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A critical examination of environmental public interest litigation in China - reflection on China's environmental authoritarianism

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Environmental public interest litigation is an innovative legal mechanism for humanity to address environmental crises. It not only addresses the tragedy of the commons in environmental crises but also serves as a crucial means for protecting the rights of environmentally vulnerable groups and upholding environmental justice. Over the past decade, the development of China's environmental public interest litigation system has been promising. Thousands of such cases are filed each year, making a significant contribution to curbing the further deterioration of China's environmental crisis. However, China still does not allow individual citizens to initiate environmental public interest litigation, and there are significant hurdles for environmental NGOs to file such lawsuits. As a result, the vast majority of environmental public interest litigation cases in China are initiated by procuratorates, which appears to be another important manifestation of China's environmental authoritarianism. This institutional setup severely restricts the ability of China's environmental vulnerable groups to protect their rights and masks many environmental issues that truly need improvement, hindering the realization of environmental justice. From a comparative perspective, compared to countries like the United States with more mature experiences in environmental public interest litigation, China's system suffers from narrow subject qualifications, extensive restrictions on environmental NGOs, and excessive litigation costs. Even compared to India, another developing country, China's environmental public interest litigation system appears conservative. Therefore, China's environmental public interest litigation system urgently needs further reform and improvement.

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Introduction

Environmental public interest litigation is a specialized legal tool for addressing environmental crises. This is because the cumulative and transitory nature of environmental pollution results in difficulty to fully account for the pollution caused by a particular enterprise or individual, while the natural environment, on which humanity collectively depends, suffers progressive damage (An and Sang, 2022). Within the traditional legal system, it is challenging to litigate against polluters in such situations for two main reasons: first, the lack of a clear outcome of pollution, namely, personal or property damage; and second, the absence of proper litigants, meaning that there are no suitable parties to initiate lawsuits (Zhang, 2002). Moreover, in many cases of environmental pollution, affected people likely lack the knowledge and resources to confront the corporations or institutions responsible for environmental damage. To address this problematic situation, environmental public interest litigation, an innovative environmental law mechanism, was developed by pioneering Western countries in environmental protection, with the United States being a representative of such countries. (Xu and Song, 2016).

Over the past three decades of the 21st century, this system has been adopted by many countries, including developed nations such as Germany, Japan and Canada (Greve, 1989; Campbell, 2023; Abery, 1999; Tsuji, 2010; Tollefson, 2002). What's commendable is that countries introducing environmental public interest litigation also include developing nations such as India, Brazil, South Africa and the Philippines (Gill, 2012; Dilay et al., 2020; Crawford, 2008; Klaaren et al., 2011; Gera, 2016). The reason behind this phenomenon lies in the profound evolution of globalization and market economies over the past few decades, leading to a global restructuring of industrial structures, where many pollution-intensive industries have shifted from developed to developing countries (Pintz and Havinga, 1988). While this trend has promoted economic growth in developing nations, it has also brought about serious environmental crises. Many developing countries face significant environmental challenges, including air and water pollution, land degradation, loss of biodiversity among others (Simonis, 1984). In this context, environmental public interest litigation has become a crucial legal mechanism for the people of developing countries to protect the environment, safeguard their health, and promote sustainable development.

Specifically, the importance of environmental public interest litigation is first manifested in its ability to fill gaps in traditional environmental law enforcement. In many cases, although environmental laws have been enacted, the effectiveness of their enforcement is far from ideal due to limited resources and inadequate enforcement by regulatory agencies. Environmental public interest litigation allows non-governmental organizations, social groups, and even individuals to intervene in environmental protection efforts. This is crucial for environmentally vulnerable groups who may lack standing under traditional legal frameworks, thus addressing the shortcomings of traditional environmental governance models (Rajamani, 2007; Amechi et al., 2021). Whether in developed countries or developing nations, environmental public interest litigation can raise public awareness of environmental issues and provide an open legal platform for ordinary citizens and social groups to directly participate in environmental protection actions, thereby promoting broad-based societal engagement and oversight of environmental protection efforts. Through the adjudication and rulings of environmental public interest litigation cases, deficiencies and loopholes in a country's environmental laws can be revealed, providing a practical basis for the revision and improvement of environmental legislation. In essence, environmental public interest litigation, pioneered by developed countries such as the United States and subsequently promoted globally, is a crucial legal system greatly beneficial to environmentally vulnerable groups and the realization of environmental justice.

At the end of the 20th century and the beginning of the 21st century, China's environmental crisis became increasingly severe, reaching a point where it could not be ignored. This also marked the beginning of the substantial development of China's environmental law. China began to diligently learn from pioneering countries in the field of environmental protection in the West to build various environmental protection systems, and environmental public interest litigation is one of the important achievements of this period (Cui, 2008; Li and Li, 2006; Luo, 2017; Shi, 2004; Wang, 2016b). From the introduction and discussion in academia to the confirmation and pilot promotion of China's legislation, China's environmental public interest litigation has gone through more than 20 years of development and has played an irreplaceable and important role in alleviating China's environmental crisis (Wang, 2016a). In 2018, in its Constitution, China called for the construction of an ecological civilization, which showed that China had elevated its environmental protection to a national strategy and that environmental public interest litigation must play an increasingly important role in China's future environmental rule of law (Huang, 2022; An and Liu, 2023). From 2016 to 2017, the number of environmental public interest litigation cases in China was less than 1000 per year, while in 2022, China's environmental resource public interest litigation cases numbered 5885 and 4582, respectively, achieving remarkable growth. Therefore, one of the leaders of the Chinese People's Congress noted that a fundamental system of environmental public interest litigation with Chinese characteristics had been formed and that it was one of the important driving factors for the effectiveness of China's environmental governance in recent years (lv, 2023).

While progress and achievements in environmental public interest litigation in China are indeed encouraging, a closer examination reveals that among the thousands of such cases filed each year in China, those initiated by the Chinese procuratorate account for 70–80% of the total and even more than 90% in some years (Xia and Wang, 2023). This seems to be another strong manifestation of China's environmental authoritarianism. In other words, the range of plaintiffs in China's environmental public interest litigation is actually quite narrow, which differs from the situation in most countries around the world (Xie and Xu, 2021). Although this approach can achieve certain environmental governance effects in the short term, whether it can truly increase the participation of Chinese citizens in environmental issues or enhance environmental awareness in Chinese society are questions that need further in-depth discussion. Additionally, China's environmental public interest litigation faces several challenges, including a low proportion of civil and administrative public interest lawsuits, dominance of criminal cases accompanied by civil public interest litigation, incomplete litigation rules, an underdeveloped system of pretrial expert meetings, and high litigation costs.

Against this background, the primary objective of this paper is to systematically outline the development of environmental public interest litigation in China, to investigate in depth the current issues it faces and to assess the impact of these issues on the effectiveness of environmental governance in China. Building on these issues, this paper will offer targeted recommendations for the future enhancement of China's environmental public interest litigation. For China, environmental public interest litigation is an entirely imported concept; thus, comparative research will serve as the main methodological approach of this paper. The

U.S., as the birthplace of modern environmental public interest litigation, will be the main focus of this comparative study, and an examination of environmental public interest litigation in the European Union, Japan and other nations will also be included. The first section of this paper systematically revisits and organizes the development of environmental public interest litigation in China. The second section analyzes the current challenges faced by China's environmental public interest litigation. The third section investigates the characteristics and strengths of environmental public interest litigation in the U.S. and aspects that are valuable for China to continue learning from. Finally, the paper proposes recommendations for optimizing environmental public interest litigation in China.

The development history of environmental public interest litigation in China

Environmental public interest litigation originated in the U.S. and is used mainly to solve the problems of government failure and market failure in environmental governance. China mainly learned and transplanted this system from the U.S. (Cao, 2015; Goldman, 2006). The introduction of environmental public interest litigation in China began in the late 1980s, and in the following 20 years, a research boom in environmental public interest litigation occurred (Han, 1989; Nie, 1991; Wu, 2001; Xu, 1987; Zheng and He, 1997; Zhu, 1999). In the "Civil Procedure Law" amended in 2012, the public interest litigation system was confirmed by legislation for the first time; in the "Environmental Protection Law" amended in 2014, environmental public interest litigation was clearly defined in legislation (Jiang, 2019). In summary, the development of environmental public interest litigation in China occurred in two stages.

Theoretical research and legislative preparation stage. In the late 1980s, academic papers that clearly introduced American environmental public interest litigation appeared in Chinese academic circles, opening the door to academic research and public opinion discussion on environmental public interest litigation in China (Liu and Zhang, 1989). In 1990, several Chinese scholars systematically introduced the civil litigation system to American environmental law, which inspired system innovation in Chinese public interest litigation (Tao, 1990). One scholar noted that although China's Environmental Protection Law (1989) has several principled provisions, such as "all units and individuals have the obligation to protect the environment and have the right to report and sue units that pollute and damage the environment." However, this approach is obviously too macroscopic, and there is no supporting implementation method. With the improvement of citizens' awareness of environmental protection, it is necessary for China to carry out discussions on issues such as the qualifications of the subject of environmental litigation, the scope of the case, and the burden of proof. In the 1990s, China's economic development entered a high-speed stage, and the importance of environmental protection did not receive enough attention. However, under such conditions, Chinese scholars' research on environmental public interest litigation is still ongoing, and research on relevant American cases and the judicial system is constantly being refined. The real research climax of China's environmental public interest litigation began in the early 21st century. After China joined the WTO, the external world put increasing pressure on China's environmental protection. Moreover, China's internal environmental crisis is intensifying, and people's demand for a good environment is increasing. Under the dual pressure of internal and external environmental protection, the Chinese government has finally begun to take seriously the importance of environmental protection. In this context, the research results on China's environmental public interest litigation began to explode. According to statistics, between 2003 and 2021, 758 papers related to environmental public interest litigation were published in high-level academic journals in China. Plaintiff qualifications, environmental rights, public interests, environmental courts, damages, etc., are high-frequency topics in research on China's environmental public interest litigation (Qin, 2021). While environmental public interest litigation is being studied in theoretical circles, scholars and the general public are also bringing environmental public interest litigation to judicial practice. The most representative case is that in 2003, in which six teachers and students at Peking University filed an environmental civil public interest lawsuit with the Heilongjiang Higher People's Court, using sturgeon, the Songhua River and Sun Island as coplaintiffs (Yan, 2007). Due to the lack of relevant regulations on environmental public interest litigation in China at that time, the case did not enter the judicial process, but it still aroused great attention to environmental public interest litigation across society.

Legislative confirmation and rapid development stage. After more than 20 years of theoretical exploration, in August 2012, China finally added civil public interest litigation clauses when amending the Civil Procedure Law. Article 55 of the revised law stipulates that "For acts that pollute the environment, infringe on the legitimate rights and interests of many consumers, and other acts that damage the public interest, the organs and relevant organizations prescribed by law may file lawsuits in the people's courts", which is considered to be the real beginning of environmental public interest litigation in China (Zhao and Chen, 2013). However, the provision does not clarify the exact meaning of "organs prescribed by law" or "relevant organizations" (Yan, 2016). In 2015, Article 58 of China's revised Environmental Protection Law limited the qualifications for environmental public interest litigation to "social organizations", which must meet the conditions of being "registered in the civil affairs department of the people's government at or above the districted city level according to law" and having been engaged in environmental protection public welfare activities for more than five consecutive years with no illegal records" (Wang and Cheng, 2014). Moreover, the clause specifically states that social organizations filing lawsuits are not allowed to seek economic benefits through litigation to maintain the "public interest" of environmental public interest litigation. Although the "Civil Procedure Law" and "Environmental Protection Law" somewhat conservatively limit the plaintiff qualifications of environmental public interest litigation to social organizations and do not grant individual plaintiff qualifications to initiate environmental public interest litigation, after legislative confirmation of environmental public interest litigation in these two important laws, its prominence became evident in judicial practice (Zhao, 2016). From 2012 to 2015, dozens of environmental public interest litigation cases actually entered the judicial process in China, contributing to the accumulation of valuable experience in the development of environmental public interest litigation in China (Gong and An, 2017).

The opportunity to facilitate rapid development in China's environmental public interest litigation was established in July 2015, when, authorized by the Standing Committee of the National People's Congress, 13 provinces (municipalities) began to use procuratorates to initiate public interest litigation. In June 2017, the Standing Committee of the National People's Congress revised the Civil Procedure Law and the Administrative Procedure Law, formally establishing a litigation system in which public interest litigation is initiated by the procuratorate, and the

environmental public interest litigation system, as an important type of public interest litigation system for the procuratorate, was further enriched and developed (Sun and Chang, 2015). In March 2018, the Supreme People's Court of China and the Supreme People's Procuratorate jointly issued the "Interpretation on Several Issues Concerning the Application of Law in Procuratorate Public Interest Litigation Cases", which made detailed and operable regulations on the procuratorate's filing of environmental public interest litigation. It is obvious that China's environmental public interest litigation has rapidly increased from dozens of cases per year to thousands of cases per year (Li and Liu, 2021). In 2021, the number of environmental public interest litigation cases concluded by courts at all levels in China increased to 4943, and 89% of criminal incidental civil public interest litigation cases were filed by procuratorates. The entitlement of a procuratorates to file environmental public interest litigation as a plaintiff has enabled the rapid development of environmental public interest litigation in China in recent years.

The current shortcomings of environmental public interest litigation in China

Environmental public interest litigation in China has undergone significant development from its nonexistence to its existence, contributing positively to the alleviation of China's environmental crisis and the strengthening of public environmental awareness. Its vital value should be fully recognized. However, as a nascent phenomenon, there are still several major issues currently present in China's environmental public interest litigation, which have become constraining factors for the sustainable development of environmental governance in China.

First, in China, the procuratorate is the plaintiff in the vast majority of environmental public interest litigation cases. This is a key factor in the rapid development of environmental public interest litigation in China and a recent manifestation of China's environmental authoritarianism (Ma and Xiang, 2023). While the current institutional arrangement of environmental public interest litigation in China can efficiently achieve positive environmental governance effects in the short term, its role in mobilizing the enthusiasm of citizens and social groups in participating in environmental governance and in enhancing the environmental awareness of Chinese society is questionable. This, in turn, raises concerns about the sustainability of China's environmental governance. According to environmental authoritarianism, in the face of complex environmental challenges and urgent ecological crises, democratic decision-making processes in the West may be too slow and inefficient, while authoritarian governments, due to their rapid decision-making and strong execution capabilities, can implement environmental protection measures more swiftly (Carpenter-Gold, 2015 ; Naito, 2017). In China, the implementation of environmental policies often involves the strong intervention of authoritative public authorities (Beeson, 2010; Wang and Lo, 2022). This approach has to some extent increased the efficiency of the implementation of environmental policies but has also sparked discussions about environmental participation, transparency of environmental information, and social equity (Wilson, 2016; Xie and Xu, 2022). A basic summary of environmental public interest litigation cases initiated by social organizations and procuratorates in China between 2016 and 2022 is shown in the following table. (Xie and Xu, 2021).

As shown in the table above, although the number of environmental public interest litigation cases initiated by social organizations is also increasing, it is comparable to the number initiated by procuratorates. In recent years, the Supreme People's Court of China has published an annual white paper on the adjudication of environmental and resource cases. However, even in the 2022 document, the number of cases initiated by social organizations was not disclosed. Admittedly, the leading role of procuratorates in environmental protection in China reflects an increased emphasis on environmental governance and demonstrates China's active intervention and determination in addressing environmental issues. However, in most countries, environmental public interest litigation is often initiated by nongovernmental organizations or individuals. This not only enhances the transparency of environmental protection and public awareness of environmental issues but also promotes social supervision and diversified solutions. The current landscape in China, where procuratorates are the predominant force in environmental public interest litigation, makes it difficult for the litigation process to fully consider public opinion, to disclose information sufficiently to the public, and potentially overlooks or fails to adequately address environmental issues involving complex socioeconomic factors.

Second, China still does not allow individuals to initiate environmental public interest litigation and has set numerous threshold conditions for social organizations to file such lawsuits, resulting in a narrow range of plaintiff eligibility (Cai, 2019). The issue of the overly narrow scope of plaintiffs in China's environmental public interest litigation has been criticized for a long time, but to date, Chinese citizens still cannot initiate environmental public interest litigation due to their personal capacity. The experiences of many pioneering countries in environmental protection show that independent individual citizens play a significant role in detecting and exposing environmental issues. These areas are closer to the site of the problem and may detect and respond to environmental issues earlier (Chu, 2023). Citizen participation in environmental protection is an important way to increase the transparency of environmental policies, promote democratic decision-making on environmental issues, and enhance public awareness of environmental protection. Not allowing individuals to initiate environmental public interest litigation limits the participation of ordinary citizens in the field of environmental protection, significantly reducing the possibility of public oversight of environmental issues, which may lead to the neglect or improper handling of these issues (Xiao and Ding, 2023). Moreover, although China's Environmental Protection Law allows social organizations to file environmental public interest litigation, these organizations must be legally registered with the civil affairs departments of the people's governments at or above the prefecture level and have been specifically engaged in environmental protection public welfare activities for more than five consecutive years without any record of violations. Admittedly, such threshold requirements are not entirely without merit, but this also seems to explain why the number of environmental public interest litigation cases filed by social organizations in China is consistently at a lower level.

Based on the above discussion, we believe that China's environmental public interest litigation does not fully reflect the concept of ecological civilization advocated by China. Since the formal introduction of the concept of ecological civilization in 2007, its importance in China's national development strategy has grown. The ecological civilization proposed by China is a comprehensive, multidimensional concept. This approach constitutes not only a strategy for environmental protection but also a novel development philosophy and lifestyle aimed at constructing an innovative form of civilization for human societal development after industrial civilization (Hansen et al., 2018; Geall and Ely, 2018). Indeed, China's current environmental public interest litigation system is beneficial for the construction of an ecological civilization and has achieved certain environmental governance effects in the short term. However, as a form of civilization,

ecological civilization cannot always rely on environmental authoritarianism to promote its advancement. The current procuratorate-led model of environmental public interest litigation limits the opportunities for ordinary citizens to directly participate in environmental protection actions. The inability of individuals to act as litigants creates a sense of distance from environmental protection among the public, reducing their sense of personal responsibility and willingness to engage in environmental issues (Zhou, 2021). Moreover, the current situation, in which the procuratorates predominantly initiate environmental public interest litigation, leads to a relatively narrow focus on environmental issues in Chinese society, which fails to fully reflect the concerns of all sectors of society about environmental problems. Additionally, the low level of participation by individual citizens and social organizations also reduces opportunities for environmental education and enhances public awareness of environmental protection. Therefore, China's environmental public interest litigation must undergo further reforms and improvements to truly align with the core essence of ecological civilization.

Moreover, the jurisdiction of environmental public interest litigation cases is still relatively confusing, and the regulations issued by different provinces in China are inconsistent, resulting in confusion and low efficiency in the jurisdiction of cases. Third, the distribution of public interest litigation cases is very uneven. The nine provinces of Jiangsu, Zhejiang, Anhui, Shandong, Hunan, Guangdong, Guangxi, Sichuan, and Guizhou each have more than 70 environmental public interest litigation cases, accounting for approximately 57.3% of the total of such cases in the nation. China's environmental public interest litigation exhibits a "more in the southeast, less in the northwest" condition, with obvious regional differences. Finally, the procedural and substantive rules of environmental public interest litigation need to be improved, and there is still much room for improvement in the management and use of environmental restoration funds.

In retrospect, the accelerated evolution of environmental public interest litigation within China's borders mirrors the nation's steadfast adherence to environmental authoritarianism as a core facet of its environmental management paradigms. Historically, this approach has been hallmarked by state-directed endeavors across diverse sectors of environmental stewardship. Presently, it is distinguished by the dominant involvement of Chinese prosecutorial bodies within the ambit of environmental public interest litigation. Within the framework of China's judiciary, these prosecutorial entities are chiefly tasked with overseeing adherence to legal statutes and spearheading initiatives for public welfare. Nevertheless, their active engagement in environmental conservation underscores the authoritarian and centralized essence of China's environmental regulatory architecture. Moreover, this progression underscores a more profound consolidation of environmental authoritarianism as an integral component of the nation's strategy for environmental conservation.

The multifaceted problems in China's current environmental public interest litigation stem from the authoritarian model prevalent in environmental governance. This governance model emphasizes the dominant roles of the government and judicial agencies, with relatively low levels of public participation. Indeed, having prosecutors take the lead in environmental public interest litigation can expedite decision-making and enforcement processes, offering efficiency advantages in swiftly addressing environmental issues and achieving protection goals, particularly in cases of major environmental violations where legal measures need rapid implementation. However, this authoritarian environmental governance model also comes with significant limitations. Firstly, excessive reliance on state authorities to lead environmental governance inevitably suppresses public and societal organization involvement, restricting the role of civil society in environmental protection and resulting in inadequate social oversight and feedback in environmental governance. Secondly, restrictions on NGOs and individuals filing environmental public interest litigation undoubtedly reduce the diversity and innovation of environmental protection actions, limiting the channels for environmentally vulnerable groups to seek legal remedies for themselves, which seems contradictory to the original intent of establishing the environmental public interest litigation system. Therefore, in the future refinement of China's environmental public interest litigation, it is imperative to draw lessons from more mature international development experiences. The following analysis will primarily focus on the development of environmental public interest litigation in the United States as the main comparative study subject, while also mentioning aspects of India's environmental public interest litigation system, another populous developing country, which offers valuable lessons for China to learn from.

International experience of the development of environmental public interest litigation

In the 1970s, the environmental public interest litigation system was first established in the United States, marked by landmark cases such as Sierra Club v. Morton, United States v. Tennessee Valley Authority, and Chevron U.S.A., Inc. v. Natural Resources Defense Council, Inc., which have had profound domestic and international impacts. It is worth noting that developing countries like India, Brazil, and South Africa quickly followed suit, establishing their own environmental public interest litigation systems in the 1980s and 1990s, resulting in significant social and environmental benefits. This progress notably surpassed China's environmental public interest litigation system. This section will primarily focus on the development of the environmental public interest litigation system in the United States for comparative analysis, while also examining the strengths of India's environmental public interest litigation system that China could consider.

The american experience of environmental public interest litigation. In contrast to the concept of environmental public interest litigation in China, environmental public interest litigation in the U.S. is called "citizen law enforcement" or "private attorney general", which refers to citizens or environmental nongovernmental organizations replacing the functions of government environmental law enforcement agencies to implement environmental laws when the agency fails to perform its functions in a timely manner. Citizens cannot substitute for environmental law enforcement agencies to enforce environmental laws unless these agencies are given the usual 60-day period to notify them of environmental violations. If the environmental law enforcement agency does not take any action against the polluter's violations within this period, citizens or environmental nongovernmental organizations can replace the government environmental law enforcement agency as the plaintiff to sue the polluter on behalf of the public interest. This type of environmental public interest litigation is reflected in 14 environmental laws (Cummings, 2007).

Before the 1970s, in American judicial practice, there were also sporadic cases of environmental public interest litigation, such as in the case of the 1956 Hudson River Natural Scenic Conservation League v. Federal Power Commission. However, these cases are usually not considered official establishment of environmental public interest litigation in the U.S. It is generally believed that the formal establishment of environmental public interest litigation in the U.S. began with the "Clean Air Act" promulgated in 1970.

Section 1365 of the act states, "Any citizen may sue in his own right—(1) against any person (including (i) the United States and (ii) any other governmental instrumentality or agency to the extent permitted by the eleventh amendment to the Constitution) who is alleged to be in violation of (A) an effluent standard or limitation under this chapter or (B) an order issued by the Administrator or a State with respect to such a standard or limitation; or (2) against the Administrator where there is alleged a failure of the Administrator to perform any act or duty under this chapter, which is not discretionary with the Administrator" (Xu, 2020). This provision is the first environmental public interest litigation enactment law, allowing anyone to file an environmental administrative public interest litigation in accordance with the provisions of the environmental law. At the same time, the court also cooperates with the legislature to give plaintiffs the right to sue extensively in the judicial process to respond to the legislation and correct the dereliction of duty of the administrative agency in enforcing environmental protection laws. This period was marked by such cases as Sierra Club v. Morton (1972), United States v. Student Objection Administration Proceedings (1973), and Duke Power Company v. Carolina Environmental Research Group Corporation (1978) as examples. The Supreme Court has taken an enlightened approach to the question of the right to sue in environmental cases. After the Clean Air Act, the Clean Water Act, the Prevention of Pollution From Ships, the Comprehensive Environmental Response, Compensation, and Liability Act, the Hazardous Species Act, the Marine Protection, Research, and Refugee Act, the Resource Conservation and Restoration Act, the Safe Drinking Water Act, and the Toxic Substances Control Act were put into effect, further developing and improving the environmental citizen litigation system in the U.S. (Hines, 2013; Kramer, 1996). The United States is a pioneer in environmental public interest litigation, and many countries that value environmental protection, such as the United Kingdom, Germany, and Japan, have emulated the United States by implementing public interest litigation systems tailored to their national conditions. For example, the "Pollution Control Act" promulgated by the United Kingdom in 1974 also provides a legal basis for individuals to file environmental public interest litigation (Bhagwati, 1984; Cummings and Trubek, 2008). In 1979, in Germany, the state of Bremen was the first to grant environmental groups the right to public interest litigation when amending the Nature Protection Act, which is considered to have officially opened the curtain of environmental public interest litigation in Germany (Greve, 1989).

Despite the past 50 years of experience in environmental public interest litigation in the U.S., its advantages can be summarized in the following three aspects:

Solid theoretical foundation. As a new phenomenon in the history of the development of the rule of law, environmental public interest litigation and its legitimacy and rationality require theoretical explanation. As the birthplace of the modern environmental protection movement, the U.S. is rich in theory related to environmental protection, which has led to solid theoretical foundations for environmental public interest litigation, such as the private attorney general, environmental trust, citizen participation, and public nuisance theories. Among these theories, the private attorney general theory and the environmental trust theory have had profound impacts on the construction and development of environmental public interest litigation systems in many countries around the world.

The "private attorney general" theory is not a legal system stipulated by American statutes but was created by judges in judicial precedents in continuous judicial practice. This later became an important basis for the civil litigation system of American environmental law with typical common law features. In 1943, Judge Frank of the U.S. Court of Appeals for the Second Circuit proposed the "private attorney general" theory in the Associated Industries of New York State v. Ickes case (Yang and Liang, 2021). Judge Frank noted that the Attorney General has the power to initiate procedures to prevent and prohibit other officials from engaging in illegal activities to protect the public interest or the government interest. In the context of this system and the concept of the rule of law, ordinary citizens should also have the right to initiate litigation procedures against violations by other officials, similar to the Attorney General of the U.S. This is the first time a U.S. court has used the "private attorney general" theory (Rudden, 1986). The "private attorney general" can be understood as legal subjects not limited to natural persons, legal persons, or other units or organizations who are entitled to bring a lawsuit to the court based on the protection of their own rights and public interests in accordance with the law because their own rights and interests have been violated. This theory provides value guidance and legal argumentation for the formal establishment of environmental public interest litigation in the U.S. and plays a pivotal role in the development of environmental law in the U.S. and countries with common law systems.

In 1970, Professor Joseph L. Sax formally introduced public trust into the field of environmental protection and established the theory of environmental public trust. The connotation of environmental public trust refers to the selection of environmental resources that incorporate social public property as a trust property; all citizens as both the trustee and the beneficiary; and charitable trust established for the purpose of maintaining the ecological environment (Sax, 1970). After this point of view was put forward, the theory of environmental public trust began to be widely used by environmentalists in practice. Since then, it has become a powerful means to defend the public interests of environmental resources and has been generally recognized in the U.S. The states have generally applied the principle of public trust in subsequent legislative work (Sax, 1980). In practice, not only has the scope of natural resources increased substantially as objects of trust increase, but the basic functions of environmental public trust theory have also expanded from ensuring the public's commercial use of navigable waters to protecting the natural environment, emphasizing the aesthetic value and recreational use of the natural environment and so on for ecological use (Rose, 1998).

The wide qualifications of the plaintiff and the defendant. Plaintiff qualification is the primary issue faced in environmental public interest litigation in any country. As the pioneer of environmental public interest litigation, the U.S. has yielded very good legal innovations on this issue, which has played a demonstrated role in the development of environmental public interest litigation in other countries. During the 1970s and 1980s, the United States passed more than 20 environmental laws, such as the Clean Air Act, the Noise Control Act, the Clean Water Act, and the Endangered Species Act, in which the questions on the standing of the plaintiff were well dealt with. These environmental protection laws stipulate that legal subjects such as individuals, companies, enterprises, partnerships, organizations, associations, states, cities, and government organizations and departments can become plaintiffs in environmental public interest litigation. This aroused the enthusiasm of American citizens and related environmental protection organizations and enabled them to take up legal weapons to protect the environment, created a new situation in the U.S. environmental rule of law, and greatly deterred polluting companies or passive government environmental protection departments. However, in the mid-to-late 1980s, the U.S. suffered a new round of an economic crisis. At that time,

President Reagan believed that economic development was the most urgent thing for the U.S., so environmental protection was reduced to a certain extent. The priority of work and relevant environmental protection laws have clearly restricted the qualifications of plaintiffs in environmental public interest litigation, and environmental public interest litigation in the U.S. had also entered a low tide period (Liu, 2023). At the turn of the 21st century, due to the intensified crisis of the human environment and the deepening awareness of the importance of environmental protection around the world, coupled with the fact that economic development in the United States reached one of its best periods in history, the United States gradually widened its environmental protection to a certain extent for plaintiff qualifications in public interest litigation. To date, the United States has formed relatively mature identification rules for the qualification of plaintiffs in environmental public interest litigation. To file an environmental public interest litigation, a plaintiff generally needs to meet three conditions: (1) must suffer actual damage, (2) must have a causal relationship between the factual damage act and the damage result, and (3) must have the possibility that the damage can be relieved by a judgment in favor of the plaintiff (NRDC, 2017).

The issue of the qualifications of defendants in environmental civil public interest litigation is also very important. The range of American citizen lawsuit defendants can be broadly classified into two types. One is represented by anyone who violates environmental laws, including the U.S. government and relevant government departments stipulated in the Constitution. For example, the scope of potential defendants in civil lawsuits stipulated in the Clean Water Act includes U.S. federal government agencies and state government agencies, any individuals and companies holding NPDES permits, and other discharge standards and restrictions stipulated in the Clean Water Act and any person in the administrative regulations (Jiang et al., 2021). The second is the enforcement agency for federal environmental law. For example, if environmental enforcement agencies do not take action in areas under their jurisdiction and supervision and if government agencies such as federal government agencies and the U.S. Environmental Protection Agency do not enforce the Clean Water Act or the Clean Air Act, citizens can bring environmental public interest litigation against the executive head of the departments.

More mature environmental NGOs. With respect to the development of environmental public interest litigation in the U.S., in the history of environmental governance in the U.S., for more than 60 years, environmental protection NGOs have played an irreplaceable and critical role. After the "Clean Air Act" set the stage for environmental public interest litigation in the U.S., many important cases that affected the environmental governance of the U.S. were brought by environmental NGOs as plaintiffs or these NGOs helped ordinary citizens to sue; some examples are the Sierra Club v. Morton case (1972) (U.S. Supreme Court, 1972) and the Friends of the Earth v Laid law Environmental Services case (1992) (U.S. Supreme Court, 1992). To date, environmental NGOs in the U.S. have made great strides and expanded in scale. According to incomplete statistics, approximately 10,000 environmental NGOs specialize in environmental issues or have significant influence in the environmental field. Some well-known environmental NGOs already have strong social influence and can even affect the formulation of environmental policies and environmental legislation in the U.S. For example, the Sierra Club, established in 1892, has branches all over the United States, with more than one million members (Sierra Club, 2023). Founded in 1951, The Nature Conservancy has worked in more than 30 countries around the world and all 50 states of the United States. It has more than 1 million members worldwide and manages more than 1600 nature reserves around the world (The Nature Conservancy). Founded in 1967, the Environmental Protection Agency currently has more than 2 million members and 12 offices in the United States, China, the United Kingdom, and Mexico (Cet). After decades of development, environmental NGOs in the United States have developed mature management models and strong political influence and have made important contributions to the development of environmental protection in the United States.

The development of environmental public interest litigation in the U.S. has also faced some criticism. For example, some scholars believe that environmental public interest litigation in the U.S. has always been regarded as a force that shapes social order, and in the process of forming this force, courts are regarded as a place to promote social change that has led to excessive strengthening of judicial power in environmental public interest litigation in the U.S. For another example, the rapid development of environmental NGOs in the U.S. has led environmental NGOs to pay increasing attention to their own interests, resulting in many unnecessary abuses in environmental public interest litigation, which has abnormally impeded economic development (KelloggInsight, 2020; Protect the Harvest; Salmi, 2020; Zaidi, 1999).

The critiques directed towards the burgeoning field of environmental public interest litigation in the United States are not without merit. However, it is imperative to acknowledge that, on balance, the benefits conferred by this judicial innovation substantially surpass its limitations. Moreover, its pivotal role in pioneering and shaping the frameworks for environmental public interest litigation globally cannot be overstated, representing a significant stride towards upholding environmental justice on a worldwide scale (Bullard, 1993). Historically, the United States grappled with acute environmental challenges, prompting the adoption of rigorous regulatory measures to mitigate these issues. Notably, these measures starkly contrast with the centralized control characteristic of environmental governance in China. Even amidst urgent environmental crises, such as pervasive pollution, the policy-making process within the United States was marked by a commendable degree of transparency and inclusivity, ensuring extensive public engagement (Delmas, 2002). The legislative journey of environmental laws was punctuated by exhaustive public discourse, expert consultations, and opinion surveys, all aimed at capturing and integrating the perspectives of a broad spectrum of stakeholders. Additionally, the vital role of non-governmental organizations and the broader civil society in environmental stewardship deserves recognition (Anderson and Smith, 2022). Their involvement extended beyond mere dialog and evaluation of policy measures; they actively monitored governmental and corporate entities, significantly elevating public consciousness regarding environmental matters.

As time progresses, it becomes increasingly evident that environmental public interest litigation stands as a crucial legal avenue for environmentally marginalized communities to advocate for justice and to invoke the judges' sense of equity (Todd, 2020). The exemplary practices and achievements of the United States in this domain warrant meticulous reflection and potentially, emulation. These practices hold the promise of guiding the future trajectory of environmental public interest litigation in China, serving as a beacon for its continued evolution.

The indian experience of environmental public interest litigation. The above discussion outlines the developmental trajectory and characteristics of environmental public interest litigation in the United States, representing one of the exemplary countries

with such a system among developed nations, offering many insights worthy of consideration by China. Now, this paper intends to delve into an analysis of India's environmental public interest litigation system. The reason being, India, like China, has faced severe environmental crises, and both countries are populous nations with populations exceeding one billion. In comparison to China, India's environmental public interest litigation began in the mid-1980s and has a more mature development experience. Given that India's environmental public interest litigation has drawn inspiration from the United States and shares a similar legal system based on English common law, it shares many similarities with the American system (Bhuwania, 2014). Therefore, this paper will not dwell on these similarities but rather focus on the unique characteristics of India's system.

Prior to the 1970s, environmental litigation in India primarily relied on traditional civil and criminal litigation procedures. Towards the late 1970s and into the 1980s, both the Indian government and its citizens began to recognize the importance of environmental protection. In 1976, India passed the 42nd Amendment to its constitution, introducing Article 48 A and Article 51 A(g), which respectively outlined the state's responsibility to protect and improve the environment and the duty of every citizen to protect and improve the natural environment (Mehta, 1999). During this period, India also enacted a series of significant environmental protection laws. In the mid-1980s, the Indian Supreme Court began to accept Public Interest Litigation (PIL), and the landmark "Delhi Air Pollution Case" (M.C. Mehta vs. Union of India) in 1985 became a milestone in Indian environmental public interest litigation. This case notably demonstrated the role of public interest litigation in environmental protection, allowing individuals or organizations not directly affected to file lawsuits for the public interest (Abraham, 1999). The intervention of the Indian Supreme Court and its subsequent rulings not only propelled the implementation of specific environmental measures but also laid the groundwork for subsequent environmental public interest litigation, ushering in a new era for environmental public interest litigation in India. Subsequently, rulings in typical environmental public interest litigation cases such as M.C. Mehta vs. Union of India, Vellore Citizens Welfare Forum vs Union Of India & Ors, Consumer Education and Research Centre vs. Union of India, T.N. Godavarman Thirumulkpad vs Union Of India & Ors., contributed to the continuous improvement of India's environmental public interest litigation system.

One of the most valuable lessons China can learn from India's environmental public interest litigation is the reduction of barriers for individuals and non-governmental organizations to participate in environmental protection, enabling ordinary citizens to fight for environmental justice (Gill, 2012). This approach encourages public involvement in environmental governance, enhances societal awareness of environmental issues, and improves the capacity to address environmental problems (Bhagwati, 1984). India's environmental public interest litigation also effectively upholds the concept of environmental justice, ensuring that the most severely affected vulnerable groups receive compensation and relief from environmental pollution. Through litigation, residents and workers in contaminated areas can receive compensation for health damages and measures to improve their living environment, thereby promoting the implementation of stricter industrial pollution controls and safer workplace standards. For instance, the "Andhra Pradesh Asbestos Case" (Consumer Education and Research Centre vs. Union of India, 1995) emphasized the right of workers to operate in environments free from health risks, leading to regulations on the use of hazardous substances in workplaces and safeguarding workers' health rights, especially in high-risk industries such as chemicals, mining, and manufacturing. Similarly, in the "Shardul Shahara River Case", the court ordered the government to provide compensation and reemployment opportunities for workers affected by pollution (Müller, 2023).

Table 1 Comparison of the number of environmental public interest litigation cases initiated by Chinese NGOs and procuratorates.

	2016–2017	2018	2019	2020	2021	2022
NGO-initiate	57	65	179	103	299	-
Procurator-initiate	791	1737	2309	3454	5610	5885

Notable is the observation that in a diverse and socially complex country like India, environmental public interest litigation can provide a platform for environmental vulnerable groups to counter powerful forces such as large corporations and government agencies (Singh, 2010; Sahu, 2008). In essence, environmental public interest litigation enables individual citizens or environmental organizations to represent the interests of the public, especially those vulnerable groups directly affected by environmental pollution but lacking sufficient resources to fight back (Rajamani, 2007). Through legal channels, these groups can challenge powerful entities engaging in irresponsible environmental behavior, thereby achieving environmental justice to some extent (Joshi, 2015). Moreover, such cases are more likely to attract media and public attention. Particularly when the contrast between vulnerable groups and powerful forces forms a stark narrative akin to the "David versus Goliath" story, it easily captures media interest and public resonance, leading to broader coverage and discussion. This not only raises public awareness of the importance of environmental protection but also encourages more people to engage in environmental conservation efforts (Table 1).

It is deeply regrettable that the advantages present in India's environmental public interest litigation system are evidently lacking in China, indicating a need for China to adopt similar approaches in future reforms of its environmental public interest litigation system. Indeed, India's environmental public interest litigation is not flawless and faces various criticisms (Cassels, 1989; Balakrishnan, 2009; Cooper, 1999). For example, some critics argue that the level of judicial intervention in environmental public interest litigation in India is sometimes too extensive, potentially leading to an excessive expansion of judicial power and encroachment upon the jurisdiction of executive and legislative branches (Gauri, 2009). In such instances, the courts are not merely institutions for legal interpretation and adjudication but are directly involved in the formulation and implementation of environmental policies, contradicting the principle of separation of powers. Nevertheless, India's environmental public interest litigation has made significant contributions to addressing environmental crises and establishing the country's environmental legal framework. Its qualities, such as allowing ordinary citizens to initiate litigation, are aspects that Chinese legislators should earnestly consider.

Localization optimization of environmental public interest litigation in China

The current landscape of environmental public interest litigation in China, dominated by procuratorates, reflects key elements of China's environmental authoritarianism, such as the centralized control of public power, scarcity of civic participation and a governance style emphasizing efficiency and authority. While this model may appear efficient and direct in addressing environmental issues, it also raises concerns about the lack of citizen

participation and diversity in environmental governance. Presently, the number of public interest litigation cases initiated by nongovernmental entities in China is minimal, likely due to the additional restrictions and challenges they face, such as gathering evidence, litigation costs and potential political risks. In light of this, and based on the findings of this study, it is recommended that for the optimization of environmental public interest litigation in China, at minimum, attention should be paid to the following aspects.

Expand the scope of litigation subjects. The subjects of environmental public interest litigation in the U.S. are very broad, but according to relevant Chinese laws, only procuratorates, environmental protection administrative departments and qualified environmental protection organizations can file for environmental public interest litigation. It is true that China has its own national conditions and tradition of the rule of law, and that it cannot completely copy the laws and regulations of the U.S. or other countries, but China's current restrictions on the subject of environmental public interest litigation are obviously questionable. At present, the vast majority of environmental public interest litigation cases in China are initiated by the procuratorate. The advantage of this approach is that the procuratorate is a professional judicial institution, and the prosecutor, as the plaintiff, obviously has better legal knowledge and judicial experience. However, completely excluding citizens from becoming plaintiffs in environmental public interest litigation is not conducive to the development of the system. The reason is that citizens are the most direct victims of environmental pollution and the most motivated to improve their own living conditions. To better improve the environmental public interest litigation system, China's future legislative reforms should expand the subject of environmental public interest litigation to include citizens, social groups, administrative departments, and procuratorates that have direct or indirect interest in environmental pollution. It is highly important to allow citizens to qualify as plaintiffs in environmental public interest litigation, as this approach is in line with the development trend of world environmental governance. This can increase the efficiency of environmental pollution and can effectively motivate individuals to use legal weapons to protect their own environmental interests. Moreover, China should also pay attention to the priority of plaintiff qualifications when improving the environmental public interest litigation system. When citizens, social groups or administrative departments are willing to initiate environmental public interest litigation, these subjects should prioritize litigation so that more social forces can participate in environmental public interest litigation and better cultivate Chinese citizens and social organizational environmental awareness. At present, more than 80% of environmental public interest litigation cases in China are prosecuted by the procuratorate as the plaintiff. This is a characteristic Chinese practice, but it means that to a certain extent, ordinary people cannot obtain in-depth access to environmental public interest cases. When interested citizens, social groups, or administrative departments are unwilling to take the initiative to assume the responsibility of the plaintiff, the procuratorate can act as a backstop and file an environmental public interest lawsuit.

Encourage the development of environmental NGOs. In 1973, China held the first national environmental protection conference. It was not until March 31, 1994, that China's first truly modern environmental NGO, "Friends of Nature", was officially registered (Zhang and Chen, 2011). Today, China's ecological and environmental problems are becoming increasingly serious, but there are very few environmental protection organizations. According to the statistics of China's civil affairs department, as of the end of 2017, there were approximately 6000 registered ecological and environmental social organizations in China, but only more than 700 groups were eligible to file for environmental public interest litigation. China's "Environmental Protection Law" stipulates that the subjects of China's environmental civil public interest litigation are limited to departments registered with the people's governments at or above the district level and organizations that have been engaged in environmental protection public welfare activities for more than five consecutive years and have no record of illegal activity. This kind of regulation has resulted in very few environmental protection organizations qualifying for public interest litigation, which is detrimental to the development of environmental public interest litigation in China. Judging from the experience of countries that are pioneers in environmental protection such as the U.S. and Germany, environmental protection organizations can play an irreplaceable and important role in environmental public interest litigation. China should consider appropriately lowering the threshold for environmental protection organizations to file environmental public interest litigation in regions with mature conditions and conduct pilot project work; in order to maintain the enthusiasm of environmental protection organizations to participate in the construction of ecological civilization in China, China should cease its stubborn insistence on restrictions on environmental protection organizations. It should be noted that the role of environmental NGOs is not only to participate in environmental public interest litigation. In fact, environmental NGOs can carry out various forms of environmental protection publicity and education activities to enhance public environmental awareness, provide advice and suggestions for government decision-making and legislation, and help vulnerable groups defend their rights in specific environmental pollution cases (An et al., 2024). Therefore, it is necessary for us to learn from the lessons of the excessive development of American environmental NGOs; nevertheless, we should encourage the substantial development of Chinese environmental NGOs in the future.

Reducing the pressure brought by litigation costs. Among the many types of legal proceedings, environmental litigation is highly specialized. The reason is that environmental pollution is usually not caused by a single factor; rather, only through professional environmental appraisal can the causal relationship between environmental pollution behavior and pollution results be determined for initiating a lawsuit. This leads to a high threshold for environmental litigation and an economic cost that is significantly greater than that of ordinary civil or criminal cases, which tends to make litigants who are qualified as plaintiffs fearful of difficulties. In recent years, in China's environmental public interest litigation, there are no analogous cases. In April 2016, hundreds of students at Changzhou Foreign Language School were suspected of being poisoned by chemical plant pollution, which attracted widespread attention from Chinese and foreign media. Not long after, China's two major environmental NGOs, Friends of Nature and Green Hair, submitted environmental public interest litigation materials to the Changzhou Intermediate People's Court and filed public interest litigation against three chemical companies. In January 2017, the first-instance judgment of the case showed that the two plaintiffs lost the case and had to jointly bear the case acceptance fee of 1.8918 million yuan (Liu, 2017). This case undoubtedly had a negative impact on the participation of Chinese environmental organizations in environmental public interest litigation. Although Article 22 of the "Interpretation of the Supreme People's Court on

Several Issues Concerning the Application of Law in the Trial of Environmental Civil Public Interest Litigation Cases" stipulates that "where the plaintiff requests the defendant to bear inspection and appraisal expenses, reasonable attorney fees, and other reasonable expenses for the litigation, the people's court may support it in accordance with the law", in judicial practice, the realization of this provision generally requires the plaintiff to recover a large amount of economic costs during the trial. Therefore, for future reforms in environmental public interest litigation in China, it is necessary to establish special litigation funds to reduce the economic burden of plaintiffs. In fact, several cities in China, such as Kunming, Wuxi, and Taizhou, have issued relevant regulations to address the shortage of funds for environmental public interest litigation and environmental restoration after litigation to a certain extent. Such attempts by these cities are very beneficial, but they are limited by their relatively low hierarchy, and the amount of funds is still very limited (Kunming Changan Net, 2015). The Chinese government should consider building a national-level environmental fund and setting detailed payment conditions based on the relevant experience in these regions; such actions would greatly dispel the concerns of citizens, environmental protection organizations and other litigants about initiating environmental public interest litigation.

Conclusion

In this paper, we delve into the Chinese environmental public interest litigation system, with particular attention to the prosecutorial-led litigation model and the authoritarian characteristics of environmental governance in China, comparing it with the environmental public interest litigation in the United States and India.

Currently, China's environmental public interest litigation exhibits a prosecutorial-led model, which can be termed as the "Environmental Public Interest Litigation with Chinese Characteristics." This model reflects China's emphasis on and control over environmental protection affairs, effectively concentrating resources and combating certain severe environmental violations, demonstrating the proactive role of state agencies in environmental protection. However, while this model has achieved some environmental benefits in the short term, it also restricts the participation of civil society and the independent oversight of third parties, potentially resulting in insufficient transparency and public engagement in environmental governance. In contrast, the environmental public interest litigation models in the United States and India emphasize the involvement of non-governmental organizations and individual members of the public in environmental protection. Through comparative analysis, we argue that a healthy environmental public interest litigation system should balance the roles of state power and civil society, leveraging the government's role in resource concentration and policy enforcement while ensuring the participation and oversight of civil society to promote transparency and public engagement in environmental governance.

Chinese leaders unveiled ambitious dual carbon goals in 2020, aiming to peak carbon emissions by 2030 and achieve carbon neutrality by 2060, underscoring China's determination to bolster efforts in environmental protection. Under this context, China urgently needs to critically examine the authoritarian characteristics in its environmental governance, particularly in the realm of environmental public interest litigation. At the core of the environmental public interest litigation system lies the incentive for citizens and societal organizations to actively engage in environmental governance, ensuring the effective detection of environmental violations and timely punishment of polluters. Such engagement is crucial for fostering widespread environmental awareness and steering environmental governance towards sustainable development. Addressing the flaws present in China's environmental public interest litigation is paramount; only by rectifying these shortcomings can China's vision of ecological civilization be realized. Otherwise, China's environmental strategies and goals risk becoming hollow promises.

Compared to environmental public interest litigation in the United States and India, China needs to enhance the participation of civil society and transparency in litigation further, ensuring the long-term effectiveness of environmental policies and societal environmental responsibility. We sincerely hope that by drawing on international experiences and continually improving domestic systems, China can construct a more open, fair, and effective environmental public interest litigation model in the near future. This will not only aid China in achieving its grand ecological civilization goals but also contribute Chinese wisdom and solutions to global environmental governance.

Data availability

All table and data are open-sourced and do not require copyright approval. All are referenced within this document.

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References

Abery E (1999) Environmental policy-making: lessons from Japan. Asia Pac J Envtl L 4:379

Abraham, CM (1999) The jurisprudence on indian environmental law. In environmental jurisprudence in India, Brill Nijhoff (pp. 105−133)

Amechi EP, Etemire U, Ihua-Maduenyi A (2021) Access to justice through environmental public interest litigation: exploring contemporary trends in Nigeria. VRÜ. Verfass. und Recht Übersee 54(3):398–414

An R, An X, Li X (2024) A new transboundary EIA mechanism is called for: legal analysis and prospect of the disposal of Fukushima ALPS-treated water. Environ Impact Assess Rev 105:107435

An R, Liu P (2023) Research on the environmental philosophy of China's environmental crime legislation from the perspective of ecological civilization. IJERPH 20(2):1517

An R, Sang T (2022) The guarantee mechanism of China's environmental protection strategy from the perspective of global environmental governance—focusing on the punishment of environmental pollution crime in China. IJERPH 19(22):14745

Anderson HN, Smith ZA (2022) Sustainable development governance in action: the United States. Handb Gov Sustain Dev 19:294

Balakrishnan KG (2009) Growth of public interest litigation in India. SAcLJ 21:1

Beeson M (2010) The coming of environmental authoritarianism. Environ Politics 19(2):276–294

Bhagwati PN (1984) Judicial activism and public interest litigation. Columbia J Transnatl Law 23:561–577

Bhuwania A (2014) Courting the people: the rise of public interest litigation in post-emergency India. Comp Stud South Asia Afr Middle East 34(2):314–335

Bullard RD (1993) Race and environmental justice in the United States. Yale J Int'l L. 18:319

Cai B (2019) Obstacles and system suggestions for Chinese citizens to file environmental civil public interest litigation. J Zhejiang Shuren Univ (2):106–110

Campbell N (2023) Individual rights and the environmental public interest: a comparison of German and Chinese approaches to environmental litigation. Rev Eur Comp Int Environ Law 32(1):105–118

Cao M (2015) A comparative study of environmental public interest litigation between China and the United States. Comp Law Res (4):67–77

Carpenter-Gold D (2015) Castles made of sand: public-interest litigation and China's new environmental protection law. Harv Envtl L Rev 39:241

Cassels J (1989) Judicial activism and public interest litigation in India: attempting the impossible? Am J Comp Law 37(3):495–519

Chu J (2023) From peripheral actors to established players: environmental NGOs' Participation through public notice-and-comment procedures and environmental public interest litigation in China. J Contemp China. https://doi.org/10.1080/10670564.2023.2204832

Cooper J (1999) Public interest law revisited. Commonw Law Bull 25(1):135–153
Crawford C (2008) Defending public prosecutors and defining Brazil's environmental public interest: a review of Lesley McAllister's making law matter: environmental protection and Legal Institutions in Brazil. Geo Wash Int'l L Rev 40:619
Cui H (2008) Research on the environmental public interest litigation system in the United States. Environ Prot (24):88–91
Cummings SL (2007) The internationalization of public interest law. Duke Law J 57:891–1036
Cummings SL, Trubek LG (2008) Globalizing public interest law. UCLA J Int Law Foreign Aff 13:1
Delmas MA (2002) The diffusion of environmental management standards in Europe and in the United States: an institutional perspective. Policy Sci 35(1):91–119
Dilay A, Diduck AP, Patel K (2020) Environmental justice in India: a case study of environmental impact assessment, community engagement and public interest litigation. Impact Assess Proj Appraisal 38(1):16–27
Gauri V (2009) Public interest litigation in India: overreaching or underachieving? World Bank Policy Research Working Paper, 5109
Geall S, Ely A (2018) Narratives and pathways towards an ecological civilization in contemporary China. China Q. 236:1175–1196
Gera W (2016) Public participation in environmental governance in the Philippines: the challenge of consolidation in engaging the state. Land Use Policy 52:501–510
Gill GN (2012) Human rights and the environment in India: access through public interest litigation. Environ Law Rev 14(3):200–218
Goldman P (2006) Public interest environmental litigation in China: lessons learned from the US Experience. Vt J Envtl L 8:251
Gong G, An R (2017) Progress and obstacles in environmental public-interest litigation under China's new environmental law: an analysis of cases accepted and heard in 2015. Clim Law 7(2-3):185–208
Greve MS (1989) The non-reformation of administrative law: standing to sue and public interest litigation in West German environmental law. Cornell Int Law J 22(2):197–244
Han M (1989) Basic principles of environmental litigation. Environ Sci Trends 18:20
Hansen MH, Li H, Svarverud R (2018) Ecological civilization: interpreting the Chinese past, projecting the global future. Glob Environ Change 53:195–203
Hines NW (2013) History of the 1972 clean water act: the story behind how the 1972 act became the capstone on a decade of extraordinary environmental reform. George Wash J Energy Environ Law 4:80–106
Huang S (2022) Judicial analysis and mechanism coordination of litigation for compensation for ecological environmental damage. Theor Mon (1):119–128
Jiang B (2019) Practical development and system improvement of China's environmental public interest litigation. Appl Law 5:12
Jiang H, Liu J, Zhang R, Li Y, Li L (2021) The United States' management experience of sewage outlets on rivers and the related recommendations for China: taking Massachusetts and Texas as example. https://www.chinaeol.net/zyzx/sjhjzz/zzlm/tszs/202201/P020220118505751233284.pdf. Accessed 2 Jan 2023
Joshi, R (2015) Expanded Standing and the Emergence of Public Interest Litigation With Special Reference to Environmental Jurisprudence in India. http://dr.ddn.upes.ac.in:8080/jspui/bitstream/123456789/2056/1/Pratika_Raoka.pdf
KelloggInsight (2020) Why well-meaning NGOs sometimes do more harm than good. https://insight.kellogg.northwestern.edu/article/international-aid-development-ngos-crowding-out-government. Accessed 2 Jan 2023
Klaaren J, Dugard J, Handmaker J (2011) Public interest litigation in South Africa: special issue introduction. South Afr J Hum Rights 27(1):1–7
Kramer L (1996) Public interest litigation in environmental matters before European courts. J Environ Law 8:1–18
Kunming Changan Net (2015) http://zfw.km.gov.cn/c/2015-11-06/709910.shtml. Accessed 2 Jan 2023
Li Y, Li B (2006) On the construction and innovation of my country's environmental civil public interest litigation system. Jurician (5):101–109
Li Y, Liu Y (2021) Review of the current situation of China's environmental public interest litigation system and path optimization. Nanjing Soc Sci (1):91–98
Liu P, Zhang L (1989) A comparative study on the protection of environmental administrative litigation rights in the laws of China and the United States. Law Rev 67–70
Liu X (2017) Don't let sky-high fees become a hindrance to environmental public interest litigation. Green Vis (3):14
Liu Z (2023) Evolution of European and American environmental protection systems. https://www.aisixiang.com/data/85865.html. Accessed 2 Jan 2023
Luo L (2017) Construction problems and countermeasures of my country's environmental public interest litigation system. China Law (3):244–266
Lv ZM, (2023) Promoting the Continuous Maturity and Finalization of the Environmental Public Interest Litigation System, People's Court Daily on March 4 2023, 4th page
Ma Y, Xiang W (2023) Enforcing law through authoritarian environmentalism? State and non-state actors in China's environmental public interest litigation. J Curr Chin Aff 52(3):464–487
Mehta, MC (1999) Growth of environmental jurisprudence in India. Acta Juridica, 71
Ministry of Ecology and Environment (2022) What are the new pollutants and how to treat it. http://www.xinhuanet.com/energy/20220331/039c7c2933d5420880582b13603abbb8/c.html. Accessed 2 Jan 2023
Müller F (2023) Mapping and assessing the Supreme Court of India's jurisprudence on sustainable development in light of the SDGs: from Vellore Citizens Welfare Forum to Hanuman Laxman Aroskar. Asia Pac J Environ Law 25(2):210–232
Naito H (2017) The political role of the People's Court and Authoritarian regime resilience: the revision of the environmental protection law in China. Issues Stud 53(04):1750012
Nie Q (1991) A brief discussion on environmental litigation rights in the United States. Technol Law 74:77
NRDC (2017) U.S. Environmental public interest litigation: experiences and lessons learned. http://www.nrdc.cn/Public/uploads/2017-01-09/587300dc91878.pdf. Accessed 2 Jan 2023
Pintz P, Havinga IC (1988) Environmental Crisis and Environmental Policies in Asian Countries. Pak Dev Rev 27(4):765–778
Protect the Harvest Many environmental NGO's do nothing to actually protect the environment. https://protecttheharvest.com/news/many-environmental-ngos-do-nothing-to-actually-protect-the-environment/. Accessed 2 Jan 2023
Qin P (2021) Evolution, characteristics and prospects of environmental public interest litigation research—citespace visualization analysis based on CNKI literature from 2003 to 2021. Adm Law Res (6):59–74
Rajamani L (2007) Public interest environmental litigation in India: Exploring issues of access, participation, equity, effectiveness and sustainability. J Environ law 19(3):293–321
Rose CM (1998) Joseph Sax and the idea of the public trust. Ecol Law Q 25:351–362
Rudden B (1986) Scientific socialism and Soviet private law. Notre Dame Law Rev. 61:151–166
Sahu G (2008) Public Interest Environmental Litigations in India: Contributions and Complications. The Indian Journal of Political Science (4):745–758
Salmi NA (2020) There are too many environmental organizations. https://matadornetwork.com/read/too-many-environmental-organizations/. Accessed 2 Jan 2023
Sax JL (1970) The public trust doctrine in natural resource law: effective judicial intervention. Mich Law Rev 68(3):471–566
Sax JL (1980) Liberating the public trust doctrine from its historical shackles. UC Davis Law Rev 14:185–232
Shi Y (2004) Exploration and analysis of several issues in the construction of environmental public interest litigation system. Mod Law (3):156–160
Sierra Club About the Sierra Club. https://www.sierraclub.org/about-sierra-club. Accessed 2 Jan 2023
Simonis, UE (1984). Environmental crisis: the missing dimension in the north-south dialogue (No. IIUG pre 84-11). WZB Discussion Paper
Singh P (2010) Promises and perils of public interest litigation in India. J Indian Law Inst 52(2):172–188
Sun B, Chang J (2015) Theoretical and practical exploration of environmental public interest litigation by procuratorates. China Environ Manag (4):50–55
Tao H (1990) Citizen litigation system in American environmental law. Law Rev (6):60–64
Todd J (2020) A'Sense of Equity'in Environmental Justice Litigation. Harv Envtl L Rev 44:169
Tollefson C (2002) Advancing an Agenda-A Reflection on Recent Developments in Canadian Public Interest Environmental Litigation. UNBLJ 51:175
Tsuji Y (2010) The legal issues on environmental administrative lawsuits under the amendment of ACLA in Japan. Yonsei LJ 1:339
U.S. Supreme Court (1972) Sierra Club v. Morton, 405 U.S. 727. https://supreme.justia.com/cases/federal/us/405/727/. Accessed 2 Jan 2023
U.S. Supreme Court (1992) Friends of earth, Inc. v. Laidlaw environmental services (TOC), Inc., 528 U.S. 167. https://supreme.justia.com/cases/federal/us/528/167/. Accessed 2 Jan 2023
Wang X, Lo K (2022) Civil society, environmental litigation, and Confucian energy justice: a case study of an environmental NGO in China. Energy Res Soc Sci 93:102831
Wang C, Cheng D (2014) The construction of the environmental public interest litigation system under the regulations of the new environmental protection law. Environ Prot (10):35–39
Wang M (2016a) On the development direction of my country's environmental public interest litigation: an analysis based on the theory of the relationship between administrative power and judicial power. China Law (1):49–68
Wang X (2016b) On the legislative order of the environmental public interest litigation system. Tsinghua Law (6):101–114

Wilson S (2016) Environmental participation in the shadow of the Chinese state. Econ Political Stud 4(3):211–237

Xia Y, Wang Y (2023) An unlikely duet: public-private interaction in China's Environmental Public Interest Litigation. Transnatl Environ Law 12(2):396–423

Xiao H, Ding C (2023) Explaining the variations in legal mobilization of environmental nongovernmental organizations in authoritarian China: a fuzzy set qualitative comparative analysis. Law Policy 45(2):181–210

Xie L, Xu L (2021) Environmental public interest litigation in China: a critical examination. Transnatl Environ Law 10(3):441–465

Xie L, Xu L (2022) Environmental public interest litigation in China: findings from 570 court cases brought by NGOs, public prosecutors and local government. J Environ Law 34(1):53–81

Xu H (1987) Several issues concerning environmental litigation. Chongqing Environ Prot (3):42–45

Xu H (2020) The status and resolution mechanism of environmental brief introduction and countermeasures of environmental public interest litigation. In: 2020 4th International seminar on education, management and social sciences (ISEMSS 2020). Atlantis Press, Dali, China, p 106–110

Xu X, Song F (2016) Theoretical preparations for the establishment of China's environmental public interest litigation system. China Popul Resour Environ (7):110–118

Yan B (2016) Research on the qualifications of plaintiffs in environmental civil public interest litigation. Zhejiang Soc Sci 145–149

Yan H (2007) Establishment of plaintiff qualifications in environmental public interest litigation: expanding the scope of "legal rights" or establishing plaintiff qualifications for natural objects. Peking Univ Law Rev (1):255–275

Yang W, Liang X (2021) The research on the alication of environmental civil public interest litigation. Int J Front Sociol 3(8):79–83

Zaidi SA (1999) NGO failure and the need to bring back the state. J Int Dev 11(2):259–271

Zhang M (2002) A discussion on environmental public interest litigation system. Law Forum 91:97

Zhang XH, Chen T (2011) Comparative analysis of environmental NGOs between China and America and Its Enlightenment to China. Environ Sci Manag 8:5–7

Zhao C (2016) Investigation and analysis on the current situation and development of environmental public interest litigation practices—taking fujian water-related ecological public interest litigation cases as an analysis sample. Shandong Judgm (6):97–101

Zhao Z, Chen T (2013) On procuratorates' initiation of civil public interest litigation from the perspective of civil litigation concept—comment on article 55 of the decision to amend the civil procedure law. China Prosec (7):72–76

Zheng S, He Z (1997) Overview of American environmental law in the 1960s and 1970s and thoughts on perfecting my country's environmental legal system. Environ Her (5):14–16

Zhou X (2021) Ecological civilization in China: challenges and strategies. Capitalism Nat Socilo 32(3):84–99

Zhu Q (1999) Citizen's litigation system in American environmental law and its enlightenment. World Environ (3):17–18

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