

Study on the Role of Environmental Courts in Improving Ecological Welfare Performance

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Abstract

Ecological welfare performance is a core indicator for measuring the effectiveness of ecological civilization construction and the improvement of people's well-being. Its improvement depends on sound institutional guarantees and effective governance measures. Environmental courts, as the core carrier of specialized environmental justice, provide solid judicial support for improving ecological welfare performance by regulating environmental violations, strengthening ecological damage restoration, and clarifying environmental responsibility. This paper systematically reviews relevant domestic and international research on the establishment of environmental courts, the evaluation of ecological welfare performance, and the relationship between the two. It focuses on summarizing the mechanisms and research methods by which environmental courts influence ecological welfare performance, analyzes current research hotspots, controversies, and shortcomings, and finally proposes targeted policy recommendations based on existing research conclusions, providing reference and guidance for further research and the optimization of environmental court practice.

Keywords

Environmental Courts; Ecological Welfare Performance; Environmental Justice; Ecological Damage Restoration; Environmental Governance.

1. Introduction

1.1. Research Background

The global ecological and environmental crisis is becoming increasingly prominent, and ecological and environmental protection has become a core issue for the development of all countries. China is currently in a critical period of ecological civilization construction, and the concept that "lucid waters and lush mountains are invaluable assets" has taken root in people's hearts. Ecological Welfare Performance (EWP), as a comprehensive indicator that takes into account both ecological environment quality and human quality of life, requires sound judicial protection to improve. Environmental justice is a key means of ecological governance, but the traditional judicial system suffers from problems such as fragmented handling of environmental cases and insufficient professional expertise, making it difficult to meet governance needs. Since the establishment of China's first environmental court in 2007, as of the end of 2024, 2,424 specialized environmental and resource adjudication institutions have been established, making China the country with the widest coverage and most complete system globally. Currently, scholars at home and abroad have conducted extensive research on

environmental courts and ecological welfare performance, but a systematic review of the relationship between the two is relatively scarce. Therefore, this paper systematically reviews relevant research, which has important theoretical and practical significance.

1.2. Significance of the Research

This paper's significance encompasses both theoretical and practical levels. Theoretically, it enriches research on the relationship between environmental courts and ecological welfare performance, fills a gap in systematic reviews of both, and improves the theoretical framework of environmental justice and ecological governance. Simultaneously, it integrates domestic and international research perspectives and methods, clarifies the research trajectory, promotes research exchange and integration, and provides guidance for future research. Practically, it analyzes the effectiveness and shortcomings of environmental court practices, providing a reference for optimizing their operation and strengthening their governance efficiency. It also clarifies their core role in improving ecological welfare performance, providing practical guidance for ecological civilization construction, environmental judicial reform, and the improvement of people's livelihoods. The core value of this paper lies in systematically reviewing relevant research, clarifying the core logic of environmental courts' impact on ecological welfare performance, analyzing research hotspots and controversies, and proposing targeted suggestions based on research conclusions, providing support for deepening related research and optimizing environmental court practices.

1.3. Scope of the Review

This review covers three core areas, combining core research findings from both domestic and international sources: first, research on environmental courts, focusing on their background, functions, operation models, and effectiveness; second, research on ecological welfare performance, focusing on its connotation, evaluation system, and influencing factors; and third, research on the relationship between the two, focusing on the pathways of action, empirical methods, conclusions, and controversies.

1.4. Current Research Hotspots and Controversies

1.4.1. Research Hotspots

Current research focuses on four main areas: First, the professional operation and effectiveness of environmental courts, focusing on the impact of "three-in-one" trials, cross-regional jurisdiction, and their effects on case handling and ecological restoration ^[9]; second, the optimization of the ecological welfare performance evaluation system, constructing an indicator system around "ecological input-welfare output" and using methods such as the DEA model for calculation ^[10]; third, the mechanism of their interaction, analyzing the impact of environmental courts through regulating corporate behavior and strengthening ecological restoration ^[6]; and fourth, the heterogeneous impact of environmental courts, exploring the differentiated roles of environmental courts in different regions and of different types ^[5].

1.4.2. Research Controversies

The main controversies in the research are threefold: First, the direction and intensity of the impact. Most studies believe that environmental courts can significantly improve ecological welfare performance ^[8], but some studies believe that there are negative effects in the short term ^[4]. Second, the core mechanism of action. Some scholars believe it is a deterrent effect ^[7], while others believe it is a restorative effect. Third, the optimization of the operational model. Scholars have different views on the scope of jurisdiction, trial model, and coordination mechanism.

1.5. Research Background and Paper Structure

This paper revolves around the core logic of "establishment of environmental courts - function path - improvement of ecological welfare performance", and unfolds in the following order: "literature review - viewpoint integration - controversy analysis - conclusion and recommendations". First, it reviews the research foundation of both, then analyzes the function path and research methods, dissects hot topics, controversies and shortcomings, and finally puts forward policy recommendations, summarizes the conclusions and looks forward to future research directions.

2. Review of Relevant Research Foundations

2.1. Review of Relevant Research on Environmental Courts

2.1.1. The Connotation and Functional Positioning of Environmental Courts

Environmental courts are judicial institutions specializing in environmental civil, administrative, and criminal cases. They are the core vehicle for specialized environmental justice, with core functions of regulating environmental behavior, resolving environmental disputes, pursuing environmental responsibility, and restoring ecological damage. International scholars define them as specialized institutions focused on environmental case adjudication and pursuing ecological protection and environmental justice. Based on the theories of environmental justice and public trust, they possess three main functions: dispute resolution, deterrence, and restoration. Domestic research places greater emphasis on the synergy between ecological governance and people's livelihood protection, highlighting their role in promoting policy implementation and regional collaborative governance. In 2024, courts nationwide concluded 219,000 first-instance environmental and resource cases, with ecological damage compensation reaching 9.6 billion yuan, demonstrating significant achievements.

2.1.2. Operational Model and Practical Effectiveness of Environmental Courts

The differences in the operational models of environmental courts are reflected in their jurisdiction, trial models, and collaborative mechanisms: jurisdiction is divided into regional jurisdiction and cross-regional jurisdiction, the latter applicable to ecosystem protection such as cross-basin trials; the trial model is mainly "three-in-one trial", with some regions exploring a model of "public interest litigation as the main approach and private interest litigation as a supplement". In practice, environmental courts can improve case handling efficiency and ecological quality. For example, Hou et al. (2023) found empirically that industrial wastewater and exhaust gas emissions decreased significantly after their establishment^[3]; Geng et al. (2025) pointed out that they can promote the improvement of corporate ESG performance^[1]. However, insufficient judicial resources and a lack of professional talent have constrained their effectiveness.

2.2. Review of Research on Ecological Welfare Performance

2.2.1. The Connotation and Definition of Ecological Welfare Performance

Ecological welfare performance is an interdisciplinary concept between ecological economics and welfare economics. Initially defined as the ratio of ecological input to welfare output, it has evolved into a comprehensive performance encompassing the three dimensions of ecology, economy, and society. International research summarizes it into two dimensions: ecology (resource utilization, pollution control) and welfare (quality of life, health security). Some scholars define it as the level of coordinated development between the ecological and welfare systems. Domestic research emphasizes the synergy between "green mountains and clear

waters" and "gold and silver mountains," with the core being the coordinated development of ecological protection and improvement of people's livelihoods.

2.2.2. Evaluation Indicators and Methods for Ecological Welfare Performance

The evaluation index system is constructed around the concept of "ecological input - environmental quality - welfare output." Ecological input includes energy consumption and pollutant emissions, environmental quality includes air quality and water quality, and welfare output includes residents' income and health levels. International scholars have developed index systems with varying emphases; some have constructed four dimensions with 18 indicators, while others focus on carbon reduction and residents' well-being. The evaluation methods are primarily quantitative, with the DEA model being the most widely used, supplemented by entropy weighting, panel data regression, and spatial econometric models to measure performance levels and analyze influencing factors and spatial effects.

2.2.3. Research on Factors Influencing Ecological Welfare Performance

Ecological welfare performance is influenced by four factors: environmental governance, economic development, social progress, and technological innovation. In environmental governance, environmental courts, as a core judicial tool, have a significant impact on its improvement. Economic development and performance exhibit an inverted U-shaped relationship. Population quality and residents' environmental awareness can drive performance improvement. Green technology innovation is an important driving force. International research focuses on the impact of environmental courts, with some scholars empirically finding that they can improve performance through ecological restoration, indicating that their carbon reduction effect is more significant in areas with high environmental regulation intensity.

3. The Role and Research Methods of Environmental Courts in Improving Ecological Welfare Performance

3.1. The Path of Environmental Courts in Enhancing Ecological Welfare Performance

Environmental courts primarily promote the improvement of ecological welfare performance through four pathways: deterrence, restoration, collaboration, and guidance. These four pathways work together to form a complete mechanism, as detailed in relevant English literature below.

3.1.1. Deterrent Effect: Regulating Environmental Behavior and Reducing Ecological Damage

The deterrent effect is one of the core approaches. By holding environmental violators legally accountable through specialized trials, the cost of violations is increased, regulating corporate and individual behavior, and reducing pollution and ecological damage. Empirical evidence shows that after the establishment of environmental courts, the incidence of corporate environmental violations decreased by more than 30%. Some scholars have pointed out that the strict handling of environmental criminal cases can reduce destructive behaviors such as illegal mining. At the same time, the deterrent effect can encourage companies to increase their environmental investment and pursue green transformation, improving ESG performance and indirectly contributing to performance improvement.

3.1.2. Restoration Effect: Promotes Ecological Restoration and Improves Environmental Quality

The restoration effect, by holding violators accountable for ecological restoration, promotes the recovery of damaged ecosystems, improves environmental quality, and enhances residents'

ecological welfare. Studies show that environmental courts can clarify restoration responsibilities and standards, increasing the rate of restoration enforcement; some studies also indicate that they can improve case handling efficiency and accelerate the restoration process. China's environmental courts are exploring diverse restoration methods such as "carbon sequestration", for example, the Fujian courts have achieved significant results in fulfilling restoration obligations through mangrove blue carbon insurance.

3.1.3. Synergistic Effect: Integrating Governance Resources and Enhancing Governance Effectiveness

Synergy, through the integration of judicial, administrative, and social resources, strengthens collaboration with relevant departments, social organizations, and the public, forming a joint force for governance. Research indicates that it can promote the connection between law enforcement and the judiciary, improving overall efficiency; analysis reveals that it can build a platform for public participation and enhance environmental awareness. In domestic practice, environmental courts have addressed difficulties in evidence collection through mechanisms such as the transfer of leads and information sharing. For example, the Xi'an Railway Transportation Court regulated the environmental testing market through judicial recommendations.

3.1.4. Guiding Effect: Strengthening Environmental Protection Concepts and Promoting Green Development

The guiding effect is a long-term approach. Through adjudicating cases, publishing exemplary cases, and promoting environmental awareness, environmental concepts are disseminated, and green production and lifestyles are promoted. Studies have shown that exemplary cases can guide enterprises to increase investment in green innovation and can raise public environmental awareness, reducing individual environmental damage. Furthermore, environmental courts improve environmental policies through judicial recommendations; for example, the Supreme People's Court publishes carbon-related cases to guide the standardized development of the carbon market.

3.2. Research Methods on the Correlation between the Establishment of Environmental Courts and Ecological Welfare Performance

Related research primarily employs quantitative methods, supplemented by qualitative methods, with the core objective being to empirically test the correlation between the two. Based on relevant literature, the mainstream methods are as follows.

3.2.1. Quasi-natural Experimental Method (Difference-in-Differences Method)

Institutional Decision Making (DID) is the mainstream approach, treating the establishment of environmental courts as a quasi-natural experiment. It compares the performance changes in areas with established courts (treatment group) with those without (control group) to examine the net effect. Empirical studies using panel data from prefecture-level cities have found that environmental courts significantly improve performance, with a more pronounced effect in eastern regions. Some studies employ spatial DID, revealing spatial spillover effects in carbon reduction. Other studies use listed companies as samples, providing micro-level evidence. Scholars often use methods such as PSM-DID and instrumental variable methods to address endogeneity issues and ensure the robustness of the conclusions.

3.2.2. Panel Data Regression Method

Panel data regression uses ecological welfare performance as the dependent variable and the establishment of environmental courts as the core explanatory variable, controlling for economic and industrial factors to examine the direction and intensity of the impact. Some scholars have used fixed-effects regression and found that the impact of environmental courts on performance is "negative in the short term and positive in the long term"; some studies

have used random-effects regression and found that its synergy with environmental regulation can significantly improve performance.

3.2.3. Case Study Method

Case studies were used to supplement quantitative research, selecting typical cases to analyze the mechanisms and effectiveness of environmental courts. By selecting cases from environmental courts in eight countries, the study found that factors such as jurisdiction influence performance improvement, and summarized the ecological restoration experiences of the Guiyang and Kunming environmental courts as examples.

3.2.4. Other Research Methods

Entropy weighting is used to construct an evaluation index system and determine weights; DEA model is used to measure performance level and efficiency changes; spatial econometric model is used to analyze spatial spillover effects. For example, He et al. (2024) found that the carbon emission reduction effect of environmental courts can radiate to surrounding areas [2], and combined DEA and DID to verify its impact from a micro perspective.

4. Research Hotspots, Controversies and Shortcomings

4.1. Research Hotspots

The research focuses on four aspects: first, the optimization and effectiveness of the operation mode of environmental courts, focusing on "three-in-one" trials and cross-regional jurisdiction; second, the improvement and spatiotemporal evolution of the ecological welfare performance evaluation system, analyzing the causes of regional differences; third, the mechanism and heterogeneity of the relationship between the two, exploring the differentiated impacts of different regions and enterprises; and fourth, the synergistic effect of environmental courts and other governance methods, exploring the path to synergistically improve performance.

4.2. Research Controversies

The main controversies are threefold: First, the direction and intensity of the impact, with most believing it to be significantly positive, while some believe it to be negative in the short term and positive in the long term, and that the intensity of the impact is constrained by judicial resources; second, the core path of action, with disagreements on the deterrent effect versus the restorative effect; and third, the optimization of the operational model, with differing views on the scope of jurisdiction, trial model, and coordination mechanism.

4.3. Insufficient Research

Current research has four shortcomings: First, the research perspective is singular, lacking research on the two-way interaction between the two, and research at the micro level is scarce; second, the research methods are limited, the endogeneity problem has not been fully resolved, the data is not refined enough, and the case representativeness is lacking; third, the research content is not comprehensive, and the research on special scenarios such as ecologically fragile areas, long-term effects, and synergistic mechanisms is relatively superficial; fourth, there is a disconnect between domestic and foreign research, a lack of international experience comparison, and few systematic reviews on the relationship between the two.

5. Research Conclusion and Policy Recommendations

5.1. Research Conclusion

This paper, after reviewing relevant research, draws the following core conclusions: First, environmental courts, as the core carriers of specialized environmental justice, possess multiple functions, and their operational models are developing towards specialization and

collaboration, with significant practical results in my country. Second, ecological welfare performance is a three-dimensional, collaborative, and comprehensive performance, primarily evaluated using quantitative methods and influenced by multiple factors, highlighting the significant role of environmental courts. Third, environmental courts promote performance improvement through four pathways: deterrence, restoration, collaboration, and guidance, with synergistic effects among these pathways. Fourth, research hotspots focus on operational models and evaluation systems, while controversies center on the direction of impact and core pathways, revealing shortcomings in perspectives and methods. Fifth, the impact of environmental courts on performance is heterogeneous, with significant long-term positive effects but potential short-term negative effects.

5.2. Policy Recommendations

Based on the research findings, and combining international experience with my country's practices, the following policy recommendations are proposed to promote the optimization of environmental courts and the improvement of ecological welfare performance.

5.2.1. Optimize the Operation Mode of Environmental Courts and Improve Judicial Efficiency

First, improve the jurisdiction mechanism, expand the scope of cross-regional jurisdiction to cover cross-basin and ecologically sensitive areas, and establish a collaborative trial mechanism; second, deepen the "three-in-one" trial model, strengthen the professional training of judges, establish an expert consultation mechanism, and improve the professionalism of trials; third, strengthen the guarantee of judicial resources, increase investment in human, financial and material resources, optimize the trial process, and improve the case enforcement rate.

5.2.2. Strengthen the Core Role of Environmental Courts and Promote the Improvement of Ecological Welfare Performance

First, strengthen the deterrent effect by severely cracking down on environmental violations by highly polluting enterprises and increasing the cost of violations. Second, strengthen the remediation effect by clarifying remediation responsibilities and standards, exploring diversified remediation models, and establishing a remediation effect evaluation mechanism. Third, strengthen the synergistic effect by enhancing collaboration with administrative agencies and social organizations and building a platform for public participation. Fourth, strengthen the guiding effect by publishing typical cases and proposing judicial recommendations to promote the transformation of green production and lifestyles.

5.2.3. Taking into Account Heterogeneity to Achieve Differentiated Governance

First, differentiated policies should be implemented for ecologically fragile areas and developed eastern regions, taking into account regional differences, and the targeted functions of environmental courts should be strengthened. Second, attention should be paid to the heterogeneity of enterprises, increasing deterrence against high-pollution, large enterprises, and focusing on guidance for small and medium-sized enterprises to promote their green transformation.

5.2.4. Strengthen Research Innovation and International Exchange, and Improve the Research System

First, we should promote the diversification of research perspectives and strengthen the integration of macro, meso, and micro perspectives and the two-way interaction between them. Second, we should optimize research methods, adopt refined data, promote the integration of quantitative and qualitative research, and solve endogeneity problems. Third, we should expand research content, focus on special scenarios and long-term effects, and deepen the research on synergistic mechanisms. Fourth, we should strengthen international cooperation,

learn from advanced experience, and promote the international dissemination of my country's research results.

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