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Air Pollution in Delhi and the Right to Life under Article 21: A Constitutional and Comparative Study

Dr. Rohit Kumar[1], Ms. Kajal[2]

[1,2] Assistant Professor, Gautam Buddha University, Greater Noida

Abstract

Air pollution has emerged as one of the most critical environmental and public health challenges in contemporary India, with Delhi frequently recording hazardous air quality levels. The present study examines the right to breathe clean air as an integral component of the fundamental right to life under Article 21 of the Constitution of India. The study analyzes the constitutional and legal framework relating to environmental protection, judicial interpretation of environmental rights, governance challenges, and pollution control mechanisms with special reference to Delhi's air pollution crisis. The research adopts a qualitative, analytical, doctrinal, and comparative methodology based primarily on secondary sources including constitutional provisions, environmental legislations, judicial decisions, government reports, policy documents, and academic literature. The study further undertakes a comparative analysis of environmental governance models in Indore and selected international examples including China, Norway, the United Kingdom, and the European Union to identify effective environmental governance practices and sustainable policy approaches.

The findings reveal that despite strong constitutional protections, judicial activism, and environmental legislations, Delhi continues to face severe pollution crises due to fragmented institutional coordination, weak implementation mechanisms, reactive governance approaches, and inadequate long-term environmental planning. The study highlights that sustainable environmental governance requires preventive policy measures, technological modernization, renewable energy transition, public participation, scientific monitoring, and integrated institutional reforms. The study concludes that the right to breathe clean air must be recognized not merely as an environmental concern but as a fundamental constitutional and human right essential for public health, environmental justice, sustainable development, and human dignity.

Keywords: Right to Clean Air, Article 21, Environmental Governance, Air Pollution, Delhi, Sustainable Development, Environmental Justice

1. Introduction

Air pollution has emerged as one of the most serious environmental and public health challenges of the twenty-first century. Rapid industrialization, urbanization, population growth, technological expansion, and unsustainable developmental practices have significantly intensified environmental degradation across the globe. Among various forms of environmental pollution, air pollution poses one of the greatest threats to human survival, ecological sustainability, and public health. According to the World Health Organization (WHO), millions of premature deaths occur annually due to exposure to polluted air, making air pollution a global environmental and health emergency (WHO, 2022). Fine particulate matter such as PM2.5 and PM10 has become particularly dangerous because of its direct impact on human respiratory and cardiovascular systems (Lelieveld et al., 2020). India, one of the world's fastest-growing economies, has simultaneously witnessed increasing environmental stress and deteriorating urban air quality. Several Indian cities frequently rank among the most polluted cities globally, with Delhi emerging as one of the most critically polluted megacities in the world (IQAir, 2023). During winter months, the Air Quality Index (AQI) in Delhi frequently reaches "Severe" and "Hazardous" categories, thereby threatening public health, economic productivity, educational activities, and overall quality of life. Delhi's pollution crisis is caused by multiple interconnected factors including vehicular emissions, industrial pollution, construction dust, thermal power generation, biomass burning, waste burning, rapid urbanization, and seasonal stubble burning in neighboring states such as Punjab and Haryana (Guttikunda & Gurjar, 2012). The increasing concentration of PM2.5 and PM10 particles in Delhi's atmosphere has resulted in rising cases of respiratory diseases, asthma, cardiovascular disorders, reduced lung function, and other serious health complications. Children, elderly persons, outdoor workers, and economically vulnerable populations remain disproportionately affected by hazardous environmental conditions, thereby creating significant environmental justice concerns (Balakrishnan et al., 2019). Consequently, the issue of air pollution in Delhi is not merely an environmental or administrative problem but is fundamentally connected with constitutional rights, public health, and human dignity.

The continuous exposure of citizens to toxic air directly affects the fundamental right to life guaranteed under Article 21 of the Constitution of India. Through progressive judicial interpretation, the Indian judiciary has expanded the scope of Article 21 to include the right to health, right to a clean environment, and right to pollution-free air and water. Environmental protection therefore evolved from a policy objective into an enforceable constitutional right. Constitutional provisions such as Article 48A and Article 51A(g), inserted through the 42nd Constitutional Amendment Act, 1976, further strengthened India's environmental governance framework by imposing responsibilities upon both the State and citizens to protect and improve the environment (Jain, 2016). The Supreme Court of India has played a transformative role in developing environmental jurisprudence through judicial activism and landmark decisions. In *M.C. Mehta v. Union of India*, the Court emphasized environmental accountability and introduced the principle of absolute liability. In *Subhash Kumar v. State of Bihar*, the Court explicitly recognized the right to pollution-free air and water as part of the right to life under Article 21. Similarly, in *Vellore Citizens Welfare Forum v. Union of India*, the Court incorporated the principles of sustainable development, precautionary principle, and polluter pays principle into Indian environmental law (Shyam Divan & Armin Rosencranz, 2001).

In response to the worsening pollution crisis, several institutional and policy measures have been introduced in Delhi, including the implementation of the Graded Response Action Plan (GRAP), conversion of public transport to compressed natural gas (CNG), restrictions on old diesel vehicles, and establishment of the Commission for Air Quality Management (CAQM). Despite these initiatives and continuous judicial intervention, Delhi continues to experience severe pollution levels every year, reflecting substantial gaps between policy formulation and effective implementation (Narain & Krupnick, 2007).The persistence of Delhi's pollution crisis demonstrates that legal recognition of environmental rights alone is insufficient without effective governance, administrative accountability, inter-state coordination, scientific monitoring, and public participation. The crisis further highlights the limitations of fragmented institutional structures and reactive governance mechanisms focused more on emergency response than long-term sustainability.

In this context, comparative environmental governance becomes highly relevant. The environmental governance practices adopted in Indore, one of India's cleanest cities, demonstrate the importance of scientific waste management, administrative efficiency, public participation, and continuous monitoring in improving environmental outcomes. Similarly, international experiences from countries such as China, Norway, the United Kingdom, and members of the European Union provide important lessons regarding pollution control, renewable energy transition, sustainable transportation, and preventive environmental governance. Against this background, the present study critically examines the constitutional recognition of the right to breathe clean air in India with special reference to Delhi's air pollution crisis. The study analyzes constitutional provisions, judicial interventions, environmental governance mechanisms, institutional challenges, and comparative environmental governance models in order to evaluate the effectiveness of existing pollution control frameworks and explore sustainable approaches for strengthening clean air governance in India.

Review of Literature

Environmental protection and the right to a pollution-free environment have emerged as important areas of academic inquiry due to increasing environmental degradation, rapid urbanization, industrialization, and public health concerns. Early studies on environmental governance primarily focused on ecological sustainability and environmental awareness. Guha (2000) examined environmental movements and highlighted the relationship between industrialization, developmental expansion, and ecological degradation. Bharucha (2005) emphasized the interdisciplinary dimensions of environmental studies and stressed the importance of ecological balance and sustainable development in environmental protection. Nagdeve (2004) analyzed environmental pollution in Delhi as a megacity problem and linked rapid population growth, urbanization, and industrial expansion with worsening environmental conditions. Rajagopalan (2015) further examined pollution, natural resource management, and ecological sustainability, highlighting the adverse effects of pollution on environmental and human health. However, these studies remained largely descriptive and did not critically analyze constitutional environmental rights and governance challenges.

The constitutional and legal dimensions of environmental protection were critically examined by Leelakrishnan (2016), who analyzed environmental legislations, constitutional provisions, and judicial remedies in India. The study highlighted the growing role of environmental jurisprudence and judicial

intervention in strengthening environmental governance. Similarly, landmark judicial decisions such as *M.C. Mehta v. Union of India*, *Subhash Kumar v. State of Bihar*, and *Vellore Citizens Welfare Forum v. Union of India* significantly expanded the scope of Article 21 by recognizing the right to clean air and pollution-free environment as part of the fundamental right to life. Several empirical studies specifically focused on Delhi's air pollution crisis. Guttikunda and Gurjar (2012) identified vehicular emissions, industrial pollution, construction activities, and thermal power plants as major contributors to deteriorating air quality in Delhi. Dholakia et al. (2013) emphasized the importance of integrated environmental policies and long-term governance strategies for improving air quality and public health outcomes. Amann et al. (2017) further highlighted the importance of sustainable urban planning, industrial regulation, transportation reforms, and emission reduction strategies in managing air pollution in megacities such as Delhi.

Bhanarkar et al. (2018) analyzed the co-benefits of environmental policies and demonstrated that pollution reduction strategies can simultaneously improve public health, reduce greenhouse gas emissions, and promote urban sustainability. Khaitan (2019) examined the environmental governance model of Indore and highlighted the importance of scientific waste management, public participation, administrative efficiency, and continuous monitoring in improving urban environmental quality. Jalan and Dholakia (2019) emphasized the need for integrated urban environmental governance and coordinated policy interventions for effective pollution management in Delhi. Recent scholarship increasingly focused on governance, environmental justice, and policy implementation challenges. Bhalla, O'Boyle, and Haun (2019) analyzed media framing of Delhi's pollution crisis and highlighted issues relating to governance accountability and institutional responsibility. Chakravorty and Sircar (2021) examined Delhi's environmental crisis within the framework of urban governance, inequality, and ecological stress, emphasizing the relationship between rapid urbanization, governance failures, and socio-economic inequality.

Roychowdhury and Somvanshi (2022) studied winter pollution trends in Delhi-NCR and highlighted the role of particulate matter, stubble burning, vehicular emissions, and meteorological conditions in worsening seasonal pollution. Poddar (2023) critically examined the long-standing intervention of the Supreme Court in Delhi's pollution crisis and highlighted the implementation gap between judicial directives and executive action. Thakur (2024) analyzed international environmental governance models including China, Norway, and the United Kingdom and emphasized the importance of renewable energy transition, electric mobility, and strong environmental regulation in reducing urban pollution. More recent studies have increasingly focused on governance reforms and technological interventions. Rawat (2025) emphasized the importance of urban local governance and decentralized institutional mechanisms in improving environmental management. Das et al. (2025) examined the relationship between anthropogenic emissions and pollution dynamics in Delhi and highlighted the importance of targeted emission reduction policies. Tewari and Jindal (2025) conducted a decadal analysis of Delhi's pollution crisis and concluded that weak implementation mechanisms and fragmented governance structures continue to undermine pollution control efforts despite multiple policy interventions.

The existing literature provides important insights into environmental degradation, pollution trends, judicial activism, and environmental governance. However, significant research gaps remain regarding the integration of constitutional environmental rights, comparative governance analysis, judicial

implementation challenges, and sustainable urban environmental management. Limited research has examined Delhi's pollution crisis through an integrated constitutional, governance, comparative, and policy-oriented framework. Against this background, the present study seeks to contribute to the existing literature by combining constitutional analysis, environmental governance, judicial interpretation, comparative policy evaluation, and sustainable development perspectives in examining the right to breathe clean air in India with special reference to Delhi.

Theoretical Framework

Theoretical frameworks play an important role in strengthening the analytical foundation of research by providing conceptual clarity and guiding the interpretation of governance structures, constitutional rights, environmental degradation, and public policy responses. Since the present study examines the right to breathe clean air from constitutional, environmental, governance, and public policy perspectives, it adopts an interdisciplinary theoretical framework combining Sustainable Development Theory, Environmental Justice Theory, Public Trust Doctrine, and the Rights-Based Approach to Environmental Protection.

The concept of Sustainable Development gained prominence through the Brundtland Commission Report**,** ***Our Common Future*** **(1987),** which defined sustainable development as development that meets present needs without compromising the ability of future generations to meet their own needs. The theory emphasizes balancing economic growth, environmental protection, and social welfare. In the context of Delhi's air pollution crisis, Sustainable Development Theory becomes highly relevant because rapid urbanization, industrialization, transportation expansion, and developmental activities have significantly contributed to environmental degradation and declining air quality. The Indian judiciary has repeatedly emphasized sustainable development as an essential principle of environmental governance, particularly in *Vellore Citizens Welfare Forum v. Union of India*, where the Supreme Court recognized sustainable development, precautionary principle, and polluter pays principle as integral components of Indian environmental law.

Environmental Justice Theory focuses on the unequal distribution of environmental harms and benefits within society. The theory argues that vulnerable populations, including economically weaker sections, children, elderly persons, outdoor workers, and marginalized communities, often bear disproportionate environmental burdens despite contributing least to environmental degradation. Delhi's pollution crisis clearly reflects environmental inequality because residents living near industrial areas, waste disposal sites, highways, and construction zones remain more vulnerable to hazardous environmental conditions. The theory further emphasizes the importance of public participation, transparency, and inclusive environmental governance in environmental decision-making processes.

The Public Trust Doctrine constitutes another important theoretical foundation of the study. According to this doctrine, natural resources such as air, water, forests, and ecological systems are held by the State in trust for public welfare and cannot be exploited merely for commercial interests. The doctrine gained significant recognition in Indian environmental jurisprudence through ***M.C. Mehta v. Kamal Nath***, where the Supreme Court emphasized the constitutional responsibility of the State to protect natural resources and ecological sustainability. In the context of Delhi's pollution crisis, the doctrine highlights the obligation of governments and public authorities to protect air quality and ensure environmental sustainability for present and future generations.

The study also adopts the Rights-Based Approach to Environmental Protection, which treats access to a clean and healthy environment as an essential component of human rights, constitutional governance, and human dignity. Through judicial interpretation of Article 21 of the Constitution of India, the Indian judiciary expanded the scope of the right to life to include the right to health, right to clean air, and right to pollution-free environment. Landmark judgments such as ***Subhash Kumar v. State of Bihar*** **and** ***M.C. Mehta v. Union of India*** transformed environmental protection into an enforceable constitutional right. At the international level, recognition of the right to a clean, healthy, and sustainable environment by the United Nations Human Rights Council and the United Nations General Assembly further strengthened the normative basis of environmental constitutionalism. The combined application of these theoretical perspectives provides a comprehensive analytical framework for understanding Delhi's air pollution crisis and the constitutional right to breathe clean air. The theoretical framework explains the relationship between environmental degradation, governance failures, constitutional rights, public health, sustainable development, and social justice. It further strengthens the study by integrating constitutional analysis, environmental governance, judicial interpretation, comparative policy evaluation, and public welfare within a single interdisciplinary framework.

Research Methodology

Nature of the Study : The present study is interdisciplinary, qualitative, analytical, doctrinal, and comparative in nature. It examines the constitutional recognition of the right to breathe clean air with special reference to Delhi's air pollution crisis. The study integrates perspectives from constitutional law, environmental governance, public policy, sustainable development, and urban governance.

Research Design - The study adopts a qualitative and comparative research design. The qualitative approach is used to analyze constitutional provisions, environmental legislations, judicial decisions, governance mechanisms, and policy frameworks relating to air pollution control in India. The comparative approach is used to examine environmental governance practices in Delhi, Indore, and selected international models.

Sources of Data

The study is primarily based on secondary data collected from reliable legal, academic, governmental, and institutional sources.

Primary Sources

1. Constitution of India
2. Air (Prevention and Control of Pollution) Act, 1981
3. Environment (Protection) Act, 1986
4. Landmark judicial decisions
5. Government notifications and policy documents
6. Reports issued by CPCB, CAQM, GRAP, and other environmental authorities

Secondary Sources

1. Books and journal articles
2. Research papers and policy reports
3. WHO, UNEP, and UN publications
4. AQI reports and environmental databases
5. Government reports and parliamentary documents
6. Newspapers, editorials, and institutional websites

Methods of Data Collection

The study relies mainly on documentary and textual analysis. Constitutional provisions, judicial decisions, environmental legislations, policy documents, AQI reports, and governance frameworks were systematically reviewed and analyzed. Comparative analysis was conducted using environmental governance indicators relating to air quality, waste management, public participation, and institutional coordination.

Objectives of the Study

1. To examine the constitutional recognition of the right to breathe clean air under Article 21 of the Constitution of India.
2. To analyze the causes, consequences, and governance challenges associated with Delhi's air pollution crisis.
3. To evaluate the role of judicial intervention and environmental governance mechanisms in pollution control.
4. To compare Delhi's environmental governance framework with Indore and selected international governance models.
5. To suggest sustainable policy measures for strengthening clean air governance in India.

Research Questions

1. Whether the right to breathe clean air can be interpreted as a fundamental right under Article 21?
2. What are the major governance and institutional challenges responsible for Delhi's pollution crisis?
3. How effective are judicial interventions and environmental governance mechanisms in controlling air pollution?
4. What lessons can Delhi derive from Indore and international environmental governance models?

Research Gap

Existing literature primarily focuses on scientific and environmental dimensions of pollution while giving limited attention to constitutional rights, governance accountability, judicial implementation challenges, and comparative environmental governance. Comparative studies between Delhi and successful governance models such as Indore remain limited. Furthermore, insufficient interdisciplinary research exists integrating constitutional law, environmental governance, public health, and sustainable urban development within a single analytical framework.

Scope of the Study

The study primarily focuses on Delhi's air pollution crisis with special reference to the constitutional right to breathe clean air under Article 21 of the Constitution of India. The study also includes comparative analysis of Indore and selected international environmental governance models**.**

Limitations of the Study

The study mainly relies on secondary data and documentary analysis. It focuses primarily on constitutional, governance, and policy dimensions rather than detailed scientific analysis of atmospheric pollutants. Environmental conditions and AQI trends are dynamic and subject to continuous changes**.**

Analytical Framework

The study adopts an interdisciplinary analytical framework combining constitutional analysis, environmental governance analysis, judicial interpretation, and comparative policy evaluation. Theoretical perspectives such as Sustainable Development Theory, Environmental Justice Theory, Public Trust Doctrine, and Rights-Based Approach have been used to interpret the broader constitutional and governance implications of Delhi's air pollution crisis.

Constitutional and Legal Framework of the Right to Clean Air in India

Environmental protection has emerged as one of the most significant constitutional and legal concerns in contemporary India due to increasing industrialization, urbanization, environmental degradation, and public health challenges. The Indian constitutional framework, through judicial interpretation and legislative intervention, gradually evolved a comprehensive environmental jurisprudence recognizing the right to clean air and healthy environment as integral components of the fundamental right to life. Although the Constitution of India originally did not contain explicit provisions relating to environmental protection, the 42nd Constitutional Amendment Act, 1976 significantly strengthened environmental governance by introducing Article 48A and Article 51A(g). Article 48A under the Directive Principles of State Policy directs the State to protect and improve the environment and safeguard forests and wildlife. Similarly, Article 51A(g) imposes a fundamental duty upon citizens to protect and improve the natural environment. These constitutional provisions collectively establish environmental protection as both a constitutional obligation and a shared social responsibility.

The most important constitutional development relating to environmental rights emerged through judicial interpretation of Article 21 of the Constitution of India. The Supreme Court progressively expanded the

meaning of the "right to life" to include the right to health, right to a clean environment, and right to pollution-free air and water. In *Subhash Kumar v. State of Bihar* (1991), the Supreme Court explicitly recognized the right to pollution-free air and water as part of the fundamental right to life under Article 21. Similarly, in *M.C. Mehta v. Union of India*, the Court emphasized that environmental pollution directly affects human dignity, public health, and quality of life, thereby requiring constitutional protection. India has also enacted several environmental legislations aimed at pollution control and environmental management. The Air (Prevention and Control of Pollution) Act, 1981 established the Central Pollution Control Board (CPCB) and State Pollution Control Boards for monitoring and controlling air pollution. The Environment (Protection) Act, 1986, enacted after the Bhopal Gas Tragedy, provided a comprehensive framework for environmental regulation and pollution control. Further, the National Green Tribunal Act, 2010 established the National Green Tribunal (NGT) for effective adjudication of environmental disputes and enforcement of environmental rights. Judicial activism has played a transformative role in strengthening environmental governance in India. Through Public Interest Litigations (PILs), the judiciary developed important environmental principles including the Precautionary Principle, Polluter Pays Principle, Sustainable Development Principle, Public Trust Doctrine, and Absolute Liability Principle. In *Vellore Citizens Welfare Forum v. Union of India* (1996), the Supreme Court recognized sustainable development and precautionary principles as essential components of Indian environmental law. Similarly, in *M.C. Mehta v. Kamal Nath* (1997), the Court established the Public Trust Doctrine by holding that natural resources are held by the State in trust for public welfare.

The judiciary has also played an important role in Delhi's environmental governance by directing measures relating to vehicular emission control, transition to compressed natural gas (CNG), industrial regulation, implementation of pollution control mechanisms, and environmental monitoring systems. However, despite extensive judicial intervention and legislative frameworks, Delhi continues to

experience severe pollution crises due to fragmented governance structures, weak implementation mechanisms, administrative inefficiency, and lack of long-term preventive environmental planning.

Thus, the constitutional and legal framework of India clearly establishes that the right to breathe clean air forms an essential part of the fundamental right to life under Article 21. Constitutional provisions, environmental legislations, judicial principles, and environmental jurisprudence collectively recognize environmental protection as a constitutional obligation necessary for safeguarding public health, human dignity, and sustainable development.

Delhi's Air Pollution Crisis: Causes, Consequences and Governance Challenges

Delhi's air pollution crisis has emerged as one of the most severe urban environmental challenges in the world. Rapid industrialization, urbanization, population growth, vehicular expansion, and unsustainable developmental practices have significantly deteriorated air quality in the National Capital Territory (NCT) of Delhi. The recurring episodes of hazardous smog, particularly during winter months, have transformed air pollution from a seasonal environmental issue into a persistent public health and governance crisis. Consequently, Delhi's pollution problem is no longer limited to environmental degradation alone but has evolved into a broader constitutional, governance, and public health concern affecting human dignity and the right to life under Article 21 of the Constitution of India. Delhi frequently records Air Quality Index (AQI) levels within the "Very Poor" and "Severe" categories, particularly during the winter season when low wind speed, temperature inversion, and stubble burning intensify pollution levels. PM2.5 and PM10 particles remain among the most dangerous pollutants because of their direct impact on respiratory and cardiovascular health. Persistent exposure to polluted air has significantly increased cases of asthma, bronchitis, lung infections, cardiovascular diseases, reduced lung function, and premature mortality, especially among children, elderly persons, and vulnerable populations.

The causes of air pollution in Delhi are multidimensional and interconnected. Vehicular emissions constitute one of the major contributors due to increasing automobile ownership, traffic congestion, outdated vehicles, and excessive fossil fuel consumption. Industrial activities and thermal power plants further contribute to atmospheric pollution through the release of harmful gases and particulate matter. Construction dust, waste burning, and rapid infrastructure expansion have also intensified environmental degradation in the city. In addition, seasonal stubble burning in neighboring states such as Punjab and Haryana significantly worsens winter pollution conditions in Delhi-NCR. Rapid population growth and unplanned urbanization have further increased pressure on transportation systems, housing, energy consumption, and urban infrastructure. Inadequate waste management systems, overflowing landfill sites, and weak environmental regulation continue to aggravate pollution levels and environmental stress in the region.

The crisis has also generated serious economic and social consequences. Rising healthcare expenditure, reduced labor productivity, disruption of educational activities, declining urban livability, and reduced economic efficiency collectively impose a substantial burden on society. Environmental inequality further intensifies the crisis because economically weaker sections, outdoor workers, construction laborers, and residents living near industrial and waste disposal areas remain disproportionately exposed to hazardous environmental conditions.Delhi's pollution crisis further reflects significant governance and institutional challenges. Multiple agencies including CPCB, DPCC, CAQM, municipal corporations, and neighboring

state governments are involved in pollution management. However, fragmented institutional structures, overlapping jurisdictions, weak coordination mechanisms, inadequate monitoring systems, and administrative inefficiency have substantially reduced the effectiveness of environmental governance.

In response to worsening pollution conditions, several institutional mechanisms such as the Graded Response Action Plan (GRAP) and the Commission for Air Quality Management (CAQM) have been introduced to strengthen pollution control and emergency response mechanisms in Delhi-NCR. However, despite judicial intervention, environmental legislations, and policy initiatives, Delhi continues to experience severe pollution crises every year, reflecting substantial gaps between policy formulation and effective implementation.

The persistence of Delhi's pollution crisis demonstrates that environmental governance cannot rely solely upon temporary emergency measures and judicial directives. Sustainable environmental management requires preventive governance, coordinated institutional action, technological modernization, public participation, scientific monitoring, renewable energy transition, and long-term environmental planning. Therefore, the right to breathe clean air can be effectively protected only through comprehensive governance reforms capable of balancing urban development, ecological sustainability, public health, and constitutional rights.

Comparative analysis

Comparative environmental governance plays an important role in identifying successful policy interventions, institutional mechanisms, administrative practices, and sustainable urban management strategies capable of improving environmental quality and ensuring effective realization of environmental rights. Delhi's recurring air pollution crisis demonstrates that constitutional recognition of environmental protection alone is insufficient without strong implementation mechanisms, administrative accountability, public participation, technological modernization, and long-term sustainability-oriented planning. In this context, comparative analysis becomes essential for understanding how different cities and countries have successfully addressed environmental degradation through preventive governance and coordinated policy implementation.The present section undertakes a comparative analysis between Delhi and Indore, along with selected international environmental governance models including China, the United Kingdom, Norway, and the European Union. The purpose of this comparative framework is to identify governance practices, policy innovations, institutional reforms, and sustainability strategies that may contribute to strengthening Delhi's environmental governance framework and protection of the constitutional right to breathe clean air.

Comparative environmental governance provides an important framework for understanding how different cities and countries address environmental degradation, pollution control, and sustainable urban development through effective institutional mechanisms and policy interventions. Delhi's recurring air pollution crisis demonstrates that constitutional recognition of environmental rights alone is insufficient without strong implementation, administrative accountability, technological modernization, and public participation. Therefore, comparative analysis becomes essential for identifying governance practices capable of strengthening environmental sustainability and realization of the right to breathe clean air.

The comparative analysis between Delhi and Indore highlights significant differences in environmental governance despite both cities operating within the same constitutional and legal framework of India. While Delhi continues to experience severe pollution crises, Indore has emerged as one of India's cleanest cities through scientific waste management, strong municipal administration, public participation, and continuous environmental monitoring. Indore adopted preventive governance strategies emphasizing cleanliness, waste segregation, recycling, citizen engagement, and sustainable urban management, whereas Delhi's environmental governance often remains reactive and emergency-oriented. Delhi frequently records AQI levels within the "Very Poor" and "Severe" categories due to vehicular emissions, industrial pollution, construction activities, waste burning, and excessive urban pressure. In contrast, Indore generally maintains comparatively moderate air quality conditions through coordinated municipal governance, effective waste management systems, organized urban planning, and stronger environmental awareness. The comparison demonstrates that environmental sustainability depends not merely upon policy formulation but also upon implementation efficiency, institutional coordination, and administrative accountability.

Table 1: Comparative Environmental Governance – Delhi vs Indore

Indicators	Delhi	Indore
Air Quality Index (AQI)	Frequently "Very Poor" and "Severe"	Mostly "Moderate" and manageable
Waste Management	Landfill-dependent, inefficient segregation	Scientific segregation and recycling
Public Participation	Limited and inconsistent	Strong citizen involvement
Governance Approach	Reactive and crisis-oriented	Preventive and systematic
Administrative Coordination	Fragmented institutional structure	Coordinated municipal governance
Urban Planning	Congestion and excessive urban pressure	Comparatively organized urban management
Pollution Sources	Vehicular, industrial, construction, waste burning	Comparatively controlled urban pollution
Monitoring Mechanisms	Multiple agencies with overlapping roles	Continuous local monitoring systems
Environmental Awareness	Moderate	High public participation and awareness
Sustainability Measures	Limited implementation	Integrated sustainability initiatives

The study also examines selected international environmental governance models including China, the United Kingdom, Norway, and the European Union. China adopted aggressive pollution control measures through industrial regulation, renewable energy expansion, and reduction in coal dependency. The United Kingdom strengthened environmental governance through the Clean Air Act and preventive environmental regulation. Norway successfully promoted electric mobility and sustainable transportation through policy incentives and technological innovation, while the European Union developed coordinated environmental governance mechanisms emphasizing sustainability, scientific monitoring, renewable energy transition, and institutional accountability. AQI and Environmental Indicators: Delhi versus Indore

Figure 1 : Governance Comparison Framework – Delhi vs Indore

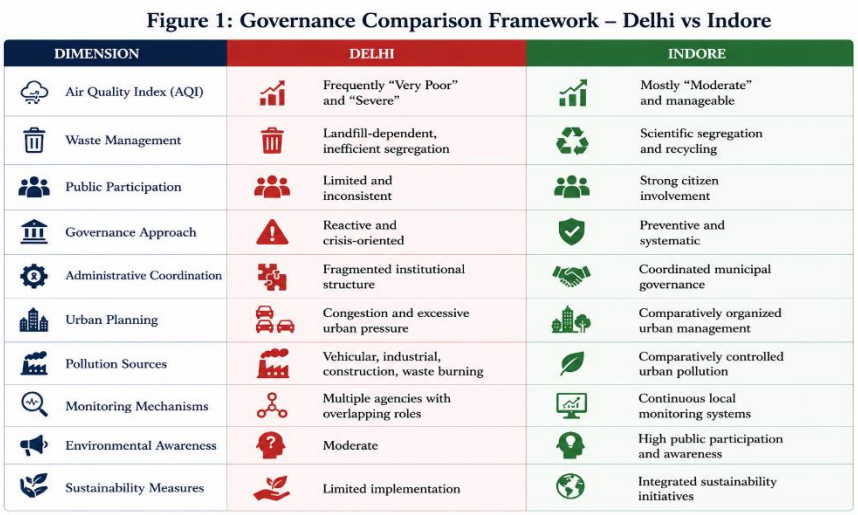

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Table 2: International Comparative Environmental Governance Models

Country/Region	Major Strategy	Key Environmental Focus	Lessons for Delhi
China	Coal reduction and renewable energy	Industrial pollution control	Strong implementation and monitoring
United Kingdom	Clean Air Act	Industrial emission regulation	Legislative reforms
Norway	Electric mobility transition	Sustainable transportation	EV promotion and public transport

European Union	Environmental directives	Sustainable governance	Coordinated institutional framework
Indore	Waste management and public participation	Urban cleanliness and sustainability	Local governance and citizen engagement

The comparative analysis demonstrates that successful environmental governance requires preventive planning, technological modernization, public participation, strong institutional coordination, sustainable transportation systems, and long-term environmental management. It further highlights that environmental governance cannot rely solely upon judicial intervention and temporary emergency measures. Effective realization of the right to breathe clean air requires integrated governance reforms, scientific urban planning, renewable energy transition, administrative accountability, and sustained policy implementation capable of balancing urban development, ecological sustainability, and public health protection.

International Comparative Environmental Governance Models

DIMENSION	CHINA	UNITED KINGDOM	NORWAY	EUROPEAN UNION
GOVERNANCE APPROACH	Strong centralized governance with top-down policy direction and strict implementation.	Rule of law based approach with independent institutions and preventive regulation.	Integrated governance with high transparency, accountability and long-term planning.	Multi-level governance with cooperation among member states and EU institutions.
KEY POLICIES AND LAWS	Air Pollution Prevention and Control Action Plan; strict emission standards for industries and vehicles.	Clean Air Act (1993, 2021); Environment Act (2021).	Climate Act; Pollution Control Act; strong environmental regulations.	European Green Deal; Ambient Air Quality Directive; Emission Trading System (ETS).
POLLUTION CONTROL STRATEGY	Industrial restructuring, coal reduction, relocation of polluting industries, and strict enforcement.	Emission limits, low emission zones, phasing out high polluting industries.	Strict emission standards, protection of ecosystems, zero tolerance for violations.	Harmonized standards across member states, emission reduction targets and compliance mechanisms.
RENEWABLE ENERGY AND TRANSITION	Large scale investment in solar, wind, hydro and nuclear energy; reducing coal dependency.	Commitment to net zero by 2050; investment in wind, solar and green technologies.	Nearly 100% renewable electricity (mainly hydro); strong green energy transition.	Target of climate neutrality by 2050; major investment in renewables and energy efficiency.
SUSTAINABLE TRANSPORT	Promotion of electric vehicles (EVs); expansion of public transport; fuel efficiency standards.	Ultra Low Emission Zones (ULEZ); promotion of EVs; investment in public transport.	High EV adoption through incentives; well-developed public transport system.	Clean mobility strategy; promotion of EVs; investment in sustainable and smart transportation.
MONITORING AND TECHNOLOGY	Advanced real-time monitoring networks; use of AI and data analytics for enforcement.	Air quality monitoring network; use of data-driven decision making and research.	High quality monitoring systems; adoption of clean and green technologies.	Copernicus programme; advanced monitoring; data sharing across member states.
PUBLIC PARTICIPATION AND AWARENESS	Increasing public awareness through campaigns; digital platforms for reporting and information.	Strong public awareness; consultation in policy making and environmental education.	High public awareness and community involvement in environmental protection.	Public participation in decision making; environmental education and awareness initiatives.
OUTCOMES AND ACHIEVEMENTS	Significant reduction in PM2.5 levels in major cities; expansion of renewable energy capacity.	Improved air quality; reduction in emissions; progress towards net zero target.	Sustained clean air quality; leadership in EV adoption and climate actions.	Continuous improvement in air quality; coordinated climate action across Europe.

KEY TAKEAWAY Successful environmental governance requires strong legal frameworks, preventive policies, technological innovation, renewable energy transition, public participation, and institutional accountability. These international models demonstrate that sustainable air quality and environmental protection are achievable through long-term commitment and integrated governance.

Policy Recommendations and Sustainable Governance Framework

Delhi's recurring air pollution crisis demonstrates that existing environmental governance mechanisms remain inadequate for ensuring long-term environmental sustainability and effective realization of the constitutional right to breathe clean air. Despite constitutional protections, judicial intervention, and environmental legislations, the city continues to experience hazardous pollution levels affecting public health, ecological balance, and human dignity. This highlights the urgent need for comprehensive governance reforms, preventive environmental planning, technological modernization, and stronger institutional accountability. One of the major challenges in Delhi's environmental governance framework is fragmented institutional coordination. Multiple agencies are involved in pollution management, yet overlapping jurisdictions and weak coordination often reduce policy effectiveness and implementation efficiency. Therefore, an integrated governance framework with clearly defined responsibilities, coordinated monitoring systems, and effective inter-agency cooperation is essential for strengthening environmental management. Delhi's pollution control strategy has largely remained reactive and crisis-

oriented, particularly during severe winter pollution episodes. Temporary restrictions and emergency measures provide only short-term relief without addressing the structural causes of pollution. Sustainable governance therefore requires a transition towards preventive environmental management based on long-term planning, scientific monitoring, and continuous policy implementation.

Vehicular emissions remain one of the major contributors to urban pollution in Delhi. Strengthening public transportation, promoting electric mobility, improving sustainable urban transport systems, and enforcing stricter emission standards are necessary for reducing pollution levels and improving urban environmental quality. Similarly, renewable energy expansion, green infrastructure development, and reduction in fossil fuel dependency are essential for achieving long-term environmental sustainability. Effective waste management also constitutes an important component of sustainable governance. Scientific waste segregation, recycling systems, decentralized waste processing, and prevention of open waste burning can significantly reduce environmental degradation and improve public health conditions. The successful waste management practices adopted in Indore demonstrate the importance of administrative efficiency, public participation, and continuous environmental monitoring in improving urban sustainability.

Environmental governance cannot rely solely upon governmental regulation and judicial intervention. Public participation, environmental awareness, citizen engagement, and community-based sustainability initiatives are equally important for promoting environmental responsibility and strengthening implementation mechanisms. Educational institutions, civil society organizations, and local communities must therefore play a greater role in environmental protection and awareness generation. Technological modernization and scientific monitoring systems should further be integrated into pollution control mechanisms. Real-time AQI monitoring, digital pollution tracking systems, and data-driven environmental governance can significantly improve policy implementation and administrative efficiency. At the regional level, stronger coordination among Delhi and neighboring NCR states is also necessary for addressing transboundary pollution challenges such as stubble burning and industrial emissions. The right to breathe clean air must ultimately be treated as an integral component of the fundamental right to life under Article 21 of the Constitution of India. Effective realization of this right requires preventive governance, strong institutional coordination, sustainable urban planning, technological innovation, public participation, and long-term political commitment capable of balancing developmental growth with ecological sustainability and public health protection.

Conclusion

The present study examined the right to breathe clean air as a fundamental right with special reference to Delhi's air pollution crisis and environmental governance framework. The study analyzed constitutional provisions, judicial interpretation of Article 21, environmental legislations, governance challenges, and comparative environmental governance models in order to evaluate the effectiveness of existing pollution

control mechanisms in India. The findings of the study indicate that Delhi's air pollution crisis has evolved into a serious constitutional, public health, and governance challenge. Rapid urbanization, vehicular emissions, industrial activities, waste burning, and weak environmental management practices have significantly deteriorated air quality in the National Capital Region. The study further highlights that continuous exposure to polluted air directly affects public health, environmental sustainability, and human dignity, thereby strengthening the constitutional relevance of the right to breathe clean air.

The study demonstrates that the Indian judiciary has played a significant role in expanding environmental jurisprudence through progressive interpretation of Article 21. Landmark judicial decisions recognized the right to clean air and pollution-free environment as essential components of the fundamental right to life. Constitutional provisions under Articles 48A and 51A(g) further reinforce the responsibility of both the State and citizens towards environmental protection and ecological sustainability. Despite constitutional protections and judicial intervention, Delhi continues to face severe pollution crises due to fragmented institutional structures, weak implementation mechanisms, inadequate coordination, and reactive governance approaches. The comparative analysis of Indore and selected international environmental governance models demonstrates that effective environmental protection requires preventive governance, administrative accountability, technological modernization, public participation, and sustainable urban planning.

The study concludes that realization of the right to breathe clean air requires integrated governance reforms, scientific environmental management, renewable energy transition, stronger institutional coordination, and long-term policy commitment. Environmental governance must therefore move beyond temporary emergency measures towards sustainable and preventive environmental planning capable of balancing developmental growth, ecological sustainability, and public health protection.In conclusion, the right to breathe clean air must be recognized not merely as an environmental concern but as an essential constitutional and human right necessary for ensuring human dignity, social justice, public health, and sustainable development in contemporary India.

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