



Review Article



Citizen Rights in Addressing Air Pollution and Ensuring a Healthy Environment: A Review

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Abstract

Air quality is one of the most vital elements for sustaining life on this planet. Without it, the existence of living beings would be impossible, making the preservation of air quality essential. However, the rapid growth of technology and urbanization has led to a significant increase in air pollutants. Given their harmful effects on human health and the environment, governments are compelled to adopt extraordinary measures to prevent air pollution and environmental degradation. Furthermore, a healthy and pollution-free environment is a fundamental citizenship right, as emphasized in numerous international and domestic laws. The persistent air pollution in Tehran, coupled with inadequate control and supervision, constitutes a violation of citizens' rights. This review study explores the right of citizens to a healthy environment, with a focus on Tehran's air pollution. It begins by examining Tehran's air pollution from an environmental perspective. The second section discusses the legal framework in Iran, analyzing the rules, regulations, and approvals that address the right to a healthy living environment. Finally, the third section investigates civil rights to a healthy environment within international law, highlighting its recognition in both mandatory and non-mandatory documents.

Keywords: Citizenship rights, Air pollution, Tehran, International law, Environmental law

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Introduction

From the past to the present, cities have experienced rapid growth and development. Population increases and urban expansion have led to significant consequences, including air, water, and soil pollution; waste disposal challenges; and rising fuel consumption, among others. Among these issues, air pollution has emerged as the most critical environmental problem globally.¹⁻³ In the industrialized world, air pollution has undergone significant changes over the last 50 years. Until after World War II, the primary urban pollutant was carbon dioxide, which originated from fossil fuel soot, land use changes, and various industrial processes.⁴ As a greenhouse gas, carbon dioxide affects the earth's radiation balance, establishing a strong connection between its emissions and climate change.⁵⁻⁷ The rapid growth of urbanization and increasing population have exacerbated the release of pollutants such as carbon monoxide, suspended particles, and nitrogen oxides. This has led to severe air pollution in many megacities, making its control and reduction increasingly challenging.^{8,9} For instance, compared to 50 years ago, the rate of car production has significantly risen,

with many vehicles manufactured and introduced to the market every 10 minutes. Moreover, urban environments in industrialized regions are heavily polluted with smoke and emissions from various sources. The air pollution problems in urban areas are evident, and neglecting appropriate measures could result in irreparable harm to citizens and the environment.^{10,11} In recent years, air pollution has become a serious issue in Iran, particularly in Tehran and other major cities, driven by population growth and increased motor vehicle traffic. Tehran's worsening air quality has had numerous adverse effects on both the environment and its inhabitants. Consequently, monitoring and controlling air quality has become a top national priority.

To address this, coordinated programs involving multiple agencies are implemented annually to reduce air pollution in Tehran. One such initiative is the establishment of Clean Air Day, observed on January 19. As members of a political entity, Tehran's citizens have both rights and responsibilities, including protecting the environment to ensure access to a healthy climate. This duty is fundamental and reinforces, rather than limits,



their rights. Clean air is a basic right of all citizens, and any activities contributing to air pollution are considered a violation of these rights.^{12,13}

Air pollution consists of hazardous substances from both human-made and natural sources. In Tehran and other megacities worldwide, the primary sources of air pollution include the following:

1. Natural sources: Volcanic eruptions, forest fires, and grass fires.
2. Mobile sources: Personal and public motor vehicles.
3. Stationary sources: Factories, industrial workshops, power plants, and domestic or commercial heating systems.
4. Inadequate air quality management.
5. Lack of coordination between responsible agencies and the Environmental Protection Organization.^{14,15}

The sources, acceptable concentrations, and effects of the criteria pollutants are summarized in Table 1.

Surveys indicate that the majority of the world's most polluted cities are located in China and India. Notably, 22 of the 30 most polluted cities globally are in India.¹⁶ Studies emphasize that access to a clean environment is a fundamental prerequisite for exercising a wide range of human rights. All individuals require clean air and water for survival.¹⁷ Analyzing the historical trends of air pollutants can help identify their variations over time, driven by natural and human factors closely tied to economic, social, and political developments. This analysis provides a valuable foundation for predicting

future air quality changes and assessing the effectiveness of related policies.¹⁸ Research on the health burden associated with particulate matter exposure in Tehran has revealed alarming statistics. Air pollution accounts for approximately 7000 deaths annually and the loss of 100 000 years of life. Also, the economic cost of air pollution in 2017 was estimated at \$3 billion.¹⁹ The impact of air pollution on social and economic conditions has gained increasing attention from economists and environmental researchers in recent decades. Studies consistently demonstrate a direct correlation between these factors. Rising air pollution leads to increased mortality, particularly among children, higher public health and education expenses, and a decline in average life expectancy.²⁰ To address these challenges, significant research has focused on evaluating the effectiveness of existing laws and policies, which has spurred the development of new strategies. However, a comprehensive evaluation of these laws is often incomplete. Research frequently fails to consider the combined effects of concurrent policies or their implementation in practice.²¹ Non-governmental organizations have played a critical role in advocating for and reforming environmental policies. Recent studies highlight the success of their efforts in improving environmental conditions and raising public awareness.²² For example, a case study in China aimed at controlling ozone and particulate matter pollution through policy and law modifications concluded that existing policies required significant

Table 1. Sources, Acceptable Concentrations, and Effects of the Criteria Pollutants

Pollutant	Common Sources	Maximum Acceptable Concentration in the Atmosphere	Environmental Risks	Human Health Risks
Sulfur dioxide	Electricity generation, fossil-fuel combustion, industrial processes, and automobile emissions	0.03 ppm (1-year period) and 0.14 ppm (24-hour period)	Major cause of haze, contribution to acid rain formation, which subsequently damages foliage, buildings, and monuments, and reaction to form particulate matter	Breathing difficulties, particularly for people with asthma and heart disease
Ozone	Nitrogen oxides (NO _x) and volatile organic compounds (VOCs) from industrial and automobile emissions, gasoline vapours, chemical solvents, and electrical utilities	0.075 ppm (8-hour period)	interfering with the ability of certain plants to respire, leading to increased susceptibility to other environmental stressors (e.g., disease, harsh weather)	Reduced lung function, irritation and inflammation of breathing passages
Particulate matter	Sources of primary particles including fires, smokestacks, construction sites, and unpaved roads; sources of secondary particles include reactions between gaseous chemicals emitted by power plants and automobiles	150 µg/m ³ (24-hour period for particles < 10 µm) and 35 µg/m ³ (24-hour period for particles < 2.5 µm)	contribution to formation of haze as well as acid rain, which changes the pH balance of waterways and damages foliage, buildings, and monuments	Irritation of breathing passages, aggravation of asthma, irregular heartbeat
Lead (Pb)	metal processing, waste incineration, fossil-fuel combustion	0.15 µg/m ³ (rolling three-month average); 1.5 µg/m ³ (quarterly average)	loss of biodiversity, decreased reproduction, neurological problems in vertebrates	adverse effects upon multiple bodily systems; may contribute to learning disabilities when young children are exposed; cardiovascular effects in adults
nitrogen oxides (NO and NO ₂)	Automobile emissions, electricity generation, industrial processes	0.053 ppm (1-year period)	Damage to foliage and contribution to smog formation	Inflammation and irritation of breathing passages
Carbon monoxide (CO)	automobile emissions, fires, and industrial processes	35 ppm (1-hour period) and 9 ppm (8-hour period)	contribution to smog formation	Exacerbates symptoms of heart disease, such as chest pain; possible vision problems and reduced physical and mental capabilities in healthy people

Source: U.S. Environmental Protection Agency (EPA).

updates. Specifically, the study recommended reforms to decarbonize China's energy system and address global climate change more effectively.²³ Innovative approaches to air pollution monitoring have also emerged in recent years. Wireless sensor systems now collect environmental data in real-time, enabling precise measurements and efficient data analysis. This practical and innovative method has significantly enhanced air pollution control measures.²⁴ Public education remains a critical component in addressing air pollution. In a study examining the effects of air pollution-related diseases, participants underwent a year of in-person and virtual training. Results indicated that awareness of air quality among participants was initially low but improved significantly following the training. These findings underscore the importance of educating the public to mitigate the effects of air pollution and reduce its associated health impacts.²⁵ Beyond raising awareness, strategies to increase community participation in air quality management are essential. Addressing structural weaknesses in the system, such as inefficient communication, superficial evaluations, and irrelevant political influences, can help close the gap between current research and policies.²⁶ Focusing on Tehran's air pollution, this study examines the right of citizens to a healthy environment. The first section explores Tehran's air pollution from an environmental perspective. The second section discusses citizens' rights to a clean living environment as outlined in Iranian laws, regulations, and approvals. Finally, the third section investigates civil rights to a healthy environment in international law, highlighting its presence in both mandatory and non-mandatory documents.

1. First Issue: Air Pollution in Tehran from an Environmental Point of View

The environment is a vast and complex system comprising various factors shaped by the gradual evolution of living organisms and the Earth's surface components. It both influences and is influenced by human activities. With the advancement of human civilization, technological development, and population growth, the world is now grappling with significant environmental challenges, including air and land pollution, which threaten the lives of the planet's inhabitants. Air pollution, a phenomenon of modern life, arises from pollutants generated by human activities. Processes such as food production, industrial operations, manufacturing of goods, and energy generation are major contributors to these pollutants. One of the primary causes of air pollution is incomplete combustion. When there is an inadequate fuel supply or an improper air-to-fuel ratio during combustion, various harmful substances-including carbon monoxide, sulfur oxides, nitrogen oxides, ash particles, and unburned hydrocarbons-are released into the atmosphere.²⁷⁻³⁰

Control Strategies to Reduce Tehran's Air Pollution

- The production and distribution of standard fuel in

Tehran according to the Euro 4 standards, which lead to the reduction of per capita pollution per kilometer traveled, from 50 to 2.7 grams³¹

- Car production based on the Euro 4 standard, because 20 Euro 4 cars produce as much pollution as one old car³²
- Development of green space, traffic management and removal of worn-out vehicles from the urban transportation cycle, especially worn-out minibuses
- Installation of real-time pollution monitoring system in industrial units
- Reducing the consumption of fossil fuels and moving towards non-fossil fuels
- Using the experiences of other countries in managing environmental problems

More than 20 million liters of standard fuel are produced daily in Tehran, reducing the volume of gasoline released into the air from 5 percent under the Euro 2 standard to 1 percent under the Euro 4 standard.³³ Citizens should consider this when purchasing a vehicle, ensuring it complies with current standards. Addressing the root causes of air pollution is essential for finding effective solutions. By improving the identified contributing factors, we can take meaningful steps toward controlling and gradually reducing air pollutants over time.

2. The Second Issue: The Right of Citizenship in the Environment in Iranian Law

Every individual has the right to live in a healthy and ecologically balanced environment. Since suitable living conditions are essential for a fulfilling life, the right to a healthy environment is considered one of the most fundamental aspects of citizenship rights. On the other hand, all citizens share a responsibility to care for nature and the environment, working alongside the government to preserve and maintain it by adhering to environmental laws and regulations.³⁴ The right to access clean air is a subset of the broader right to a healthy environment. Consequently, air pollution is regarded as a violation of citizenship rights, as any form of pollution threatens the mental, psychological, and physical well-being of citizens. It also endangers the most fundamental rights of citizenship: the rights to life and health. For these reasons, the right to clean air is considered a key component of citizenship in Muslim societies. In recognition of the importance of this issue, Iranian laws and regulations have addressed air pollution and proposed various solutions to combat it. To better understand the concept of air pollution, we will first examine its definitions as outlined in the relevant legal frameworks.³⁵

Laws Related to Environmental Rights

Constitution: The Iranian Constitution recognizes the environment as a public asset, placing it on equal footing with health and education. In this context, Article 50 of the Constitution is considered one of the most

comprehensive and explicit provisions for environmental protection, establishing the right to a healthy environment as a fundamental citizenship right.

Municipal law approved (1955): Given the significance of air pollution and its detrimental effects on urban areas, the Municipal Law includes provisions for the preservation and expansion of green spaces in cities. Part of the seventh book of this law specifically addresses air pollution, reflecting its critical importance.³⁶

Law on how to prevent air pollution, approved on April 23, 1995: This law was enacted to fulfill Article 50 of the Constitution and aims to ensure clean and protected air. It mandates that all individuals and entities comply with its regulations. Comprising six chapters, the law takes a strict approach to air pollution, explicitly prohibiting any actions that cause air pollution and prescribing penalties for violators. The fifth chapter is dedicated to detailing these punishments to enforce compliance and protect air quality effectively.³⁷

3. The Third Issue: The Right of Citizens to a Healthy Environment from the Perspective of International Law

The United Nations Charter includes provisions aimed at promoting and encouraging global respect for human rights. It emphasizes individual and collective actions to achieve this goal, as well as recommendations from the Economic and Social Council. This section examines the rights of citizens to a healthy environment within the context of both mandatory and non-mandatory environmental rights.

The Rights of Citizens to a Healthy Environment in Mandatory Rights

To understand mandatory rights, treaties, international protocols, and judicial opinions must be analyzed. Below are some examples³⁸:

- *United Nations Convention on Climate Change (1992)*: This convention mandates that advanced nations take all necessary measures to enhance their capabilities to encourage, facilitate, and provide access to comprehensive and reasonable environmental knowledge and technology to other member states, especially developing countries. Furthermore, it emphasizes the importance of supporting the development and promotion of technologies and capacities in developing nations.³⁹
- *Aarhus Convention approved (1998)*: This treaty uniquely links environmental rights with human rights and highlights the responsibilities of the present generation toward future generations. The convention asserts that sustainable development is achievable only through the active participation of individuals and relevant groups. Public participation is founded on three key principles: (a) Public access to environmental information, (b) The ability of the public to participate in environmental decision-making, and (c) Access to environmental courts.⁴⁰

The Rights of Citizens to a Healthy Environment in Non-mandatory Rights

Non-mandatory rights encompass declarations, statements, international covenants, and resolutions issued by organizations such as the United Nations General Assembly.⁴¹

- *Stockholm Declaration (1972)*: This declaration explicitly recognizes the right to a healthy environment as a fundamental human right. It affirms the right to a healthy environment alongside freedom and equality, making it one of the essential rights. It also holds humans responsible for protecting and improving the environment for both present and future generations.⁴²
- *Rio Declaration (1992)*: Known as the Declaration of the United Nations Conference on Environment and Development, this document outlines 27 general principles defining governments' duties regarding development and the environment. The Rio Declaration asserts that long-term economic progress is achievable only when linked with environmental protection. This requires nations to establish equitable global partnerships involving governments, individuals, and key societal sectors.⁴³
- *The Hague Declaration (1989)*: This declaration elevates environmental rights as a human rights issue, stating that environmental damage constitutes harm to the right to live with dignity within the global environment.^{44,45}
- *Resolution 45/49 of the United Nations General Assembly (1990)*: This declaration elevates environmental rights as a human rights issue, stating that environmental damage constitutes harm to the right to live with dignity within the global environment.⁴⁶

Conclusion

The legal framework in Iran, rooted in Article 50 of the Constitution of the Islamic Republic of Iran, provides the necessary capacity to recognize the citizen's right to a healthy environment. However, significant shortcomings and legal gaps persist within the country's laws and approvals. Besides, there are no specific legal mechanisms to guarantee citizens' access to a healthy environment under national laws. In other words, the legal tools required to exercise this right are incomplete and require substantial revisions within Iran's legal system. At the international level, international environmental law, as an emerging field, has endeavored to encourage governments to adopt and uphold these rights by designing, formulating, and promoting concepts such as the citizen's right to a healthy environment. Despite these efforts, several fundamental problems hinder the implementation of international environmental laws on both national and global scales. These obstacles include conflicts of interest among governments, the short-term costs of environmental protection, the prioritization

of economic benefits over ecological considerations, and disagreements between developed and developing nations. While limitations and challenges exist regarding the right to a healthy environment at both national and international levels, several practical suggestions can help achieve and implement this right:

- Relocating polluting industries outside city limits.
- Decommissioning outdated and worn-out vehicles.
- Encouraging owners of old cars to replace them by ensuring the timely delivery of new vehicles.
- Prohibiting the production of non-standard vehicles by domestic manufacturers.
- Implementing odd-even traffic restrictions in Tehran based on license plate numbers.
- Establishing stricter penalties for violators of citizenship and environmental rights.
- Enforcing existing regulations and punishments outlined under citizenship rights.
- Expanding and modernizing Tehran's public transportation fleet.
- Creating job opportunities to reduce the number of passenger cars in Tehran.
- Enhancing public awareness through radio and television programs about citizenship rights.
- Distributing educational brochures to inform citizens about their environmental rights.
- Introducing and teaching the laws and regulations related to citizenship rights to citizens.

By addressing these recommendations, the implementation of the right to a healthy environment can be significantly advanced, both in Iran and globally.

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Author's Contribution

Conceptualization: Nima Aali, Ramin Maleki.

Formal analysis: Nima Aali.

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Competing Interests

The authors confirm that there is no competing interest for this research.

Ethical Approval

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc) have been completely observed by the authors.

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