach of a "community of life" encompassing mountains, waters, forests, farmlands, lakes, grasslands, and deserts.

First, the "River Chief Plus" mechanism has played a crucial role in vertical integration and judicial protection, effectively addressing long-standing issues such as shoreline encroachment and aquaculture cages. It has precisely targeted illegal sand mining, illegal pollutant discharge, and other ecologically destructive criminal activities, clearing legal and spatial barriers for ecological restoration and providing strong legal safeguards for the implementation of systematic restoration projects.Second, the inter-departmental coordination meetings have facilitated horizontal planning collaboration and resource integration. Under the regularized coordination of the River Chief System Office, departments such as water resources, natural resources, ecological environment, and forestry have been able to align their efforts on the same platform, ensuring that various projects are coordinated in terms of objectives, space, and implementation. This approach avoids the past issues where fragmented departmental management led to conflicting or counterproductive results.The integration platform driven by the "River Chief Plus" mechanism and inter-departmental meetings has reshaped the previous situation of divided departmental governance into a unified, coordinated system of co-governance, laying the foundation for the implementation of ecological restoration and systematic governance projects.For example, Longyan City in Fujian Province has implemented the Jiulong River Basin Integrated Protection and Restoration Project, which advances water pollution control, soil erosion management, biodiversity conservation, and ecosystem function restoration from the perspective of the entire watershed ecosystem. In Tibet’s Linzhi City, a series of comprehensive soil and water loss management projects have been carried out through multi-departmental collaboration, ultimately increasing the soil and water conservation rate to 93.37% and promoting fundamental improvements in the region's ecosystem structure and function.This collaborative governance framework has enabled a shift toward a more integrated and holistic approach to environmental management, providing the institutional foundation for large-scale ecological restoration efforts across China.

3.3. Happy Rivers and Lakes, and Value Transformation: Sustainable Exploration under Policy Authentication

After achieving basic environmental governance goals, many regions have begun to explore the concept of "Happy Rivers and Lakes" and the environmental value of water bodies based on the River Chief System. Water governance starts with water and ends with people. The ultimate goal of the "River and Lake Strategy" is to realize a harmonious coexistence between humans and water, transforming governance outcomes into public happiness and a sense of gain. After achieving the fundamental goal of "clear water and green shores," the River Chief System is advancing through policy authentication and institutional innovation, elevating the policy goals toward human-water harmony and exploring diverse pathways for realizing the value of ecological products, thus injecting endogenous power into the long-term sustainability of governance.

First, with basic governance goals such as water quality improvement being achieved in recent years, the policy focus of the River Chief System has gradually shifted from pollution control and ecological restoration to the higher-level goal of building "Happy Rivers and Lakes." The implementation of Happy Rivers and Lakes marks the consolidation and strengthening stage of River Chief System work [24]. For instance, Zhejiang Province has set a target for over 80% of counties (cities, districts) in the province to complete the construction of Happy Rivers and Lakes by 2027, as outlined in the "Plan for Accelerating the Construction of Happy Rivers and Lakes to Promote High-

Quality Urban-Rural Integration (2025–2030)." Fujian Province has taken the lead in issuing the Evaluation Guidelines for Happiness of River and Lake, setting quantifiable indicators across five dimensions: safety, health, ecology, beauty, and harmony, thus transforming the abstract concept of "happiness" into measurable and operational governance standards. The River Chief System is evolving from "managing chaos" to "creating benefits," evolving organically through practical implementation.

Second, its flexible governance platform provides space for local policy experimentation, leading to a series of innovative mechanisms that transform ecological benefits into economic and social value. Longyan City in Fujian Province pioneered the Judicial Carbon Sink Mechanism for Soil and Water Conservation, guiding eco-destroyers to purchase carbon sinks as an alternative to traditional compensation through judicial procedures. This innovation was subsequently adopted by Gansu Province, where the first "carbon compensation" transaction in the Yellow River Basin was implemented. This initiative realized alternative ecological restoration through market mechanisms, turning implicit ecological benefits into explicit economic value.

Finally, under the framework of the River Chief System, the construction of "Happy Rivers and Lakes" has significantly enhanced residents' sense of acquisition and happiness by restoring the social service functions of rivers and lakes, while integrating ecological governance with public services. In the process of building Happy Rivers and Lakes, Zhejiang Province has established 65 "Happy Mother Rivers," developed 5,570 kilometers of rural water system projects, and created 494 high-quality "Water Beautiful Villages." These explorations have not only restored the ecological functions of rivers and lakes but have also reshaped their role as public spaces with social service functions, thus achieving a unified outcome of environmental and social benefits.This evolving approach under the River Chief System underscores the transition from traditional environmental management to a more holistic, sustainable model, where the ecological, social, and economic values of water governance are fully realized and integrated.

4. Conclusion and Discussion

In the process of rapid industrialization and urbanization, China faces long-standing and structural water governance challenges, including fragmentation in river and lake management, failures in cross-regional coordination, and the dilution of governance responsibility. The River Chief System has become a cornerstone of ecological reform, expanding from local practices to a broader state strategy. Initially pioneered in Wuxi City, the system was explored and innovated by surrounding regions. In December 2016, the General Office of the CPC Central Committee and the General Office of the State Council issued the Opinions on the Overall Implementation of the River Chief System, officially marking the River Chief System's elevation to a state strategic initiative. Its significance goes beyond just the promotion of a policy—it represents a profound transformation in the governance system. The River Chief System has delivered governance results in various regions and has been adapted to local contexts, achieving policy reproduction.This study takes a different approach from recent research on the diffusion and political mobilization processes of the River Chief System. It aims to establish a dual-pronged analytical framework of "institutional construction and environmental outcomes," systematically addressing two core questions: First, what kind of institutionalized governance system has the River Chief System created? Second, how has this system made substantial, verifiable contributions in the field of environmental protection? This research seeks to connect the institutional framework with its environmental governance outcomes, providing a comprehensive understanding of how institutional innovation and environmental results are interlinked within the River Chief System.

This study demonstrates that the fundamental institutional contribution of the River Chief System lies in successfully constructing a modernized water environment governance system that is clear in terms of authority and responsibility, efficient in coordination, and robust in support. It has transformed the political principle of "political organization and government joint responsibility" into

a practical, operable, and accountable institutional framework. Specifically, at the organizational level, the five-level River Chief system, ranging from provincial to village levels, has achieved vertical continuity of responsibility and comprehensive coverage. This system has established the rigid principle of "responsibility of the chief official," fundamentally addressing the issue of "who is accountable" in river management. At the mechanism design level, the "River Chief Plus" collaborative model and the involvement of multiple stakeholders in governance have effectively integrated administrative, judicial, and social supervisory powers. This has built a systemic structure for cross-departmental and cross-sectoral collaborative governance, solving the operational challenges of coordination. At the policy support level, through the continuous infusion of political momentum, a stringent assessment and accountability mechanism, and the precise governance strategy of "One River, One Policy," the system has been sustained with authoritative driving forces and incentive constraints. This has galvanized action across all levels of River Chiefs, addressing the issue of ensuring long-term sustainability.

The governance effectiveness of the River Chief System has been fully validated through the substantial improvement in ecological and environmental conditions. This study's empirical analysis reveals the causal chain from institutional construction to environmental outcomes, specifically reflected in the following three dimensions: First, under the influence of assessment and accountability mechanisms, the RCS injected substantial institutional rigidity into water pollution control, directly driving the fundamental improvement of water quality in river basins. Water quality indicators, as both incentives and responsibilities, are central to governance actions. By 2024, the proportion of river sections meeting Grade I-III water quality standards increased by 22.6 percentage points compared to 2016. Second, the collaborative governance mechanism provided an institutional platform for implementing comprehensive ecological restoration projects, expanding the scope of governance from singular water quality management to the overall health of river basin ecosystems. The participation of multiple stakeholders made cross-basin governance more feasible. Third, as governance objectives continuously evolved, the RCS further advanced toward value-based governance of harmonious coexistence between humans and water, actively exploring mechanisms for realizing the value of ecological products, thus injecting endogenous momentum into the long-term sustainability of governance. The preliminary governance achievements of the River Chief System lay the foundation for the construction of "Happy Rivers and Lakes," which serves as an effective pathway for translating ecological governance results into economic benefits. From pollution control to ecological restoration and value governance, the River Chief System has progressively achieved these threefold governance objectives.

5. Limitations and Future Outlook

This study distills the core theoretical mechanism from institutional construction to environmental outcomes—the "High-level Promotion-Policy Authentication" model. "High-level Promotion" refers to the injection of strong, top-down political momentum and potential energy into river and lake governance through top-level design, local leaders' political authority, policy directives, and performance assessments. It addresses the initial motivation and sustained pressure for governance. "Policy Authentication" refers to a comprehensive, systemically constructed set of refined, operable institutional arrangements, organizational systems, and implementation methodologies developed in response to and for the realization of High-level Promotion. Specifically, this is manifested in the five-level River Chief system, the "River Chief Plus" collaborative mechanism, the "One River, One Policy" tailored strategy, and the assessment and accountability mechanism. This authentication system refines and transmits macro political momentum, ensuring that it can be accurately identified, effectively executed, and ultimately translated into concrete, measurable governance actions at the grassroots level. The effectiveness of this model stems from the complementary, indispensable relationship between the two. High-level Promotion provides the necessity and authority for Policy Authentication. Without the political momentum from the top, the complex cross-departmental and

cross-regional water governance could easily fall into coordination failures due to inherent fragmentation. Furthermore, the sophisticated institutional design would be difficult to implement without sufficient authority. Policy Authentication, in turn, provides the practicality and effectiveness for High-level Promotion. Without a scientific and rigorous policy framework, high-level political directives might be misexecuted and fail to translate into tangible environmental improvements. This model constitutes the core mechanism by which the River Chief System converts political ideology into environmental reality, successfully overcoming the collective action problem in governance, and ultimately achieving the predefined public governance goals.

This study aims to provide valuable insights for the deepening of domestic environmental governance and the supply of international environmental public goods, offering a new analytical perspective for understanding the implementation of major public policies in the Chinese context. For China, the successful experience of the River Chief System demonstrates that solving complex ecological and environmental problems across regions and departments must rely on solid institutional construction and strong organizational support, transforming the political principle of political organization and government joint responsibility into a long-term governance structure. In the future, efforts should be made to further promote the construction of "Smart Rivers and Lakes," accelerate the improvement of the ecological product value realization mechanism, and adaptively expand and transplant the governance logic of the River Chief System to broader and more complex environmental governance fields. For many developing countries around the world facing similar governance challenges, the "High-level Promotion - Policy Authentication" model provides a valuable Chinese example. A governance model that combines strong state mobilization capabilities with refined institutional design can effectively overcome collective action problems across regions and departments and successfully address complex environmental challenges.

This study still has certain limitations. The research is mainly based on macro-level institutional analysis and case study reviews, and there is room for improvement in the comprehensiveness of data and the depth of quantitative analysis. Additionally, there is a need for further comparative research to explore the underlying reasons for the differentiated implementation effects of the River Chief System in different regions. In recent years, the River Chief System has entered the "deep-water zone." Looking ahead, future research could focus on how to use big data and artificial intelligence technology to empower the intelligent management of rivers and lakes, how to further quantify and improve the market-based compensation mechanisms for ecological value, and how to continuously optimize cross-administrative district and cross-basin ecological compensation and collaborative governance mechanisms to address the emerging new challenges.

References

[1] Information on: https://www.gov.cn/zhengce/202506/content_7029509.htm.

[2] Banban Wang, Qionghui Mo, Haoqi Qian. The Diffusion Models and Effects of the Local Environmental Policy Innovation——A Micro-econometric Evidence from the Diffusion of River Chief Policy. China Industrial Economics. (2020) No.08, p. 99 - 117.

[3] Shuming Wang, Mengmeng Cai. Critique of the System of River-leader Based on the Perspective of New Institutional Economics. China Population, Resources and Environment.Vol.21 (2011) No. 09, p. 8 - 13.

[4] Luozhong Wang, Rui Pang. Temporal and Spatial Evolution Mechanism and Policy Diffusion Path of China's Public Policy: A Study of the Implementation and Changes of River-Chief System. Chinese Public Administration. (2018) No. 05, p.63 - 69.

[5] Hui Li, Bin Hu, Baobin Ma. How do Policy Innovations Diffuse Across Scenarios? ——An Exploratory Case Study Based on the Evolution of the "X-Chief" System. CASS Journal of Political Science. (2025) No. 02, p. 96 - 108+177 - 178.

[6] Feng Sun. Why Effect beyond Policy Objectives Produced——AQualitative Study Based on Environmental Policy Spillovers. Journal of Public Management. Vol. 22 (2025) No. 01, p.50 - 62+171.

[7] Dolowitz, D. P. The Rise and Transfer of the River Chief System: A Review of Chinese Water Governance and Its Potential to Transfer to the Global Community. Sustainability. Vol.16 (2024) No. 19, p. 8535.

[8] Min Ren. The river-chief mechanism: a Case Study of China's Inter-departmental Coordination for Watershed Treatment. Journal of Beijing Administration Institute. (2015) No. 03, p. 25 - 31.

[9] Bo Li, Shui Yu. Bottom-line Pressure Type System: The Operation Logic of Local Water Environmental Governance by River Chief. Ningxia Social Sciences. (2018) No. 02, p. 41 - 47.

[10] Hanqing Li. Deconstruction and Organization Dilemma of River Chief System Based on Administrative Subcontract——An Analysis of Shanghai. Chinese Public Administration. (2018) No. 11, p. 114 - 120.

[11] Yizhen Yu. Difficulties and Cuntermeasures of River-Chief Implementation: Practice Effect and Problems of Hangzhou River-Chief System. Journal of Lingnan Normal University. Vol.39 (2018) No.01, p.62 - 66.

[12] Boelens, Rutgerd, Arturo Escobar, et al. Riverhood: Political Ecologies of Socionature Commoning and Translocal Struggles for Water Justice. The Journal of Peasant Studies. Vol.50 (2022) No.3, p.1125 – 56.

[13] Wilson, N. J., Inkster, J. Respecting water: Indigenous water governance, ontologies, and the politics of kinship on the ground. Environment and Planning E: Nature and Space. Vol. 1 (2018) No. 4, p. 516 - 538.

[14] Örjan Bodin. Collaborative environmental governance: Achieving collective action in social-ecological systems. Science. Vol. 357 (2017) No.6352, p. eaan1114.

[15] Yanqing Xu, Zhiren Zhou. Analysis of Interdepartmental Collaboration in Treating Water Environment——A Study on Analytical Framework and Future Research Directions. Journal of Jiangsu Administration Institute. (2014) No. 06, p.110 - 115.

[16] Qiting Zuo, Han Chunhua, Han Chunhui et al. Study on the Theoretical Basis and Support System of River Governor System. Yellow River. Vol. 39 (2017) No. 06, p. 1 - 6+15.

[17] Wei Liu, Jiawen Wu, Wen Chen. Pathway of transboundary collaborative environmental governance in the Taihu Basin: A case study of Suzhou-Jiaxing joint river chief system. Journal of Lake Sciences. Vol. 37 (2025) No. 05, p.1671 - 1682.

[18] Ye Xiong. On Cross-domain Environmental Governance——Take “River-chief System” as a Sample. Social Sciences of Beijing. (2017) No.05, p. 108 - 116.

[19] Qi Wang, Ren Xiaomeng. A Study on the Transmission Mechanism of Local Government Policy Innovation from the Perspective of Intergovernmental Relations: A Retrospective Examination Based on the “River Chief System”. Theory Monthly. (2024). No.12, p. 41 - 50.

[20] Jianguo Zhou, Ye Xiong. “The River Chief System”: How Is Continuous Innovation Possible? — a Two-Dimension Analysis on the Basisof Both Policy Text and Reform Practice. Jiangsu Social Sciences. (2017). No. 04, p. 38 - 47.

[21] Zhenbo Zhang, Zhao Yan, Jin Taijun. Impact of officials' ecological accountability on the effectiveness of the river chief system and its mechanisms. China Population, Resources and Environment. Vol. 34 (2024). No. 08, p. 70 - 79.

[22] Information on: https://www.mee.gov.cn/hjzl/sthjzk/zghjzkgb/202506/P020250604527010717462.pdf.

[23] Yong Wang. Functional Rorganization of River Chief System under the Stratergic Thinking of “River Basin Protection Together”. Journal of Huaiyin Teachers College (Social and Sciences Edition). Vol. 47 (2025). No. 04, p. 338 - 350+431.

[24] Jialiang Wu, Jutao Liu. Practice and Thinking of Promoting the Construction of Happy Rivers and Lakes in Jiangxi Province Under the Background of River and Lake Chief System. Water Resources Development Research. Vol. 23 (2023) No. 05, p. 53 - 56.