

A Study on the Restriction of Patent Rights in Ecological Restoration in Western China under the Principle of "Polluter Pays" in Environmental and Resource Law

Anqier Wang

School of Law, Xinjiang University of Finance and Economics, Urumqi, Xinjiang, China

Abstract: "Liability for Damage," as a fundamental principle of China's environmental and resource law, no longer functions solely as a criterion for determining responsibility; it also extends to how ecological restoration can be effectively implemented. In ecological restoration projects in the western regions, those who cause damage are often required to restore the damaged ecosystem to its baseline state. This obligation is set by law, is mandatory, and in principle cannot be simply replaced by monetary compensation. In reality, however, restoration projects heavily rely on core environmental protection technologies, which are often covered by the exclusive rights of environmental patents. If the patent holder refuses to license or sets excessively high licensing terms, restoration costs increase, the restoration timeline may be delayed, and effective judgments can even fall into a deadlock of "having technology but unable to afford it, having a judgment but unable to implement it." Faced with this conflict, this article no longer regards traditional compulsory licensing as the only solution. Instead, it bases its approach on the legal principle of "liability for damage," combining theories of ecological restoration and the socialization of green technology patents, to demonstrate the independent legitimacy of imposing restrictions on relevant patent rights. The article then examines the limitations of existing systems such as patent compulsory licensing, government use, and judicial coordination in the western context, while also drawing on foreign experiences such as the U.S. "government use" provision and Germany's theory of the primacy of public law obligations. On this basis, it proposes a special compulsory licensing procedure aimed at restoration, FRAND commitments for essential restoration technologies, and a dual-mode judgment model of "compulsory restoration action + determination of

reasonable compensation," striving to balance ecological public interest protection with intellectual property incentives.

Keywords: Polluter Pays; Ecological Restoration; Patent Right Restriction; Compulsory Licensing; Ecological Governance in Western China

1. Introduction

1.1 Research Background and Objectives

The ecological security position of the western regions is difficult to replace. Areas such as the Qinghai-Tibet Plateau and the Loess Plateau are not only important ecological barriers but also typical ecologically fragile zones, where the urgency and technical demands for restoration are significantly higher than in the central and eastern regions. Article 5 of the Environmental Protection Law establishes the principle of "liability for damage," and Articles 1234 and 1235 of the Civil Code further concretize this into ecological restoration responsibility, shifting environmental infringement remedies toward an ecological restoration model. However, private technical rights are becoming a prominent obstacle: core technologies such as soil heavy metal remediation, desertification control, and mine pit ecological restoration are mostly covered by patents, forming an imbalance of "technology in the east, demand in the west," leaving western restoration entities at a disadvantage in accessing technology[1]. In the Qilian Mountains case, excessively high patent licensing fees led to a standstill in the enforcement of the judgment; the Gansu desertification control project was also shelved due to licensing fees exceeding the budget. The rigid restoration obligations of environmental law thus directly collide with the exclusive private rights of patent law. This article takes patent barriers in western ecological restoration as the entry point, and based on the principle of "liability for damage" and the concept

of ecological restoration, argues for the independent legal legitimacy of restricting patent rights in the field of environmental restoration, examines the limitations of current systems such as compulsory licensing and government use, and draws on foreign experiences to propose restriction schemes adapted to the particularities of the western regions, with the aim of providing academic reference for the compilation of the Environmental Code and the revision of the Patent Law. Theoretically, this extends the principle of "liability for damage" to intellectual property restrictions, introducing a socialized perspective on green technology patents; in practice, it helps lower the technical access barrier for western restoration entities and provides guidance for courts and administrative agencies.

1.2 Research Content and Methods

The whole text generally follows the line of 'conflict identification—justification of legitimacy—system review—experience reference—path improvement': first, it looks at where exactly the conflict between the repair obligation and patent exclusivity occurs; then it argues the legitimacy of imposing restrictions on patent rights; next, it returns to the current system to examine the shortcomings of arrangements such as compulsory licensing and government use, and also looks at relevant foreign practices; finally, it proposes a more systematic set of improvement suggestions. In terms of research methods, normative analysis, case studies, comparative law, and interdisciplinary research are combined[2]. The aim is not to stay within environmental law or intellectual property law alone, but to seek an operable balance in the intersection of the two.

1.3 Literature Review and Innovations

Existing research is generally concentrated in four directions. Some start from the principle of 'liability for damage' and the responsibility for ecological restoration, viewing the theory of ecological restoration as a mark of the transformation of the environmental tort remedy paradigm; some discuss the limitation and socialization of green technology patent rights, advocating for the weakening of exclusive rights and the strengthening of remuneration rights; some focus on environmental governance and institutional construction in the western regions, paying particular attention to the adaptability

defects of ecological rule of law in the west; others conduct comparative studies abroad, such as the government use provisions of the U.S. Superfund Law, Germany's public law priority obligation theory, and the relevant aspects of the TRIPS Agreement. Overall, there are still three shortcomings: the lack of connection between environmental law and intellectual property law, insufficient cross-departmental research; limited research on regional adaptability in the western regions, with technological factors often treated as exogenous variables; insufficient domestic adaptation of foreign experiences. This paper advances mainly on three levels: using the 'liability for damage' principle as a starting point, combining ecological restoration theory and the socialization theory of green technology patent rights, to justify the independent legitimacy of patent restrictions in the field of environmental restoration; focusing on specific scenarios in the western regions, considering factors such as ecological vulnerability, technological imbalance, and fiscal weakness, and their amplifying effects on patent barriers; constructing a four-in-one path of 'legislative mandate, contractual prevention, judicial coordination, and supporting measures,' introducing mechanisms such as FRAND commitments and dual judgment models, to integrate ex-ante prevention with ex-post remedies.

2. Institutional Conflict: The Logic of Patent Barriers in Western Ecological Restoration under the "Liability for Damage" Principle

2.1 The Legal Rigidity of Restoration Obligations and the Imbalance of Patent Rights

The "Liability for Damage" principle was established by Article 5 of the Environmental Protection Law, and was specifically detailed in Articles 1234 and 1235 of the Civil Code, forming a sequence of "restoration priority, compensation as a supplement". This essentially represents a transformation from the theory of infringement damage to the theory of ecological restoration. The restoration obligation has a legal rigidity: it stems from legal provisions and cannot be excluded through agreements; restoration takes precedence over monetary compensation; when not fulfilled, administrative authorities can perform the act on behalf of the party and judicial authorities can enforce it; the rigidity of the western ecological environment is further

strengthened. The patent system exchanges technical disclosure for exclusive protection with a time limit. Environmental restoration patents have both private and public attributes, and the exclusive right should be subject to stricter social obligations. The distribution of patents is significantly imbalanced: eleven eastern provinces and municipalities hold core patents accounting for 78.2% of the country's total, while the twelve western provinces and autonomous regions and municipalities only account for 12. The imbalance in supply and demand leads to the alienation of rights: refusal of ordinary licensing, demanding high licensing fees (in some cases, exceeding 30%, and the industry typically 5% - 10%), tying, and restrictions on improvement, etc. When the exercise of rights hinders the fulfillment of legal obligations and causes significant ecological public interests to be damaged, it evolves from market competition to legal conflict[3].

2.2 Typical Forms of Patent Barriers and Value Collisions

Patent barriers present three forms: refusal of licensing leading to a deadlock in restoration execution, in the Qilian Mountain case, the right holder only agreed to issue a sole license and demanded the overall undertaking of the project, making the construction unable to start; high licensing fees pushing up restoration costs, in the Gansu desertification control project, the patent licensing fee was four times the budget, and forced the use of less effective alternative technologies; unreasonable licensing conditions hindering technical adaptation, in a certain soil restoration project in the southwestern karst area, it was required to use a specific agent, but this agent had reduced effectiveness at high altitudes and low temperatures and was not allowed to be adjusted, resulting in the restoration not meeting the standards. This is a collision of individual property freedom and the overall interests of the ecological system, representing the institutional tension between traditional private law's "individual orientation" and environmental law's "ecological orientation"[4]. The legal restoration obligation and exclusive private rights have their respective normative bases but cannot be simultaneously realized. Normative gaps emerge within the legal order, and the boundary of patent rights needs to be recalibrated.

3. Legitimacy Justification: The "Liability for

Damage" Principle as the Legal Foundation for Patent Rights Restrictions

3.1 Theoretical Origin and Normative Basis

Patent rights are not absolute rights; their legitimacy is rooted in the social contract. The theory of the socialization of ownership has led to the proposition of "socialization of green technology patent rights"[5]: Based on the public interest of the environment, moderate intervention in the exclusive effect of green patents is made, forming a "weak prohibition, strong compensation" rights structure. The "Liability for Damage" principle provides a normative framework for this - ecological restoration is a major public interest, and when private rights and public interests cannot be reconciled, the latter has priority in the value hierarchy.

At the constitutional level, Article 9 and Article 26 stipulate the state's environmental protection obligations, and "Liability for Damage" is a institutional tool for fulfilling these obligations. The state has the authority to restrict private rights that hinder their implementation. At the environmental law level, "Liability for Damage" has objective legal effect, and the boundary of patent rights must be limited by it as necessary. At the patent law level, Article 53 of the Patent Law can encompass "major ecological environment restoration", which belongs to the "quasi-public use" for fulfilling legal obligations. The restriction is not to deny the patent rights, but to transform them from an exclusive implementation right to a reasonable compensation right.

3.2 Boundary Control: The Benchmark for Patent Rights Restrictions under the Principle of Proportionality

Restrictions must be tested by the principle of proportionality: The appropriateness requirement is that the involved patent is necessary for the restoration plan and cannot be replaced; the necessity requirement is that negotiation for licensing is preferred, followed by compulsory licensing, and finally emergency use; the narrow proportionality requirement is based on reasonable compensation, referring to the normal licensing fees in the industry, and taking into account the public attribute and regional economic conditions. At the same time, four-dimensional boundaries are delineated: The purpose is limited to ecological restoration, the

scope is limited to the necessary technologies for restoration, the term is limited to the actual cycle of the restoration project, and the subject is limited to Recovery responsible person, government-designated substitute performance units, or qualified restoration construction units.

4. Reality Check: The Applicable Dilemmas and Western Adaptability Obstacles of the Current Patent Rights Restriction System in China

4.1 Dormant State and Applicable Obstacles of the Patent Compulsory License System

The compulsory license system in China has been "having the system but no practice" for a long time, and no case of application has occurred in the field of environmental restoration. The first narrow gate is constituted by the legalization of the legal basis: "emergency situation" usually refers to extreme crises such as wars and epidemics, and ecological restoration is difficult to meet the threshold; the "public interest purpose" lacks clear definition, and the competent authorities prefer to suspend the approval in the face of ambiguous areas. In terms of procedures, there is no quantitative standard for the pre-negotiation, and the review cycle is combined with litigation, which can reach more than half a year, forming a sharp conflict with the strong seasonality and timeliness of environmental restoration in the west. The qualification is strictly limited, requiring applicants to "have the implementation conditions", and county-level environmental protection departments are excluded. The risk-aversion mentality of administrative decision-making further leads to the dormancy of the system.

4.2 Normative Blank in the Government Use and Promotion Application System

Article 14 of the Patent Law stipulates that "patent inventions of state-owned enterprises and public institutions" can be promoted and applied, but it cannot cover core patents held by private enterprises and foreign enterprises. In the case of substituted performance, the law does not clearly stipulate whether the government can directly use the patent technology and only pay a reasonable fee, and local governments are caught in the dilemma of "acting quickly when the situation is urgent, but lacking legal basis". Our country lacks a similar institutional arrangement like "government use" in the United States, and the

patent expropriation system is also in a legislative vacuum.

4.3 Coordination Limitations and Insufficient Authority in Judicial Judgments

In judicial practice, including reasonable licensing fees in restoration costs only solves the "who pays the money" issue, but does not solve the "where to get the technology"; replacing actual restoration with monetary compensation deviates from the "priority of restoration", sacrificing ecological public welfare. More fundamentally, courts do not have the authority to directly rule on compulsory licenses, and the environmental resources trial court and the intellectual property trial court are separated, lacking cross-domain collaboration.

The above institutional obstacles are significantly magnified in the western context: the imbalance of technology distribution makes the restoration parties in the west negotiate in a weak position, financial strain makes the high licensing fees unbearable, the weak professional ability at the grassroots level, and the ecological fragility and seasonal nature of restoration impose strict requirements on the efficiency of the system, forming a sharp contradiction with the lengthy and inefficient current procedures.

5. Foreign Reference: Comparative Law Examination of Patent Rights Restrictions in Environmental Restoration

5.1 Institutional Practices of Major Countries

The United States has formed a dual-track system oriented towards public use: the administrative path relies on the government use clause (28 U.S.C. §1498), where the government or the contractor uses the patent for government purposes does not constitute infringement, only requiring reasonable compensation; the judicial path is reflected in the public interest exception of injunction relief, in the eBay case, after establishing the four-element test, environmental restoration cases usually refuse to issue injunctions, only ordering reasonable use fees. Environmental single laws also have a dedicated compulsory license mechanism. Germany does not have a specific clause, and judicial practice has developed the theory of "prior public law obligation" theory: when fulfilling public law environmental governance obligations, using the patent technology does not constitute infringement, only paying reasonable

compensation, and the Soil Restoration Case of the Federal Supreme Court in 1997 is a landmark case. Japan's Patent Law stipulates the legal implementation right, the government can authorize specific entities to use it for public interests, with reasonable compensation, and sets a fast review channel. The EU has not uniformly established a compulsory license, but through the supporting policies of the "European Green Agreement", it has established a green patent fast track and a sharing pool, clearly stating that member states can issue compulsory licenses in environmental emergencies under TRIPS Article 31, and public funds should fund environmental research and development results that are open to licensing under reasonable conditions for public governance projects[6].

5.2 Comparative Law Insights and Localization Adaptation Considerations

The common experience is: to qualitatively define the use of technology in environmental restoration as "quasi-public use", to transform the exclusive right into a remuneration right; to set strict thresholds and reasonable compensation; to focus on efficiency and scenario adaptation. In terms of localization, the government's usage system can be introduced to prioritize the integration of public law obligations into judicial interpretations and optimize the compulsory licensing procedures.

6. System Construction: Improving the Patent Rights Limitations for Environmental Restoration in Western Regions

In light of the limitations of the current system and the particularities of ecological restoration in the western regions, a multi-faceted mechanism integrating legislative enforcement, contractual prevention, judicial collaboration, and supporting measures should be established to ensure the seamless connection between pre-emptive prevention and post-remedial relief.

6.1 Legislative Improvement: Establish a Special System for Patent Mandatory License for Ecological Restoration

In the existing mandatory license system, a dedicated channel for ecological restoration should be added. In the short term, the State Council should formulate the "Ecological Restoration Patent Mandatory License Measures" to specify the rules. In the medium to long term, special provisions should be added to the "Patent

Law" for revision. The review standards are as follows: technical necessity review, the proposed use of the patent must be the core technology indispensable for the restoration plan, and it should be recognized by experts organized by the provincial-level or above environmental protection department; pre-emptive negotiation review, the applicant must negotiate with the patentee under reasonable commercial conditions, failure to negotiate, failure to respond within the deadline, or proposing obviously unreasonable conditions shall be regarded as a failure of negotiation; ecological urgency review, for cases where immediate restoration is necessary to prevent damage expansion, irreversible consequences, or involving key national ecological functional areas and major ecological security incidents, "missing the construction window period will cause significant ecological losses" is considered an urgent situation. In terms of procedures, a "green channel" should be established, with the review time compressed to 15 to 30 days, and the qualification of the entities is relaxed. County-level environmental protection departments and rights holders of ecological damage compensation can apply on behalf of the applicant, and environmental damage compensation negotiations and environmental public interest litigation can be initiated simultaneously. The license fee follows the "reasonable license fee" principle, generally not exceeding 10% of the direct costs of the restoration project, which shall be borne by Recovery responsible person, and the government shall make advance payment for the execution and then recover the funds.

6.2 Pre-emptive Prevention: Establishing a FRAND Commitment Mechanism for Necessary Restoration Patents

Post-remedial mandatory license is a relief measure, but it is costly and time-consuming. A more ideal approach is to prevent from the source through contractual mechanisms[7]. For ecological restoration technology research and development projects funded by the state or local governments, the outcome patents should make a FRAND commitment for the use of the ecological restoration purpose in the project agreement. Unreasonable refusals of licensing should not be allowed. The license fee should be fair and reasonable, and in case of non-compliance, part of the funding shall be recovered and included in the scientific research credit record. For

restoration patents included in the national and provincial green technology promotion directories, a "choice withdrawal" mechanism should be established. If the patent holder does not declare to retain the complete exclusivity right within the public announcement period, it shall be regarded as agreeing to open the use of the restoration purpose under FRAND conditions. If the commitment is violated, the restoration party can file a compulsory contracting lawsuit. This commitment is only applicable to non-profit use of the ecological restoration purpose and does not restrict normal rights in commercial environmental protection projects.

6.3 Judicial Collaboration: Establishing a Combined Judging Model of "Restoration Obligation + Patent License"

The Supreme People's Court can issue judicial interpretations for environmental resource trials to promote the "Restoration Obligation + Patent License" combined judging model. In environmental civil public interest litigation and ecological damage compensation cases, if the restoration plan involves patents and there are licensing obstacles, the court can issue both a judgment requiring the restoration obligation and a ruling that the restoration party uses the necessary patents at a reasonable cost. The legal basis is the realization guarantee of the "liability for damage" principle and the collateral effect of the effective judgment's execution. The applicable conditions include clear restoration plans, the patent being necessary for the restoration, failure of negotiation, not using in a timely manner will cause the judgment to be unenforceable or damage expansion[8]; procedurally, the application can be initiated by the restoration party or by the court on its own initiative, and the judgment document should clearly specify the technical scope, time limit, cost standard, and payment method, and the cost shall be included in the restoration costs borne by the responsible party; in terms of evidence rules, the burden of proof can be moderately reversed, with the patent holder bearing the burden of proving the rationality of the license fee and the availability of alternative technologies, and promoting professional collaboration between the environmental resource trial court and the intellectual property trial court.

6.4 Supporting Measures: A Multi-Party Collaborative Guarantee System

The Ministry of Ecology and Environment and the National Intellectual Property Administration can jointly establish a "necessary restoration patent technology list" for common ecological damage types in the western region and a cross-disciplinary expert assessment database to provide a basis for the determination of technical necessity and the review of compulsory licensing[9]. A national and provincial-level special fund for the use of ecological restoration patents should be established to subsidize the expenditure of licensing fees in difficult areas in the west, compensate damaged small and medium-sized patent holders, and support the research and development and talent cultivation of local environmental protection technologies in the west. Western provinces should be encouraged to establish cross-regional ecological restoration patent sharing pools, unify licensing rules, and jointly negotiate and purchase to promote east-west paired cooperation and the transfer of patent technologies from the east to the west. Based on the patent open licensing system, a green technology open licensing zone should be established, with incentives such as annual fee reduction and preferential evaluation for excellence, to guide environmental protection patents to actively open license, reducing conflicts at the source[10].

7. Conclusion

The complexity of ecological environment governance in the west exceeds the adjustment scope of a single departmental law. The conflict between the "liability for damage" principle and patent rights is deeply rooted in the value tension between traditional private law's individual orientation and environmental law's ecological orientation. From the perspective of the integration of public and private law, the "liability for damage" principle should be extended to the space of private rights coordination, and necessary restrictions on patent rights in the field of ecological restoration should be imposed under the premise of ensuring the reasonable remuneration rights of patent holders, to open up institutional channels for ecological restoration. In terms of institutional construction, a diversified and collaborative path of prevention through pre-event FRAND mechanisms, resolution through judicial adjudication during the process, and guarantee through post-event compulsory licensing should be adopted, supplemented by technical lists, special funds, regional

collaboration, and other supporting measures.

In future legislation, it is recommended that the "ecological restoration" section of the "Environmental Code" clearly stipulate that patent technology rights holders shall not refuse licensing without justifiable reasons, and when the licensing fee is too high, compulsory licensing can be applied for or ruled by the court as reasonable use; the revision of the "Patent Law" should add the reason of "for ecological restoration purposes" for compulsory licensing, and improve the rules for public use by the government. This study still has limitations in the discussion of empirical data and private law autonomy mechanisms. In the future, it can be further explored through combined field research in the west to discuss market-based coordination mechanisms such as patent pools and open licensing, providing more solid support for institutional improvement.

References

- [1] Chen Quansheng. Basic Theory of Environmental Law . Beijing: China Environmental Science Press, 2004: 60-66.
- [2] Lv Zhongmei, Dou Haiyang. Reconstructing the Environmental Tort Remedy System Based on the "Theory of Ecological Restoration" . Social Sciences in China, 2020(02): 118-140+206.
- [3] Lin Xiuqin. Perfection of China's Patent Compulsory Licensing System . Chinese Journal of Law, 2006(06): 130-138.
- [4] Wan Zhiqian, Zheng Youde. A Preliminary Study on the Ecological Reconstruction of Intellectual Property System . Law Review, 2010, 28(01): 44-51.
- [5] Wang Mingyuan, Wang Anna. Socialization of Green Technology Patent Rights: Origin, Manifestations, Controversies and Solutions . Tribune of Political Science and Law, 2017, 35(02): 21-31.
- [6] Drexl J. Public Interest Limitations on Patent Rights: A Comparative Analysis of German and U.S. Law. IIC - International Review of Intellectual Property and Competition Law, 2015, 46(7): 763-792.
- [7] Wang Anna. On the Transformation of Green Technology Patent Licensing Mode from the Perspective of Regulation Theory. Journal of Political Science and Law, 2023, 40(3): 40-51.
- [8] Liu Zhijian. Research on the Polluter Pays Principle in Environmental Law. China Social Sciences Press: 2023.
- [9] Ni Cuijie. Research on the Compulsory Licensing System for Green Technology Patents. Hebei University of Economics and Business, 2023.
- [10] Wan Xiaoli, Chenxiongshen. An Empirical Study on the Pilot Operation of Patent Open Licensing from a Multidimensional Perspective. China Invention & Patent, 2024, 21(9): 54-67.