

ALTERNATIVE DISPUTE RESOLUTION IN ENVIRONMENTAL CONFLICTS. A COMPARATIVE STUDY OF BIODIVERSITY, MARINE ECOSYSTEMS, AND INDUSTRIAL POLLUTION IN ASIA

Resolución alternativa de disputas en conflictos ambientales; un estudio comparativo de la biodiversidad, los ecosistemas marinos y la contaminación industrial en Asia

S. ABRAHAM^{1*} and G. ASWATHY PRAKASH²

¹ Research Scholar, Department of Law, Saveetha School of Law, Saveetha Institute of Medical and Technical Sciences (SIMATS), Tamil Nadu, India.

² Associate Professor, Department of Law, Saveetha School of Law, Saveetha Institute of Medical and Technical Sciences (SIMATS), Tamil Nadu, India.

*Author for correspondence: abrahamlawyer12@gmail.com

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ABSTRACT

Environmental challenges related to biodiversity conservation and industrial pollution have become increasingly complex, especially in Asia, where rapid economic growth is often associated with conflicting goals of environmental protection. Marine biodiversity can be strongly affected by industrial pollution from marine activities, such as those involving fishing boats, cargo ships, and oil tankers operated by seafarers. This study aims to compare the role of alternative dispute resolution in environmental conflict management across different Asian countries. The term “alternative dispute resolution” (ADR) refers to a range of techniques used to resolve conflicts outside the conventional court system. This study examines the legal frameworks, policies, and procedures for ADR across countries, focusing on their strengths and weaknesses. This case study of disputes related to wildlife protection, forestry, effective waste management, and pollution control, ADR culturally and politically influences dispute resolution. It examines the impact of economic factors. The findings shed light on the potential of ADR to reconcile environmental protection with economic development in Asian socio-political contexts, paving the way for a coherent environmental governance and it is more effective.

Palabras clave: conservación, marineros, industrialización, urbanización.

RESUMEN

Los desafíos ambientales relacionados con la conservación de la biodiversidad y la contaminación industrial se han vuelto cada vez más complejos, especialmente en Asia, donde el rápido crecimiento económico suele estar asociado a objetivos contrapuestos en materia de protección ambiental. La biodiversidad marina puede verse gravemente afectada por la contaminación industrial derivada de actividades marinas, como el trabajo con barcos pesqueros, cargueros y petroleros operados por

marineros. Este estudio busca examinar comparativamente el papel de la resolución alternativa de disputas en la gestión de conflictos ambientales en diferentes países asiáticos. El término “resolución alternativa de disputas” (RAD) describe diversas técnicas utilizadas para resolver conflictos fuera de los tribunales convencionales. Este estudio examina el marco legal, las políticas y los procedimientos para abordar la RAD en diferentes países, centrándose en las fortalezas y debilidades de estos enfoques. Este estudio de caso sobre disputas relacionadas con la protección de la vida silvestre, la silvicultura, la gestión eficaz de residuos y el control de la contaminación, analiza la influencia cultural y política de la RAD en la resolución de disputas. Examina el impacto de los factores económicos. Los hallazgos arrojan luz sobre el potencial de la RAD para conciliar la protección ambiental con el desarrollo económico en contextos sociopolíticos asiáticos, allanando el camino hacia una gobernanza ambiental coherente y más eficaz.

INTRODUCTION

Asia’s environmental landscape has been significantly changed by speedy industrialization, urbanization, and population expansion in recent decades. The alterations, although fostering economic advancement, have concurrently intensified strains on natural resources, culminating in pervasive environmental disputes, especially over biodiversity depletion and pollution (Pedersen 2015). Seafarers often operate in environmentally sensitive marine areas, especially on fishing boats, cargo ships, and oil tankers. Marine biodiversity can be strongly affected by industrial pollution from marine activities such as oil spills, ballast water emissions, and hazardous waste dumping. When the marine ecosystem is damaged, the ship company, the coastal community, and the environmental regulator can use alternative dispute resolution (ADR) procedures, such as arbitration and mediation, to resolve disputes. The conservation of biodiversity is crucial for preserving ecological equilibrium and sustaining ecosystems upon which human existence relies. Nonetheless, industrial activities frequently result in habitat deterioration, species endangerment, and the contamination of air, water, and soil resources (Kariuki et al. 2022).

Environmental conflicts are intricate and multifaceted, usually involving numerous stakeholders. Governments strive to reconcile economic development and environmental conservation, frequently under public oversight. Industries, conversely, aim to optimize revenues and production, sometimes conflicting with conservation initiatives and environmental legislation. Environmental organizations promote sustainable practices and ecosystem protection, whilst local populations may experience either economic benefits or detrimental impacts from such

actions. The alignment of these interests can generate considerable conflicts, as diverse stakeholders frequently conflict over environmental policies, regulatory frameworks, and developmental initiatives. The aim of this study is to investigate the role and effectiveness of ADR in addressing environmental problems, including biodiversity conservation and industrial pollution, across many Asian countries. This study aims to evaluate the efficacy of ADR in addressing biodiversity conservation and industrial pollution conflicts and to evaluate ADR results in comparison to those obtained via litigation and to ascertain obstacles specific to the application of ADR in Asian environmental disputes.

Historically, such disputes have been resolved through litigation. While litigation can sometimes result in strong judgments, it often requires significant costs and time. Lawsuits can linger for years, fueling hostility among the parties involved. Arbitration in environmental disputes can inappropriately focus on legal liability or breaches of law rather than on substantive issues. New approaches to dispute resolution have emerged as effective tools to overcome these challenges. ADR refers to a variety of techniques used to resolve conflicts outside the conventional courts. It is a more flexible, private, and frequently quicker way for parties to reach a mutually agreeable resolution than protracted and expensive litigation.

ADR techniques commonly used include negotiation, conciliation, arbitration, and mediation. They incorporate techniques such as mediation and negotiation, facilitating collaborative and flexible dispute resolution. Unlike court resolutions, ADR strongly encourages positive communication and enables parties to find mutually beneficial solutions, since the decision-action process can include scientific research, community input, and environmental

awareness resources. Furthermore, ADR can facilitate the establishment of enduring connections and lay the groundwork for future collaborations among stakeholders, particularly in the context of sustainable development (Dhiaulhaq et al. 2015).

The adoption of ADR is increasing across Asia, despite a number of institutional and legal obstacles, such as the absence of standardized environmental ADR frameworks, a lack of knowledge or ability among communities and regulators, and unequal bargaining power between parties. Some governments have implemented reforms, such as environmental tribunals with mediation divisions, while private projects, such as public-private environmental arbitration forums and multi-stakeholder mediation platforms, are becoming more popular. The role of ADR in promoting inclusive, sustainable, and legally sound settlements is anticipated to grow in importance within the region's environmental governance framework as environmental concerns continue to rise.

RESEARCH METHODOLOGY

A comparative approach was used to analyse the legal frameworks, policies, and practices of ADR across different Asian countries, through case studies examining disputes related to wildlife protection, forestry, weed management, and pollution control. The investigation examined cultural, political, and economic factors that affect the ADR process and its outcomes.

Research questions

1. Is there a need to examine the effectiveness of ADR to resolve environmental disputes related to biodiversity conservation and industrial pollution, especially in India?
 - Conduct a comparative analysis of the effects of alternative dispute resolution in biodiversity protection and pollution disputes, emphasizing efficiency, stakeholder satisfaction, and compliance. Include case studies from the Indian context, such as the Ganges River network and the Kaziranga National Park.
2. What are the comparative advantages of alternative dispute resolution over traditional disputes in managing environmental disputes in Asian countries, and how can those insights be applied in the Indian context?
 - case studies from Asian countries using innovative dispute resolution, including Malaysian

mediation in the Taman Negara National Park and Taiwanese mediation on air quality in Taichung. Identify flexible approaches for India focused on economic efficiency, early problem-solving, and environmental sustainability. India can explore decentralized environmental mediation cells and hybrid ADR models, and develop eco-compensation schemes through ADR to resolve disputes between the environment and industry.

3. What are the barriers to the implementation of ADR in environmental disputes in India, and what are the possible ways to overcome these challenges?
 - India can learn from the successful models in Japan, China, Malaysia, and Taiwan to build a robust, science-informed, participatory ADR ecosystem that fosters early conflict resolution, sustainability, and access to environmental justice. Innovative models of ADR, such as localized mediation in Malaysia, urban pollution ADR in Taiwan, science-integrated ADR systems in Japan and China, that show procedural mechanisms. India's system can evolve by adapting flexible, cost-effective, and community-based approaches from other case studies, drawing on different perspectives. This comparative perspective strengthens the analytical study in **table I** and supports practical recommendations regarding the Indian perspective method.

CASE STUDIES

Biodiversity conservation disputes: Instances when alternative dispute resolution was employed to reconcile disagreements between conservation initiatives and developmental projects

Case study 1: Mediation in the Taman Negara National Park, Malaysia

Taman Negara National Park, the oldest rainforest in the world, faced a conservation and development controversy over a proposed highway that would deprive vital wildlife habitats of endangered species. The dispute involved local communities, environmental organizations, and government agencies. The ADR initiated a mediation process that involved government representatives, watchdog organizations, aboriginal community leaders, and practitioners. Mediators with expertise in environmental planning negotiated to explore options and find solutions to reduce the environmental impact. A highway to

TABLE I. ROLE OF ALTERNATIVE DISPUTE RESOLUTION (ADR) IN MANAGING ENVIRONMENTAL CONFLICTS, ESPECIALLY REGARDING BIODIVERSITY CONSERVATION AND INDUSTRIAL POLLUTION.

Objective	Insight for India
Analyzing the effectiveness of ADR in managing biodiversity conservation and industrial pollution disputes	Focus on rapid resolution. Incorporate ADR processes that provide prompt resolutions to prevent extended environmental harm and to guarantee that disagreements do not escalate.
	ADR can yield swifter results than conventional litigation, which is especially vital for biodiversity and pollution-related matters that require timely remedies.
	Assess stakeholder satisfaction by implementing feedback tools, facilitating the refinement of ADR processes, and bolstering trust.
	Monitor compliance with ADR. The results provide assurance that ADR contracts include enforceable policies and compliance monitoring to support companies and other stakeholders involved in product commitments to environmental conflicts.
	A model for ensuring stakeholder accountability can have a sustainable, beneficial impact on the environment through ADR effects.
Comparing ADR outcomes with litigation	Cost effectiveness recognizes that alternative dispute resolution can reduce litigation costs for private and public sector entities, making it a more convenient option for communities affected by industrial pollution and biodiversity loss
	Reducing costs makes it easier to handle other cases, helping individuals unable to pursue protracted legal proceedings.
	Long-term environmental and social impacts are emphasized through sustainable solutions through ADR, which addresses root causes rather than legal solutions that last just a while. By incorporating programs for continuous environmental monitoring and future prevention measures, ADR measures can lead to positive environmental and social outcomes over time compared to traditional cases.
	Increased legal support ensures strong legal backing for ADR agreements, making them legally binding and enforceable to prevent non-compliance. This could involve official approval of ADR results by government officials or the integration of ADR into environmental policy.
Identifying challenges unique to ADR in Asian environmental conflicts	India should invest in the training of mediators, arbitrators, and facilitators in environmental science and law to develop specialist personnel who can address complex ecological challenges in ADR processes.
Identifying challenges unique to ADR in Asian environmental conflicts	Provide incentives for companies and communities to participate in ADR and encourage stakeholder engagement, in particular emphasizing the benefits of faster results, costs, and resources with an emphasis on environmental compliance. Government support can increase acceptance and trust of ADR as an effective means of resolving environmental disputes.

minimize environmental damage was concluded. The developers agreed to establish an environmental fund to help communities develop conservation measures. Research for India suggests that ADR can incorporate multiple parties to achieve a mutually agreeable outcome. India can benefit from standardized approaches in areas where development policies threaten biodiversity, emphasizing the importance of collective impact reduction and community engagement (Purwanto et al. 2020).

Case study 2: Negotiation in Kazi Ranga National Park, India

Kaziranga National Park, a UNESCO World Heritage Site in Assam, India, faced pollution challenges due to the expansion of agricultural settlements within its boundaries, which adversely affected wildlife corridors, and the conflict between people and livestock escalated. The ADR approach was adopted, involving government officials (that included forest and wildlife departments), as well

as local communities, indigenous groups and small-scale farmers, conservation NGOs, and ecologists. Through community forums and guided discussions, participants were able to understand each other's stories. The parties agreed to establish buffer zones around the park, allow regular activities without infringing on protected property, and provide additional livelihood opportunities for local communities, such as an ecosystem tourism project, to reduce external demand from people, and reduce pressure on land and natural resources. The Insight for India example illustrates how ADR can lead to solutions that align conservation efforts with local needs. By directly engaging local stakeholders in the network, India can promote sustainable conservation practices and reduce conflicts between conservation objectives and local development (UNDP 2015).

Industrial pollution disputes: Cases utilizing ADR to address conflicts between industrial operations and pollution regulations

Case study 3: Arbitration in the Taichung City Air Quality Dispute, Taiwan

Taichung, a prominent industrial region in Taiwan, experienced escalating air pollution levels due to nearby coal power stations and companies. Municipal authorities and community organizations expressed concern about health hazards and ecological deterioration. An arbitration process was initiated, involving industrial representatives, environmental specialists, and local government officials in meetings facilitated by an arbitrator. Scientific data regarding the effects of air pollution and technical mitigation strategies were utilized to inform decision-making. The arbitration concluded with an agreement for industries to implement cleaner technologies and decrease emissions. Companies were mandated to invest in renewable energy options and contribute to an air quality enhancement fund. The arbitration process instituted monitoring and compliance mechanisms to ensure openness (Cattoen et al. 2025). Given India's substantial air pollution issues, ADR may serve as an effective strategy for negotiating pollution-control measures with industrial sectors. Arbitration can facilitate compliance with stringent environmental standards while enabling corporations to adopt greener technologies through structured agreements (Wahyu et al. 2021).

Case study 4: Mediation regarding pollution of the Ganges River, India

The Ganges River, essential for drinking water, agricultural irrigation, and cultural importance, is

significantly contaminated by industrial waste, untreated sewage, and agricultural runoff (Abraham and Swati 2025). This resulted in disputes among industry, local governments, and environmental organizations seeking to rehabilitate water quality. A mediation procedure commenced with representatives from the polluting industry, environmental NGOs, and local government agencies. An impartial mediator orchestrated dialogues concerning pollution mitigation, waste management, and public health issues (Garimella 2016).

The mediation resulted in an agreement in which enterprises pledged to diminish effluents and invest in wastewater treatment facilities. The government instituted more rigorous monitoring policies and offered incentives for industries that embrace sustainable practices (Redpath et al. 2013). Insight for India demonstrates that ADR can effectively address complex industrial pollution challenges by bringing together multiple parties to deliberate on viable pollution mitigation strategies. Mediation can facilitate significant improvements in water quality in India by promoting collaboration rather than litigation, which tends to be contentious and protracted. As shown in **table II**, all case studies in India follow the strategy of insights from other Asian countries.

The chart in **figure 1** categorizes the practices of status in India as follows:

- Partially followed: 42%
- Not fully followed: 25%
- Not followed: 17%
- Needs improvement: 8%
- Emerging: 8%

DISCUSSION

Effectiveness of ADR in addressing environmental conflicts

Time and financial efficiency

ADR methods, including mediation and negotiation, generally require less time than conventional litigation. This is vital in environmental conflicts, as postponements can intensify ecological harm. ADR can substantially reduce the costs associated with judicial processes. This encompasses reductions in legal fees, judicial expenses, and other associated costs. Case studies illustrate that ADR proceedings frequently result in expedited outcomes, hence alleviating financial constraints on all parties involved.

TABLE II. ANALYSIS OF ALTERNATIVE DISPUTE RESOLUTION (ADR) INSIGHTS FROM OTHER ASIAN COUNTRIES.

Country	ADR strategy	Environmental conflict type	Insight for India	Status in India
Indonesia	Integrating indigenous knowledge and community participation in the country	Biodiversity conservation	Engage local communities and indigenous groups in ADR to integrate traditional ecological knowledge.	Partially followed: India has begun incorporating local communities into biodiversity conservation initiatives; however, actual involvement in ADR processes remains constrained.
Japan	Environmental mediation for pollution control in the country (Lee and Yang 2016)	Industrial pollution	Establish environmental mediation centers to mitigate pollution through joint initiatives with industries.	Not fully followed: Environmental mediation centers are constrained. Collaboration is improving, though specialized mediation centers could enhance resolution effectiveness.
China	Specialized environmental ADR centers in the country	Biodiversity and pollution	Establish specialized ADR centers staffed with expertise in environmental law and science.	Not followed: India possesses ADR centers; however, only a limited number are specialized in environmental law. Establishing such centers could augment proficiency and results.
South Korea	Public-private partnerships (PPPs) in environmental ADR in society (Luo 2017)	Industrial pollution	Advocate for public-private partnerships in alternative dispute resolution to foster collaboration between government and industry for sustainable pollution management.	Partially followed: Although public-private partnerships (PPPs) exist, their application in ADR for pollution management is limited. Enhancing public-private partnerships in ADR could advance collaborative pollution management.
Singapore	Strong regulatory support for ADR outcomes in society	Biodiversity and pollution	Enhance regulatory support to guarantee the enforceability and oversight of ADR agreements.	Partially followed: India possesses regulatory backing for ADR; nevertheless, the enforceability and compliance mechanisms in environmental cases require enhancement.
Malaysia	Incorporating EIAs in ADR within society	Biodiversity conservation	Utilize EIAs in ADR for informed decision-making in biodiversity matters, reconciling conservation with development.	Partially followed: India employs EIAs in its decision-making; nevertheless, the systematic incorporation of EIAs into ADR processes could enhance results in conservation conflicts.
Thailand	Building ADR capacity and awareness in environmental law policy in society	Biodiversity and pollution	Educate mediators and legal practitioners in environmental ADR to enhance the quality of dispute settlement.	Needs improvement: ADR training is available, and specialized programs on environmental ADR for mediators and attorneys are scarce. Enhancing capacity may improve specialization.
South Korea and Singapore	Leveraging technology for transparent ADR processes	Biodiversity and industrial pollution	Utilize digital tools for ADR to enhance accessibility and transparency, particularly in rural regions.	Emerging: India has begun adopting digital ADR systems; however, their full integration into environmental disputes, especially for rural stakeholders, remains incomplete.

EIAs: environmental impact assessments.

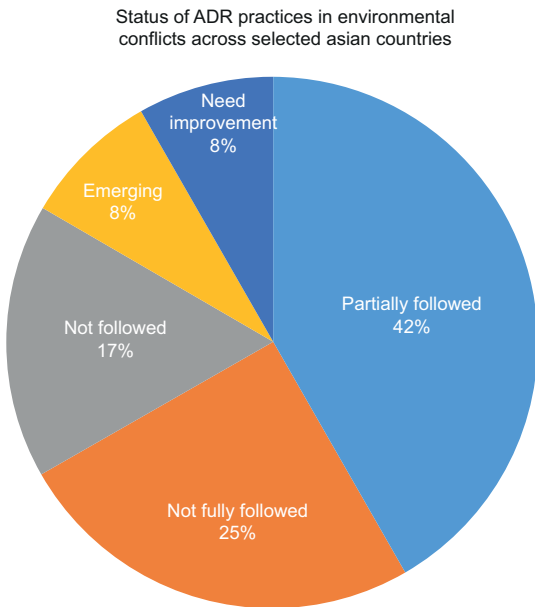


Fig. 1. Pie chart representing the status of India in alternative dispute resolution (ADR) practices in environmental conflicts across selected Asian countries (Symes and Rao 2018).

Stakeholders satisfaction

ADR facilitates the involvement of all stakeholders, such as seafarers, encompassing marginalized communities in the settlement process. This can augment satisfaction as stakeholders perceive their opinions as acknowledged and esteemed. The facilitative essence of ADR promotes cooperative solutions that take into account the interests of all parties, resulting in outcomes that are more acceptable and sustainable than those achieved through combative litigation.

Compliance outcomes

Enhanced compliance rates

Parties are more inclined to adhere to agreements established through ADR, as they have actively engaged in formulating the resolution. This differs from court-imposed judgements, which might be perceived as unilateral and provoke opposition. Long-term sustainability ADR decisions frequently emphasize the enduring sustainability of natural resources, as they facilitate innovative solutions that take into account ecological consequences, rather than solely legal requirements.

Comparative advantages of ADR

Inclusivity and engagement

ADR methods include stakeholders in substantive discourse, cultivating a sense of ownership

over the results. This differs from litigation, which can estrange participants and diminish prospects for constructive interaction.

Solution-oriented approach

Contrary to litigation, which typically centers on victory or defeat, ADR prioritizes cooperative problem-solving. This method is especially advantageous in environmental conflicts, where intricate interdependencies necessitate inventive, comprehensive resolutions.

Flexibility and adaptability

ADR approaches possess intrinsic flexibility, enabling parties to customize processes and solutions to meet their individual requirements. This adaptability is essential in environmental disputes, which can differ significantly in context and magnitude.

Challenges in performing ADR regulatory obstacles

The lack of enforceability of ADR outcomes may dissuade parties from selecting these procedures in favor of conventional litigation. Cultural perspectives on conflict resolution may favor formal legal proceedings rather than informal methods such as mediation. This may raise doubts about the authenticity and efficacy of ADR. In certain cultures, a predisposition for hierarchical decision-making may conflict with the collaborative essence of ADR. The scarcity of skilled mediators with proficiency in environmental matters can impede the proper execution of ADR. Resources and training programs to cultivate skilled practitioners are frequently inadequate. Institutional resistance from legal systems that prioritize litigation might hinder the promotion of ADR as a viable option.

CONCLUSIONS

India is progressively enhancing the use of ADR mechanisms in environmental issues, notably through community engagement and public-private collaborations. However, further progress is necessary in areas such as the creation of specialized environmental ADR centers, the systematic incorporation of environmental impact assessments (EIAs), and the enhancement of training in environmental ADR. The proliferation of digital ADR systems could improve accessibility and openness in nationwide dispute resolution, especially for marginalized communities. This study aims to investigate the effectiveness of ADR mechanisms in addressing environmental conflicts. It focuses on a

comparative analysis of their use in resolving disputes concerning biodiversity conservation and industrial pollution in various Asian countries (Yang et al. 2022). This visual insight reveals that although India is advancing in integrating ADR tactics, considerable opportunities for improvement persist across multiple domains, especially in improving the efficacy and specialization of ADR processes for environmental issues. This study highlights the important role of ADR in resolving environmental disputes in Asian countries. Key findings suggest that ADR is generally less time-consuming and cost-effective than traditional litigation, improving stakeholder satisfaction and compliance. ADR compels everyone to participate internally and encourages joint problem-solving. It offers considerable advantages compared to adversarial legal approaches. However, there are obstacles in the guise of governmental, cultural, and institutional obstacles to the effectiveness of ADR in resolving environmental conflicts:

1. Advocating ADR as a primary means of conflict resolution: Governments and organizations should actively support ADR as a primary means of resolving environmental problems. This can be achieved through public campaigns, education programs, and exposure to successful ADR case studies in practice.
2. Establishing supporting frameworks. Legislative frameworks should be reformed to ensure that outcomes can be implemented by supporting and explicitly adopting ADR mechanisms. This calls for policies that encourage the use of ADR in environmental conflicts.
3. Training of intermediaries with environmental expertise. Investment in training programs for environmentally competent intermediaries is essential. This enhances the ability of judges to effectively handle technically complex environmental cases.
4. Educational programs for stakeholders on the benefits of ADR should raise awareness among local agencies and government agencies about the benefits of ADR in environmental disputes. Increased awareness may lead to changes in cultural attitudes towards the adoption and implementation of ADR procedures.

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