

Strategies and Pathways for Integrating Ecological Revitalization into Ecological Crime Governance in Rural Areas of Northwestern Sichuan

Fan Deng^{1,*}, Shaoyao Guo²

¹Law School, Guilin University of Electronic Technology, Guilin, Guangxi, 541004, China

²Sichuan Songpan County People's Court, Aba Tibetan and Qiang Autonomous Prefecture, Sichuan, 624000, China

*Corresponding author

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Abstract: The Northwestern Sichuan Plateau, a key ecological protection area in China, is characterized by a unique highland ecosystem and abundant biodiversity. However, with economic development and resource exploitation, ecological crimes have escalated, severely threatening the region's environment, social stability, and economic growth. This paper examines the relationship between rural ecological revitalization and ecological crime governance, analyzing the types and characteristics of typical ecological crimes in the region and the challenges in governance. It proposes strategies for integrating ecological revitalization with crime governance, focusing on legal frameworks, coordinated economic and ecological development, rural cultural cultivation, cross-regional collaboration, and technological innovation, aiming to provide theoretical and practical solutions for ecological revitalization and crime governance in Northwestern Sichuan.

1. Introduction

The Northwestern Sichuan region, a key ecological area in western China, faces increasing environmental pressures. Despite the Rural Revitalization Strategy, ecological crimes such as illegal resource extraction, wildlife harm, and land encroachment undermine both the environment and sustainable development. Weak legal frameworks, economic incentives, and local governance challenges complicate ecological crime governance. Therefore, integrating rural ecological revitalization with crime governance is essential for the region and similar areas.

Ecological revitalization and crime governance are interlinked: revitalization improves the environment and supports crime prevention, while governance, through legal, economic, and cultural measures, aids revitalization. Together, they promote ecological civilization and rural revitalization.

This paper explores the relationship between rural ecological revitalization and ecological crime governance in Northwestern Sichuan, addressing challenges and proposing strategies. By

strengthening the rule of law, promoting coordinated development, and integrating rural culture with crime prevention, it offers a new governance model to support revitalization and ecological progress.

2. The Intrinsic Relationship between Rural Ecological Revitalization and Ecological Crime Governance

Frequent ecological crimes pose a direct threat to environmental stability and the sustainability of rural revitalization. Debates on the legal interests protected by criminal law in ecological crimes and discussions on rural ecological issues often center on the dichotomy between anthropocentrism and ecocentrism.^[1] Emphasized that rural revitalization must "adhere to harmonious coexistence between humans and nature," transcending the constraints of single-centered theories to rebuild the rural community of life.^[2] This approach aligns ecological benefits with human rights protection and demands that environmental preservation and people-centered development advance together.

The shared goals of ecological crime governance and rural ecological revitalization enable mutual reinforcement. Governance creates a favorable ecological, social, and cultural environment for revitalization, while revitalization provides a stronger social and economic foundation for governance, enhancing its effectiveness. Together, they contribute significant momentum to China's modernization efforts.

3. Types and Characteristics of Typical Ecological Crimes in Northwest Sichuan

3.1 Illegal Extraction of Ecological Resources

Northwestern Sichuan is rich in unique natural resources such as minerals, timber, water, and wetlands, which support local economic development but face significant environmental threats. Illegal logging is a major ecological crime, reducing forest resources and damaging carbon sequestration. Illegal mining is also prevalent, with unlicensed and excessive resource extraction in mineral-rich areas like gold, sand, and rare earth mines, threatening local geology and soil conservation^[3]. Additionally, illegal peat and turf extraction in the Ruogai Wetlands disrupts ecological functions, damaging the integrity of the Plateau's natural ecosystem.

3.2 Harm to Wildlife

The Northwestern Sichuan region is a key area for biodiversity conservation in China, home to rich wildlife resources. However, in recent years, illegal activities driven by economic gain and recreational hunting have severely threatened the stability of ecosystems and biodiversity. Illegal poaching, targeting endangered species such as the snow leopard, black-necked crane, antelope, rhesus macaque, wild ass^[4], himalayan goral, red-bellied pheasant^[5], musk deer, and himalayan musk deer^[6], barking deer, roe deer^[7], among others, is particularly prominent. Illegal wildlife trade also exacerbates population decline, fueling the criminal network. Additionally, illegal fishing disrupts aquatic ecosystems, further endangering aquatic species' survival and reproduction.

3.3 Illegal Occupation of Agricultural Land

The Northwestern Sichuan region, a crucial ecological barrier in western China, relies on its forests and farmland to maintain ecological balance. Illegal land occupation primarily involves unauthorized conversion of forest land for farming, planting economic trees, or repurposing farmland for real estate, commercial development, or mining. In this ecologically fragile area, such

activities pose severe threats to ecosystem stability and sustainability, leading to deforestation, increased soil erosion, and potential changes in plant species composition, disrupting the regional ecological balance.

4. Dilemmas in Ecological Crime Governance in Northwestern Sichuan

4.1 Weak Foundation of Rule of Law

Some rural areas in Northwestern Sichuan face weak legal and ecological awareness due to limited information and low education levels. The region's legal development is hindered by a shortage of legal professionals, with severe talent drain caused by its remote location, underdeveloped economy, and harsh working conditions. Judicial institutions primarily handle general criminal cases and lack specialists in ecological crime, while local enforcement suffers from insufficient, underqualified staff and limited experience in complex cases. Additionally, the legal framework is inadequate to address the increasingly diverse forms of ecological crime, such as illegal wildlife trade and high-tech resource exploitation, leaving the region ill-equipped to meet evolving ecological protection needs.

4.2 Challenges in Local Governance

In some rural areas of Northwestern Sichuan, economic development is slow, relying heavily on resource extraction and traditional agriculture, creating a "dilemma" for local governments in addressing ecological crimes. These crimes are cross-regional, covert, and complex, leading to regulatory blind spots. The lack of a unified cross-regional enforcement mechanism prevents timely legal action, allowing ecological crimes to spread. Additionally, the hidden and complex nature of these crimes makes monitoring and identification difficult for local authorities.

4.3 The Difficulty of Ecological Restoration

The natural environment of Northwestern Sichuan is characterized by typical plateau features, including arid climate, low and uneven precipitation, and severe issues like land desertification, salinization, and soil erosion. Due to the cold climate, wildlife reproduction is difficult and plant growth is slow, making ecological restoration a long-term process.

Ecological restoration requires advanced technologies and adequate funding, yet local restoration efforts are still relatively underdeveloped. Research and application in ecological restoration remain weak. Although national and local governments have increased investments in recent years, the lack of balanced funding and comprehensive restoration projects, coupled with the absence of long-term mechanisms in some areas, has hindered sustained and effective progress in ecological restoration.

5. Strategies for Integrating Ecological Crime Governance into Rural Ecological Revitalization in Northwestern Sichuan

5.1 Strengthening the Integration of Legal Construction and Ecological Governance

Rural ecological revitalization relies heavily on robust legal frameworks, as effective ecological crime governance requires a sound legal foundation. Local governments must enact region-specific environmental policies and regulations, clearly defining accountability and penalties for various ecological crimes to ensure legal compliance. Additionally, strengthening the professional capacity of law enforcement is essential. This includes advancing specialized environmental judicial

mechanisms^[8], such as dedicated environmental courts and prosecutorial systems^[9], and enhancing the training of enforcement personnel to equip them with the skills to identify and address ecological crimes effectively. To attract and retain skilled legal professionals, policy incentives such as competitive salaries and clear career development pathways are crucial.

In Northwestern Sichuan, the weak legal awareness among rural residents contributes significantly to ecological crimes. The erosion of traditional cultural values due to digital influences has led to a more profit-driven mindset, prompting some villagers to exploit ecological resources. Therefore, rural ecological revitalization strategies must integrate legal education and public awareness campaigns. Through mobile courts, village broadcasts, public bulletin boards, and rural markets, governments can disseminate information on environmental laws and regulations, fostering a stronger sense of compliance and responsibility. Raising legal awareness not only prevents ecological crimes but also encourages greater public participation in ecological governance.

5.2 Coordinated Advancement of Economic Development and Ecological Protection

The "Two Mountains" theory redefines the relationship between ecological protection and economic development.^[10] Northwestern Sichuan must pursue a green rural economy to achieve ecological and economic synergy. Developing green industries like eco-tourism, organic agriculture, and sustainable products can protect the fragile environment, create new growth points, and reduce the ecological pressure of traditional activities. Promoting green industries provides sustainable income for rural residents, lowering the incentive for ecological crimes, while a win-win model of restoration and conservation helps curb illegal resource extraction and deforestation.

5.3 Establishing a Collaborative Governance Mechanism with Multiple Stakeholders

Ecological crimes in Northwestern Sichuan exhibit clear cross-regional characteristics, often spreading across multiple areas, complicating governance efforts. To effectively curb ecological crimes, a cross-regional governance collaboration mechanism should be established. Local governments, ecological protection agencies, and judicial authorities must strengthen information sharing and coordination to ensure efficient action against cross-regional ecological crimes. Rural ecological revitalization and ecological crime governance also require broad participation from society, businesses, and the public. Enterprises closely linked to the environment can promote the development of green industries, ecological agriculture, and sustainable tourism. NGOs, environmental groups, and communities play a crucial role in ecological crime governance, compensating for government gaps, engaging in conservation projects, conducting environmental education, and raising public ecological awareness. Ethnic communities, with their complex ecosystems and rich cultural traditions, are vital in forest ecosystem restoration and the building of life communities. Rural communities, as the primary subjects of ecological protection, can participate in restoration and conservation through collective actions, fostering a shared governance atmosphere.

5.4 Application of Technology and Information Systems in Ecological Governance

The application of technology and information systems significantly enhances the monitoring, early warning, and prevention of ecological crimes. Traditional manual patrols and governance methods can no longer meet the increasing demand for ecological crime control. Advanced technologies such as satellite remote sensing, drone surveillance, and big data analysis enable precise monitoring and real-time alerts for illegal resource extraction, land occupation, and wildlife

crimes. For example, remote sensing can detect deforestation and wetland degradation, allowing for timely identification and tracking of illegal activities through comparative data analysis. Drones can efficiently patrol remote and inaccessible areas, overcoming the limitations of manual monitoring. Moreover, big data and artificial intelligence facilitate trend, location, and pattern analysis of ecological crimes, identifying potential crime hotspots and enabling proactive measures. This data-driven approach is far more precise and efficient than traditional methods.

In addition to crime prevention, technology supports scientific management of ecological restoration. The fragility of Northwestern Sichuan's ecosystems necessitates systematic, data-backed restoration efforts. Tools such as Geographic Information Systems (GIS), remote sensing, and ecological models provide accurate data and decision-making support for restoration planning. Long-term environmental monitoring and data collection allow for the development of cost-effective and scientifically sound restoration strategies. For instance, in wetland and forest restoration projects, real-time remote sensing data can assess progress and guide adjustments to planting schemes, ensuring long-term ecological stability and recovery effectiveness.

6. Conclusions

The governance of ecological crimes in northwestern Sichuan is a cornerstone for achieving rural ecological revitalization and ensuring sustainable development. These two processes are deeply interconnected and mutually reinforcing, requiring a strategic approach to integrate them effectively. Strengthening the rule of law, advancing a green economy, fostering an ecological culture, and leveraging modern technological solutions are pivotal components in this endeavor. Governance must prioritize the development of a robust legal framework tailored to the region's unique ecological challenges, ensuring that all forms of ecological crimes—such as illegal logging, unauthorized mining, and wildlife trafficking—are clearly defined and strictly penalized. Enhancing law enforcement capabilities through specialized training, environmental courts, and the professionalization of ecological prosecutors is essential to uphold justice and deter criminal activities.

In parallel, raising public awareness of environmental laws and the importance of ecological protection is critical. This can be achieved through widespread legal education campaigns, using diverse channels such as mobile courts, community workshops, and rural broadcasts to ensure the message reaches even the most remote areas. Promoting a green rural economy is equally vital, as it not only provides sustainable livelihoods but also reduces the economic motivations behind ecological crimes. Developing ecological compensation mechanisms, whereby those engaged in conservation efforts are financially incentivized, can further mitigate crimes driven by illegal economic activities, fostering a more balanced relationship between economic development and environmental preservation.

Cultural development plays a significant role in preventing ecological crimes by reshaping societal values and instilling a sense of environmental responsibility. By integrating traditional ecological wisdom with modern sustainability practices, rural communities can build a stronger foundation for ecological stewardship. Increasing public ecological consciousness encourages active participation in environmental governance, creating a culture of shared responsibility for the protection of natural resources. Furthermore, cross-regional cooperation is crucial to address the transboundary nature of many ecological crimes. By sharing resources, information, and best practices, neighboring regions can strengthen their collective ability to combat ecological threats.

Finally, technological solutions are indispensable for enhancing governance precision and efficiency. The use of satellite remote sensing, drone surveillance, big data analytics, and geographic information systems (GIS) allows for real-time monitoring of ecological changes and

early detection of criminal activities. These tools not only improve crime prevention but also facilitate the scientific management of ecological restoration projects, ensuring long-term stability and recovery of damaged ecosystems.

In conclusion, the governance of ecological crimes in northwestern Sichuan requires a comprehensive, multi-dimensional approach that integrates legal, economic, cultural, and technological strategies. Future policies should emphasize the importance of multi-stakeholder collaboration, foster innovative governance mechanisms, and prioritize the efficient allocation and sharing of resources. Only through such coordinated efforts can long-term ecological security and sustainable development in the region be achieved, contributing to the broader goals of ecological civilization and rural revitalization.

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