

Strengthening Environmental Law in Pakistan - Institutional, Policy, and Stakeholder Dimensions of Effective Governance

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Abstract

This paper examines the potential and challenges that may be faced in implementing environmental laws in Pakistan. It dwells on the legal framework of Pakistan, which comprises laws, regulations, and institutional mechanisms of environmental protection. This paper seeks to critically analyze the ecological legislation in Pakistan and identify the key components of the bill, like stakeholder participation, policy goodwill, and enforcement capabilities, that determine the effective execution of the laws in Pakistan. The presence of strong legislative systems, institutional inefficiencies, resource unavailability, and coordination among the relevant actors makes effective implementation challenging. Another criterion used in the study is how the enforcement and regulatory efforts promote environmental degradation and achieve sustainable development. Certain improvements have been made, especially in terms of minimization of pollution and biodiversity loss, yet the area that requires improvement is waste management, air quality, and water resource management. With all said above in mind, the report provides recommendations for the enhancement of environmental governance in Pakistan and makes the process of its enforcement more effective. These are increased stakeholder participation, awareness creation, institution-building, and policy enhancement. Another important insight gained during the study is the importance of working with the organizations that represent the commercial sector, academia, and civil society to promote collective action and the development of an environmentally aware culture.

Keywords: Conservation, Organizations, Pollution, Public Participation, Regulations

Introduction

With time, we realize that, as much as the world is a totality of stunning natural scenes and landscapes, there should be some adaptation of the same to serve our needs and demands in a better way (Amish et al., 2024; Sheikh, 2023). Consequently, we have added technological aspects of artificially increasing age to age and from era to era

(Moin, 2024; Ullah & Bashir, 2024). But we have absolutely lessened and neglected the negative impacts that came out in the form of a gruesome countenance of the strategy (Aslam et al., 2022). Vile emissions ruin the freshness of the air, whereas unnecessary, risky, and injurious materials erode the cleanliness of the water (Amir, 2022; Hussain et al., 2020).

The standard of living of the man was raised; however, this raising and progress introduced him to a poor state of health and a shock at the threat of losing his life (Vighio, 2024). He came to know after a lot of issues that these devastating health and environmental problems were present, and he needed to put in to an adequate policy and law-making mechanism and its successful execution (Bhatti & Anwar, 2022).

Increasing environmental concerns in all the nations of the world are air and water pollution, which are exacerbating in developing countries such as Pakistan (Suleri, 2022). The Pakistan environmental laws have their roots in the Mughals and British India. It encompasses all the features of the environmental laws, such as land use, canal irrigation, forestry, energy development, wildlife protection, and noise pollution (Bashir & Ali, 2024). In Pakistan, several organizations are conducting studies on environmental conservation (Sumair et al., 2024).

Pakistan has a large number of organizations where research is underway to conserve the environment (Najam & Yusuf, 2023). These agencies also research several issues, such as forestry, energy, industry, wildlife, fisheries, agriculture, and environmental planning (Khan et al., 2024). The disturbing water pollution issue is a global issue, especially in third-world countries (Riaz & Rehman, 2022). The second cause could be the fact that Pakistan has not been managing the various state and semi-state agencies of the country effectively, and that they have the role of safeguarding the environment and dealing with the existing environmental disasters (Shirazi & Hussain, 2022). The most popular organizations are Space and Upper Atmospheric Research Council (SUPARCO), Pakistan Meteorological Department (PMD), Water and Power Development Department (WAPDA), National Institute of Oceanography, and some of the research institutes (Mirza & Ahmed, 2023).

Research Justification

The environmental regulations are necessary to ensure the protection of biodiversity, ecosystems, and the health of the people. Research has found that an effective enforcement of such rules leads to a reduction in the level of pollution, improvement in the quality of air and water, and preservation of the natural environment. Moreover, environmental laws also support ecological sustainability, preserve resources, and minimize environmental degradation. Studies have shown that to enforce environmental laws, there are strong enforcement mechanisms that are required, which entail inspection, monitoring, and enforcement measures.

Besides, research reports that the successful implementation of these laws can also lead to financial benefits through better travel, which can be environmentally oriented, increased property prices, and a reduction in the number of medical costs associated with pollution-related illnesses. In this way, investments in the implementation and enforcement of environmental rules are the key to the development of sustainable economic growth, human population health, and environmental protection along with environmental protection.

Research Methodology

This research was formed by a systematic review method. The research objectives are determined in this method, and an extensive literature review is done on the subject (Komba & Lwoga, 2020). The research findings are classified according to the subject's content (Hiver et al., 2021; Petticrew & Roberts, 2006). Classified information is included in the study by organizing it as headings (Gan et al., 2021; Pawson et al., 2005). The flow of the study is formed by evaluating classified information and titles (Page, 2021; Rahi, 2017). Thus, integrity is ensured by considering the researched subject with its contents (Egger et al., 2022; Victor, 2008). Consequently, this technique was selected, and the associated processes were observed. Reviewing the relevant literature resulted in accumulating data and information coded according to the study goals. The coded data were grouped by subject. After classifying and merging the subjects, they were ordered by degree of connection. The criteria for selection are listed.

1. **Relevance:** Researches that directly addressed the questions posed by this study are included.
2. **Quality:** Studies that meet a certain quality threshold (e.g., methodological rigor, bias risk) are included. Most of the research is from Scopus-indexed and Clarivate Analytics journals and reputed publishers.
3. **Recency:** Consideration of the publication date to ensure that the review reflects the most current evidence. Most of the studies are from the last three years.
4. **Language:** Only studies published in English are included.
5. **Data Completeness:** Previous studies must provide sufficient data on outcomes of interest for practical synthesis; this is also ensured in this research.

This study did not use primary data from human participants; therefore, no ethics clearance letter from the ethics committee was required.

Literature Review

Many barriers and complexities are involved in the implementation of the environmental law in Pakistan, which often results in a lack of enforcement and adherence (Amir, 2022; Ullah & Bashir, 2024). A literature review has revealed that numerous crucial factors contribute to this issue (Bhatti & Anwar, 2022). To begin with, it is difficult to enforce environmental regulations due to the institutional weaknesses of the regulatory bodies and their inability to execute their roles (Najam & Yusuf, 2023). Many reports indicate that it is challenging to purchase the technology infrastructure, finance, and skilled personnel to monitor and enforce the rules (Moin, 2024). Bureaucratic inefficiency and corruption also hamper enforcement activities, as they help offenders evade prosecution (Sheikh, 2023).

Second, socioeconomic variables play a great role in shaping compliance behavior (Aslam et al., 2022). It has been found that poverty, unemployment, and a lack of adequate alternative sources of income encourage societies and industries to prioritize short-term financial gains in the future over environmental conservation (Sumair et al., 2024). Moreover, the lack of equity in the benefits and burdens of the environment fuels social tensions and opposition to control, particularly among marginalized populations (Shirazi & Hussain, 2022). Furthermore, there is a need to have more awareness and participation by the masses to make sure that the implementation of environmental laws takes place (Hussain et al., 2020).

It has been pointed out in research that extensive environmental education programs are essential in developing a culture of compliance and in empowering individuals to sue the decision-makers and the polluters (Amish et al., 2024). Moreover, the legitimacy and transparency of decision-making processes can be enhanced by strengthening the process of public consultation and participation by civil society (Bashir & Ali, 2024). In addition, these irregular laws and legal hiccups in environmental laws complicate implementation (Riaz & Rehman, 2022). Scholars offer significant changes that make the process of regulation easier, more transparent in terms of enforcement approaches, and align existing laws (Mirza & Ahmed, 2023). What is more, national and subnational laws should be harmonized to eliminate interjurisdictional conflicts and promote effective enforcement strategies (Suleri, 2022).

Also, there is no possibility of neglecting the significance of governance processes and political will (Vighio, 2024). Research indicates that agendas on environmental policy and implementation goals are influenced by political favor and the capture of elites and areas of vested interest (Khan et al., 2024). The solution to these underlying powers requires concerted actions towards improving accountability, inclusion, and openness in the governance process (Amir, 2022). In addition, external influences such as globalization and climate change have additional burdens to the implementation of environmental policies (Najam & Yusuf, 2023).

Successful efforts towards tackling the usual environmental issues require national and international efforts following the fast industrialization, urbanization, and transboundary pollution (Suleri, 2022). To sum it up, various institutional, socioeconomic, legal, political, and external challenges hinder the implementation of environmental laws in Pakistan. These challenges have to be addressed by comprehensive and multifaceted measures aimed at increasing the participation of the population and legal solutions (Sheikh, 2023; Ullah & Bashir, 2024).

History of Environmental Legislation in Pakistan

The environmental laws in Pakistan are the result of the early development of the country, which gained its independence in 1947 (Amir, 2022; Suleri, 2022). Due to the initial focus on the management of the natural resources and wildlife preservation, such laws as the Pakistan Forest Act of 1927 and the Pakistan Wildlife Act of 1972 were introduced (Riaz & Rehman, 2022; Sheikh, 2023).

However, in the late 20th century, Pakistan began developing a comprehensive approach to environmental conservation (Bhatti & Anwar, 2022; Moin, 2024). The Pakistan Environmental Protection Ordinance was passed in 1983, establishing the legislative environment of ecological management and enforcement (Hussain et al., 2020; Ullah & Bashir, 2024; Vighio, 2024). Subsequently, it was replaced by the Pakistan Environmental Protection Act of 1997, which set up the Pakistan Environmental Protection Agency (EPA) as the main regulatory institution and expanded the scope of the administration of the environment (Najam & Yusuf, 2023). Pakistan has since continued strengthening its environmental regulations (Khan et al., 2024; Shirazi & Hussain, 2022).

Environmental Organizations and Laws of Implementation

Enforcing environmental regulations is mainly the mandate of the federal, provincial, and local governments in Pakistan and various regulatory agencies (Sumair et al., 2024). Although the provincial environmental protection departments are the ones who would be involved in enforcing and compliance within the jurisdictions, the Pakistan Environmental Protection Agency (EPA) is the one that would play a vital role in the coordination and management of the environmental protection activities at the federal level (Aslam et al., 2022; Mirza & Ahmed, 2023).

The major impediments that hamper the implementation of the environmental regulations in Pakistan include low awareness and participation of the citizens, institutional capacity challenges, and lack of funding (Bashir & Ali, 2024). To address these problems, the government has been attempting to engage the population in making

environmental decisions, align the efforts of the relevant parties, and strengthen the enforcement mechanisms (Amish et al., 2024).

In Pakistan, there are a number of principles that apply in the implementation of environmental laws.

1. **Strict Liability:** It is possible to hold people and organizations who did not intend or were negligent to cause environmental damage, and be responsible.
2. **Polluter Pays Principle:** The financial stress of the pollution control and repair process lies with the polluters.
3. **Precautionary Principle:** Prevention of environmental hazards must be taken even without scientific confidence.

Environmental Laws in Pakistan

1. **Air Quality Act (1967):** The Air Quality Act is a comprehensive federal act meant to regulate air pollution, monitor emissions of both point and non-point sources, as well as to ensure the safety of the country's population and the environment. The United States Environmental Protection Agency enforces it.
2. **Water Act (1980):** By the year 1972, there was a response to the Stockholm Declaration of 1972 through the formulation of a federal act known as the Water Act in 1980. It controls pollution of the water, lays down its standards of water quality, and performs preservation and restoration programs of surface waters, which include lakes, rivers, and wetlands.
3. **Environmental Protection Act 1990:** It is a major legislation in the United Kingdom that provides for various aspects of environmental protection that include but not limited to waste management, pollution control, and the cleanup of contaminated sites.
4. **National Environmental Policy Act (2005):** It is a United States federal law that establishes a framework under which to assess environmental impacts in federal decision-making processes, ecological assessments, and environmental statements of significant proposed federal projects.
5. **Convention on Biological Diversity:** The CBD is an international treaty to guarantee equality, sharing the benefits of the use of genetic resources, sustainable use of biological resources, and the protection of biodiversity.
6. **Paris Agreement:** As a part of the UNFCCC, the Paris Agreement focuses on ensuring that the rise of global temperatures is recorded not more than 2 degrees Celsius and 1.5 degrees Celsius.
7. **Montreal Protocol:** The Montreal Protocol is one of the international agreements, in which emphasis was put on the substance reducing the ozone layer with the goal of phasing out the production and use of ozone-depleting products such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) to protect the ozone layer as promised under the Stockholm Declaration of 1972. Such regulations and legal frameworks are just a part of a much bigger set of environmental protection acts and international agreements to address environmental concerns and move toward sustainable growth.

Analysis of Different Reports

1. **World Bank Report:** In order to enhance the environmental outcomes, the World Bank Pakistan Environmental and Social. According to the Framework Assessment, there should be greater institutional capacity, policy consistency, and stakeholder participation.
2. **UNEP Assessment:** According to the research made by the United Nations Environment Program, it is important to consider environmental factors in the planning of development, promote sustainable use of resources, and tighten regulatory control.
3. **NGO Reports:** Non-governmental organizations (NGOs) report on regional and global scales, raising awareness about environmental issues like deforestation, industrial and water pollution, and advocating legislative reforms, community participation, and corporate responsibility.

Legal Framework in the Implementation of the Environmental Law

1. **Pakistan Environmental Protection Act 1997:** This is a comprehensive act that provides the federal and provincial governments with the power to issue rules and regulations that serve as the legal basis of all environmental protection, pollution control, and conservation programs.
2. **National Environmental Quality Standards:** These standards guide compliance and enforcement of regulations by setting environmental regulation quality ambient air, water, and soil standards that safeguard the health and environment of the populace.
3. **Environmental Impact Assessment (EIA) Regulations:** EIA regulations are aimed at fostering sustainable decision-making and minimizing the negative impact of environmental projects, which entail evaluating the potential ecological effects of development projects.
4. **Pollution Control Mechanisms:** To prevent and minimize pollution, the law has waste management guidelines, industrial zoning, restrictions on effluent discharge, and emissions standards.

5. **Legal Remedies and Penalties:** The legal framework provides the deterrence aspect of the environmental offense, and the reparation of damages to the environment, legal penalties and fines, and legal remedies for violations of the environmental laws.

Discussion

Although the environmental regulations are strong in Pakistan, there are still numerous stumbling blocks that need to be overcome during their implementation. The problems that often impair its effective enforcement are corruption, the inability of institutions, and insufficient resources. In addition, the lack of uniformity in enforcing the practice between the regions may sometimes be caused by the splitting of responsibilities between federal and regional bodies.

In addition, it must continue to unite more of the public and raise awareness on environmental matters, undermining accountability and compliance. Among the factors that lead to this comprehension and involvement disparity, there is a need for environmental education and outreach programs. However, efforts have been undertaken to address such problems. The government has moved to enhance collaboration among the regulatory bodies, strengthen the enforcement capability, and enhance the participation of people in environmental decision-making.

Efforts such as campaigns through media and building capacity by the enforcement officers are being made to close these gaps. Also, the international partnerships and support have played an essential role in aiding Pakistan in the implementation of the environmental laws. To enhance ecological governance and enforcement capacities, liaison with donor agencies and international organizations has led to an influx of money, experience, and technical assistance.

Nevertheless, it should receive continuous encouragement and financial assistance in order to overcome the implementation bottlenecks and make the laws governing the environment in Pakistan operable. It involves rectifying institutional defects, promoting consciousness and mobilization, and promoting coordination between formal institutions, the business sector, and non-governmental institutions.

Conclusion

Although Pakistan has achieved some advancement in enacting far-reaching environmental laws, numerous hurdles still there that need to be overcome before such rules can be successfully enforced. Despite the efforts to strengthen the protocols of enforcement and increase the cooperation between regulatory agencies, there still exist issues, such as a lack of resources, institutional capacity, and the knowledge of the population. These problems require a multimodal approach, which includes increasing the financing of the environmental governance, enhancing the capacity-building program of the enforcement authorities, and spreading public interest by means of awareness-raising and education-raising actions. Moreover, there is a need to improve the coordination between the federal and provincial agencies in ensuring that the same approach is applied across all parts.

Moreover, international partnerships and collaborations are of much assistance to the efforts made by Pakistan in carrying out environmental legislation effectively. International organizations and donor agencies can help to support the process of environmental governance and enforcement by providing financial assistance, technical assistance, and expertise. In the end, legislators, business, civil society, and the rest of the population should also be determined to make great strides towards environmental conservation. By investing in sound institutions of governance and focusing on ecological sustainability, Pakistan can mitigate environmental degradation, safeguard its natural resources, and establish a more robust and healthy future for its people.

Recommendations

1. **Increase Institutional Strength:** Invest in raising the effectiveness of enforcement and regulatory institutions to implement environmental law.
2. **Assigned Adequate Resources:** Provide regulatory bodies with resources in terms of funds and human resources to assist their compliance, enforcement, and monitoring activities.
3. **Enhancement of Preparation:** Improve the level of cooperation and coordination among the federal and local law enforcement agencies to ensure consistent implementation of enforcement strategies in different regions.
4. **Optimize Legal Structure:** To counter the loopholes, contradictions, and overlaps of the current laws and regulations, reform and improve the law system on environmental protection.
5. **Establish awareness in the population:** To facilitate adherence and involvement, start a mass education campaign to sensitize the population on the environmental issues, rights, and responsibilities.
6. **Promote Stakeholder Engagement:** Promote proper stakeholder engagement and consultations among the stakeholders (communities, businesses, academic institutions, and civil society organizations) in the development and enforcement of environmental policies and regulations.

7. **Monitoring and Reporting:** Increase reporting and monitoring systems to check compliance with environmental laws and the effectiveness of the enforcement measures.
8. **Create Environmental Courts:** In a bid to administer justice on environmental violations promptly and to speed up the process of settling environmental-related disputes, special-purpose ecological courts or tribunals are recommended.
9. **Introduce Environmental Impact Assessment (EIA):** This involves making all development projects go through vigorous and transparent environmental impact assessment (EIA) so as to identify and mitigate any possible environmental issues.
10. **Impose the Polluter Pays Principle:** Impose the polluter pays principle in order to compel the polluters to pay the costs incurred in the process of remediation and pollution control.
11. **Encourage Green Technologies:** To reduce the impact on the environment, stimulate the use of clean and green technologies in companies, and aid in sustainability.
12. **Enhance Waste Management:** Incorporate Waste-to-Energy projects, composting, waste recycling, and other waste management infrastructure and facilities.
13. **Conserve Key Habitats:** Enforce more effective protection measures on critical habitats and biodiversity hot spots to ensure the ecosystems and endangered species survive.
14. **Enhance International Collaboration:** Increase collaboration to share best practices, knowledge, and resources in protecting the environment with other organizations, donor agencies, and neighboring countries.
15. **Track Climate Change Effects:** Have mechanisms of tracking and reducing effects of climate change, including resilience-building strategies and adaption strategies.

Research Limitations

1. **Weak Institutional Capacity:** Federal and provincial environmental authorities often have inadequate financial resources, technical expertise, and human resources to monitor the environment and implement legislation properly. Such a limitation impedes monitoring and compliance with the rules.
2. **Political Interference:** The use of politics and corruption may sabotage the activities of regulatory enforcement, leading to regulatory capture and favoritism to polluting industries. The application of lax environmental rules can also be caused by political reasons, especially when a keen interest is involved.
3. **The absence of Public awareness and participation:** Lack of community participation in conservation programs and non-adherence is due to a lack of public awareness of issues on the environment and rights. Public involvement leads to the problem of enforcing environmental regulations since the authorities would be more willing to initiate action against the offenders.
4. **Poor Monitoring and Enforcement Mechanisms:** Lack of environmental regulation compliance is caused by low inspection and enforcement capacities and ineffective monitoring and enforcement. Industries are able to violate rules on environmental conservation without any consequences or enforcement on the same, due to the fact that there are no real consequences for violation environmental rules and little enforcement of the same.
5. **Jurisdictional Conflicts:** Environmental laws are difficult and ineffective to regulate and enforce, as federal and provincial governments have overlapping jurisdictional assertions and responsibilities. The absence of coordination and collaboration between different departments in the government is another issue that makes implementing environmental laws a tough challenge.
6. **Resource Constraints:** Environmental authorities require increased resources, equipment, and infrastructure in order to perform their monitoring, enforcement, and compliance work effectively. To manage environmental problems and respond to emerging threats, agencies require additional resources.
7. **Legal Loopholes and Delays:** The delays and legal lapses in the judicial system should be addressed to implement environmental laws. Delay in the ecological case resolution is common due to tedious court hearings and bureaucratic hurdles, which enable the offenders to go on with their activities unchecked.
8. **Complicatedness of Environmental Problems:** Since the issues of the environment are complex and multifaceted, it may be required to use interdisciplinary approaches and the collaboration of different stakeholders and industries. Lack of understanding these complexities and competing interests may hinder the efforts to address the environmental issues of all-inclusiveness.
9. **Impetus of Economic Forces:** Sometimes, environmental interests are dominated by economic ones, leading to laxity in regulations or exemption of systems that are considered vital to economic growth. According to regulators and policymakers, the need to balance between environmental protection and economic development is still a major issue.
10. **Transboundary Issues:** Transnational Environmental problems, i.e., deforestation, air and water pollution, climate change, etc., require international collaboration and concerted efforts. The lack of proper cooperation with the

neighboring countries in terms of transboundary environmental issues can hinder efforts to address the common ecological challenges appropriately.

Research Implications

1. **Policy Recommendations:** The results of the research can be useful to policymakers in identifying the effectiveness of the existing environmental laws and regulations in Pakistan. Recommendations backed by empirical studies could be used to develop new policies or reforms to close the implementation gaps and improve the ecological outcomes.
2. **Determining Challenges and Barriers:** The research may be utilized to recognize the specific problems and obstacles that prevent the environmental legislation in Pakistan. In understanding the surveyed variables, it is mandatory to develop targeted treatment and strategies to overcome the hurdles of implementation.
3. **Evaluations of Institutional Capacity:** The study is able to assess the institutional capacity of federal and provincial environmental agencies to enforce environmental laws. Infrastructure, financial resources, technical knowledge, and people resources assessment are some of the areas of improvement that can be found.
4. **Analysis of Legal Frameworks:** The efficacy, consistency, and adequacy of the environmental protection laws in Pakistan can be analyzed through a study. Comparative studies that draw a comparison between countries can also observe the best practices and check to what extent they can be relevant to Pakistan.
5. **Assessing Compliance Mechanisms:** It is possible to evaluate the effectiveness of compliance mechanisms in ensuring that regulatory compliance by businesses and other stakeholders is achieved through monitoring, inspection, enforcement, and fines. It entails the power of environmental laws and adherence.
6. **Evaluating Public Awareness and Citizen Engagement:** It will be possible through research to determine how much people in Pakistan are involved in the environmental decision-making process and the extent of people's awareness of environmental issues and rights. Community empowerment and involvement can be developed by relying on the attitudes and views of the public related to environmental protection strategies.
7. **Research can investigate Socioeconomic Impacts:** There are several ways research can examine how environmental laws and regulations have socioeconomic implications on various stakeholders, including communities, businesses, and their vulnerable populations. It involves a comparison of the distributional consequences of environmental policies and the compliance costs and benefits.

Future Research Directions

1. **Longitudinal Studies:** Longitudinal research would be able to demonstrate the dynamic, trends, and patterns of the application of environmental laws by investigating the way they have changed over a long period of time. Long-term assessments would also be helpful in indicating the reasons for successful or unsuccessful implementations and offering long-term development plans.
2. **Impact Assessment:** An assessment on the impact of environmental laws can be used to determine the success of the laws in relation to the maintenance of the natural ecosystem, the health of the people, their socioeconomic growth, and the quality of the environment, to identify where the laws are going right, as well as those areas of concern that should be improved. The quantitative and qualitative methodologies allow impact evaluations to quantify the results and determine the effectiveness of regulatory actions.
3. **Spatial Analysis:** A deeper insight into the geographical distribution of law implementation can be gained by mapping the environmental risks, hotspots, and vulnerabilities through the application of geographic information systems (GIS) and spatial analytics. Spatial analysis may also assist in knowing areas of priority to work on, effectively direct resources, and create laws and regulations that are geographically oriented.
4. **Stakeholder Perspectives:** Government agencies, businesses, civil societies, communities, and the marginalized groups are all stakeholders whose perspectives may be analyzed to provide an in-depth insight into the opportunities and obstacles presented by the enforcement of environmental legislation. Stakeholder analysis may enhance the collaboration of a large number of stakeholders and inform participatory decision-making strategies.
5. **Comparative Studies:** Comparative research on other countries that address similar environmental problems may contribute to cross-national knowledge sharing and best practice sharing. Comparative studies will be able to attract attention to crucial lessons, identify new strategies, and provoke the creation of policy changes that are highly specific to Pakistan.
6. **Policy Evaluation:** An assessment of the effectiveness of some policy interventions, regulatory change, and institutional innovations can offer evidence-based information on the outcome and impact. Policy evaluations can enhance the effectiveness and efficiency of environmental governance frameworks, suggest policy changes, and have an effect on adaptive management methods.

7. **New Technologies:** The efficiency and efficacy of law enforcement are possible through researching how new technologies, such as blockchain, artificial intelligence, big data analytics, and remote sensing, can be utilized in environmental monitoring, enforcement, and compliance. Automation, real-time tracking, and the use of data to make decisions can be applied to environmental management. It can be discovered in the research on the implementation of emerging technologies.
8. **Climate Change Adaptation:** Investigating the ways to implement adaptation to climate change into the practice of environmental laws may enhance opposition to its impact and promote sustainable development. Institutional coordination and policy coherence, and mainstreaming of climate adaptation measures, can be studied in the context of environmental governance.

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