



ENVIRONMENTAL POLLUTION AND ITS HEALTH IMPACTS ON THE COMMUNITY THE CITY OF NAJAF AS A CASE STUDY

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Abstract

Environmental pollution is considered one of the most prominent challenges facing modern societies due to its significant impacts on both human health and the environment. Environmental pollution includes air, water, and soil contamination, in addition to the accumulation of solid and liquid waste and industrial by-products, which leads to a wide range of health and environmental problems. Studies indicate that continuous exposure to environmental pollutants increases the likelihood of respiratory, dermatological, and gastrointestinal diseases, and negatively affects quality of life and public health. The city of Najaf, like other Iraqi cities, is exposed to varying levels of environmental pollution as a result of diverse industrial activities, the high density of vehicles, and the use of electrical generators, in addition to the lack of adequate infrastructure for waste management and sewage systems. These combined factors have contributed to an increased prevalence of environment-related diseases among the population, particularly among children and the elderly, making the study of the current state of environmental pollution and the analysis of its impact on health an urgent necessity to understand the magnitude of the problem and its consequences. Furthermore, environmental pollution in Najaf is not limited to a single aspect; rather, it involves interactions among air, water, soil, and waste, which complicates control efforts and increases the importance of field studies to assess the actual conditions on the ground. The field study in the study area reveals a lack of effective pollution management and proper waste management,



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contributing to the deterioration of the population's health and an increase in health problems. Therefore, studying environmental phenomena and assessing their health impacts is a crucial step in understanding the challenges facing the population in Najaf. This study also aims to establish a scientific framework for implementing measures to mitigate the effects of pollution on public health and the environment. The research comprises four sections: the first addresses the scientific methodology of the research; the second examines the theoretical aspects of environmental pollution in the study area; the third focuses on the practical aspects; and the fourth presents the most significant solutions and scientific conclusions reached by the researcher through the field study.

Section One: Scientific Methodology of the Research

First: Research Problem

The research problem was represented by the worsening of environmental pollution in the city of Najaf and the high rate of diseases related to environmental pollution, represented by air, water, soil pollution, noise pollution and other environmental sources that are widespread in the city, in addition to studying the sources of environmental pollution and health diseases in the city.

Second: Significance of the Research

This research achieves great importance as it shows the impact of environmental pollution on public health in the study area. Studies and field tours contribute to providing assistance to the competent authorities in developing effective policies to reduce pollution. The research also contributes to raising society's awareness of preserving the environment and trying to reduce pollution rates and methods of prevention.

Third: Research Objectives

The research aims to address one of the most important problems facing society, and to highlight the causes of pollution and its effects on the diverse forms of life in the geographical area, the city of Najaf was chosen for the purpose of application.



Fourth: Research Hypotheses

1-There is a direct relationship between air and water pollution in Najaf and the increased rates of respiratory, dermatological, and gastrointestinal diseases among the population.

2-Industrial areas and regions with high vehicle density record higher rates of pollution-related diseases compared to areas less exposed to pollutants.

3-The lack of infrastructure for waste management and sewage systems significantly contributes to the increased spread of gastrointestinal diseases among the population.

Fifth: Research Methodology

This research adopts the descriptive–analytical approach to examine the relationship between environmental pollution and the spread of health-related diseases.

Sixth: Research Limits

1- Human Limits:

The research is limited to the population of the city of Najaf, with a focus on the groups most affected by environmental pollution, such as children, the elderly, and residents of industrial areas and regions with high vehicle density.

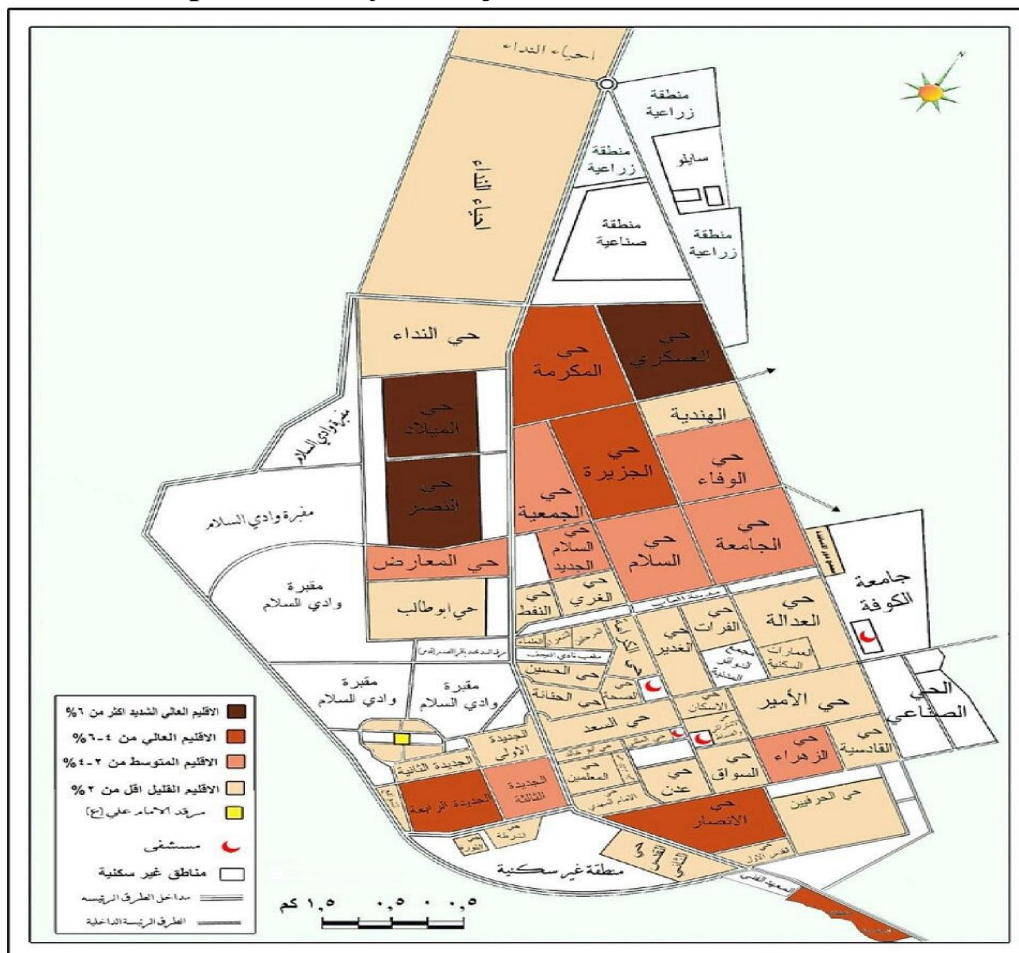
2- Temporal Limits:

This research was conducted during the time period extending from (1/9/2025) to (2026/9/1)

Spatial Limits: 2-

The research focuses exclusively on the city of Najaf, without extending to other Iraqi provinces, and includes various residential, industrial, and service areas within the city.

Administrative ap of the City of Najaf



Source: Al-Muzaffar, Safaa Majid Abdul-Sahib. (2017). Change in Residential Patterns in the City of Najaf and Its Impact on the Urban Environment (p. 429). University of Kufa, College of Arts.

Section Two: The Theoretical Framework of Environmental Pollution

First Axis: Environmental Pollution: Concept, Types, Sources, and Factors Influencing Its Spread

Environmental pollution is one of the most serious problems facing the world today, due to its direct impact on health. Alfred defines "diversity pattern" as any substance or energy introduced into the environment that leads to a change in its



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natural composition and a disruption in the diversity of the ecosystem, and more clearly on the organisms within the ecosystem. This concept also presents all forms of diversity of the components of the environment, whether (physical, chemical, or biological), with different results, in addition to natural laboratories. When the concentration of pollutants in air, water, or soil exceeds the naturally permissible limits, the environment becomes unable to absorb them, leading to environmental and health disturbances. In recent decades, industrial development, transportation, and modern agriculture have contributed significantly to the increased emission of pollutants, as many factories and vehicles rely on fossil fuels that release large quantities of toxic gases. In addition, population growth and urban expansion have led to increased waste generation and the pollution of water and air, making environmental pollution a global phenomenon that requires international coordination to mitigate its accelerating effects.¹

Second: Types of Environmental Pollution

The forms of environmental pollution vary depending on the source and nature of the pollutant. It can be classified into several main types as follows

1- Air Pollution

Air pollution is considered one of the most dangerous and widespread types of pollution. It results from the emission of toxic gases such as carbon dioxide, sulfur oxides, nitrogen oxides, lead, and fine particulate matter (PM_{2.5} and PM₁₀) from old vehicles, electrical generators, and factories. The World Health Organization indicates that air pollution causes the death of approximately seven million people worldwide, due to respiratory problems, asthma, heart disease, and other illnesses.²

¹ Abdul Rahman, Mohammed. (2021). Principles of Environment and Pollution. University of Baghdad – College of Environmental Sciences.

² World Health Organization (WHO). (2023). Air Pollution and Health Report. Geneva: WHO Press



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Water Pollution 2-

Water pollution occurs as a result of waste, whether industrial or solid. This leads to the accumulation of organic substances and heavy metals, posing serious threats to human health and aquatic life. Water pollution in developing countries is considered one of the main causes of the spread of intestinal diseases such as cholera and typhoid.

3-Soil Pollution

Soil pollution results from the excessive use of pesticides and chemical fertilizers, as well as the disposal of solid waste and industrial residues. This leads to the deterioration of soil fertility and the accumulation of toxins in agricultural crops, which poses a risk to human health when these crops are consumed.

4-Noise Pollution

Noise pollution refers to excessive sounds generated by transportation, factories, and electrical generators that exceed permissible limits. This type of pollution causes neurological and psychological problems, such as anxiety, sleep disturbances, and gradual hearing loss³. Studies indicate that air pollution is the most dangerous among all types of pollution due to its rapid spread and its direct connection to the human body through the respiratory system

Third: Sources of Environmental Pollution

The National Environmental Report issued by the Iraqi Ministry of Environment (2022) indicates that sources of environmental pollution can be classified into natural sources and human (anthropogenic) sources. This classification is considered one of the most important scientific foundations for analyzing the phenomenon of pollution and understanding the mechanisms of its spread in contemporary cities. It facilitates the identification of pollution patterns and methods of control by distinguishing between natural causes beyond human control and those resulting from direct human activities.

³ Ali, Hassan. (2020). Public Health and Environment. Al-Yazouri Scientific Publishing and Distribution House.



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1-Natural Sources

Natural sources of pollution are part of environmental processes that occur periodically, as they arise from natural phenomena that are difficult to control or fully mitigate. However, their effects are often temporary and not permanent, because the environment has the capacity for self-regulation and readaptation over time.

Among the most prominent of these sources are

- Volcanic emissions: During volcanic eruptions, large quantities of gases such as sulfur dioxide, carbon dioxide, and fine particulate matter are released into the air, causing short-term changes in the composition of the atmosphere
- Dust and sandstorms: These are recurrent phenomena in arid and semi-arid regions such as Iraq, particularly in the city of Najaf Al-Ashraf, which is affected by seasonal storms originating from the western desert. These storms lead to increased concentrations of suspended particles in the air, reduced visibility, and adverse effects on human health, especially respiratory diseases. These storms lead to an increase in the concentration of suspended particulate matter in the air, resulting in temporary atmospheric pollution and breathing difficulties among the population.
- Natural fires in forests and agricultural areas: These fires lead to the emission of gases and dense smoke, causing temporary air pollution and affecting the local climate. However, their effects do not last long due to the ability of vegetation cover to regenerate over time.

Although these sources are not the result of human activity, climate change caused by anthropogenic pollution has contributed to an increase in their frequency and intensity, making them more impactful today than they were in previous decades.

2- Human (Anthropogenic) Sources:

Human sources are considered the most dangerous and persistent, as they result from activities carried out by humans in the fields of industry, agriculture,



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transportation, housing, and energy. These activities are the main cause of ongoing pollution, due to their reliance on fossil fuels, chemicals, and non-compliance with environmental standards.

Among the most important of these sources are:

- Industrial activities: These include factories producing construction materials such as cement and iron, as well as petrochemical plants. They release large amounts of toxic gases and fine particulate matter into the atmosphere, and discharge industrial waste into soil and water without adequate treatment, causing long-term pollution.
- Agricultural activities: These involve the excessive use of pesticides and chemical fertilizers, which seep into the soil and groundwater, leading to chemical pollution that can reach humans through the food chain. Additionally, burning crop residues at the end of the season releases large amounts of smoke and harmful gases.

3-The Situation in Najaf Al-Ashraf City

⁴The city of Najaf faces significant environmental challenges due to population growth and the expansion of urban and commercial activities. One of the most serious environmental problems in the city is the emission of gases from privately owned generators, which run on fuel for long hours daily. This causes the release of large quantities of carbon monoxide, nitrogen oxides, and particulate matter into the air. These gases have serious health effects, particularly on the respiratory system, posing a significant risk to residents. Furthermore, haphazardly dumped waste is widespread in the outskirts of the study area, with waste being disposed of using rudimentary methods. This leads to increased levels of toxic gases in the atmosphere. Leaked wastewater also seeps into the soil and groundwater, causing significant pollution. Water pollution is another critical environmental problem in Najaf. Some sewage systems discharge untreated wastewater directly into

Iraqi Ministry of Environment. (2022). National Environmental Report in Iraq. Baghdad: Environmental Studies Department.⁴



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agricultural areas, resulting in water contamination. Over time, the health risks increase in densely populated neighborhoods and areas near waste sites and power generators.



Source: Field photograph of one of the private electrical generator sites and a waste dump in Najaf City, 2025.



Source: Field photograph of one of the private electrical generator sites and a waste dump in Najaf City, 2025



Second Axis: The Reality of Environmental Pollution in the City of Najaf Al-Ashraf

The city of Najaf Al-Ashraf is considered one of the Iraqi cities of major religious and urban significance. However, it currently faces a range of growing environmental challenges that have clearly affected the quality of air, water, and soil, in addition to noise pollution resulting from urban expansion and the excessive use of private electricity generators. This chapter aims to review the most prominent forms of environmental pollution in the city, clarifying their sources and their impacts on human health and the environment.

Air Pollution in the City of Najaf

Air pollution is considered one of the most dangerous types of pollution facing the city of Najaf. Field studies indicate a clear increase in the concentrations of fine particulate matter (PM_{2.5} and PM₁₀), which primarily result from emissions produced by old vehicles and privately operated electricity generators widely spread across most residential neighborhoods, in addition to smoke generated from the burning of waste and industrial residues. The results of a field study on the main sources of noise pollution in residential areas of Najaf revealed that air pollution is closely intertwined with noise pollution, as private generators represent a dual source of gaseous pollutants and noise simultaneously. The severity of air pollution lies in its direct impact on human health, as continuous exposure to polluted air leads to chronic respiratory diseases such as asthma and bronchitis, in addition to cardiovascular diseases. It also contributes to increased rates of allergies and eye irritation. Health impacts become more severe during the summer and autumn seasons due to dry climatic conditions and frequent dust storms, which increase the accumulation of suspended particles in the air⁵.

⁵ Bahrani, H. S. M. (2009). A field study on the main sources of noise pollution in residential neighborhoods in the city of Najaf. Al-Qadisiyah Journal for Engineering Sciences, 2(4). College of Engineering, University of Kufa



Water Pollution in the City of Najaf

The city of Najaf suffers from severe problems related to water quality, both in terms of bacterial and chemical contamination, as a result of the interaction of several environmental and administrative factors. Field reports have shown that drinking water in some neighborhoods contains high levels of coliform bacteria (*E. coli*), which indicates contamination by untreated sewage. This problem is exacerbated by the deterioration of water distribution networks and the aging of pipelines, allowing pollutants to infiltrate the system, especially in areas experiencing low water pressure. Furthermore, the discharge of domestic and industrial waste into river channels and nearby water bodies contributes to the deterioration of groundwater quality. Reports titled “Warnings of Drinking Water Contamination in Three Iraqi Provinces” caution that the continuation of this situation may lead to the spread of intestinal diseases and food poisoning among residents, particularly children and the elderly. In light of the limited availability of environmental treatment projects, Najaf’s water remains vulnerable to continuous pollution, which necessitates the adoption of effective policies for health monitoring and regular water quality⁶ surveillance. Water plays a vital role in human health; however, its contamination has become a major concern in Najaf, especially in areas such as Bahr Al-Najaf⁷.

Sources:

1. Untreated Sewage

Sewage flows into rivers and water surfaces, posing a serious problem that often goes unnoticed and compromises water purity. Both modern and older areas are more prone to this problem than other areas due to inadequate sewage infrastructure. The entry of bacteria, parasites, and viruses into drinking water

⁶ Al-Kubaisi, S. (2025, September 4). Warnings of drinking water contamination in three Iraqi provinces. *Al-Araby Al-Jadeed*. <https://www.alaraby.co.uk/society>

⁷ Al-Khafaji, A. J., Alattabi, A., Jassim, Y., & Sadooni, F. Oil-polluted groundwater in central and west Iraq as indicator of potential new hydrocarbon plays. *Petroleum Science and Technology*, 2023. Web . (<https://www.tandfonline.com/doi/abs/10.1080/10916466.2023.2209122>)



leads to the spread of intestinal diseases such as diarrhea and food poisoning, and can also impact the mental and physical development of children⁸.

2. Industrial and Domestic Waste

Chemical, industrial, and domestic waste contributes to the contamination of groundwater and rivers, with accumulation of heavy metals such as lead (Pb), cadmium (Cd), and mercury (Hg) being regularly observed. Long-term exposure to these pollutants can cause chronic poisoning and disorders of the nervous system, kidneys, and liver, in addition to negative effects on the health of future generations⁹.

Health Effects of Water Pollution:

Increased rates of intestinal diseases, diarrhea, and food poisoning.*

Higher risk of chronic diseases resulting from heavy metals.*

Impacts on children's mental and physical growth.*

* Increased likelihood of premature births and congenital malformations in pregnant women¹⁰.

Soil Pollution in the City of Najaf Al-Ashraf

Soil in the city of Najaf is among the most environmentally exposed components to pollution due to increasing human, agricultural, and industrial activities. The soil in Najaf is among the most environmentally vulnerable to pollution due to human activity and increasing industrial agriculture. Agricultural technologies and pesticides were rapidly introduced in very large quantities. The gases released from burning solid waste, along with the high humidity, seep into the air, and the ash settles into the moisture, causing pollution. This pollution, which is caused by both overproduction and shortages of vegetables, poses a chronic health risk

⁸ Al-Saadawi, S. (2022). Water Pollution and Public Health Risks in Iraqi Urban Areas. *Environmental Health Journal*, 19(2), 101–118.

⁹ Al-Janabi, Environmental Pollution in Iraq

¹⁰ Siddiqua, 2022



due to the prevalence of contaminated food. The Quality of Water Used for Irrigation.¹¹

Agricultural areas in the study area containing highly contaminated, stubborn metals such as lead and other metals pose a significant health risk. These metals enter the soil through the intensive use of chemical pesticides and fertilizers, in addition to leakage of industrial pollutants. When crops cultivated in such soil are consumed, heavy metals can accumulate in the human body, causing chronic health problems such as kidney failure, disorders of the nervous system, and cardiovascular diseases. A study published in 2025 revealed that heavy metal levels in the soil of certain areas of Najaf exceed safe limits, which necessitates the implementation of measures to reduce health risks and rehabilitate agricultural lands.¹²

Health Effects of Soil Pollution:

- Accumulation of toxins in daily food intake and increased risk of chronic diseases and cancers.
- Negative impacts on food quality and the health of future generations.
- Increased likelihood of health problems such as skin disorders and nervous system disturbances¹³.

Sources of Soil Pollution

1- Random Waste Dumps

The leakage of organic and chemical substances into the soil due to unregulated waste disposal leads to the deterioration of agricultural land fertility and renders crops unsafe for consumption, thereby increasing human exposure to foodborne pollutants¹⁴.

¹¹ Rasool, I. T. (2023). The hazards of soil pollutants on human health. Master's thesis, College of Science, University of Kufa.

¹² Al-Hassnawy, S. H. H., & Al-Abbasi, F. S. S. (2024). A study of environmental pollution in some areas of the city of Najaf for some heavy metals. Research & Reviews: Journal of Ecology, 13(02), 14-23:.

¹³ World Health Organization (WHO). (2021).

¹⁴ European Environment Agency (EEA). (2025). Soil Pollution in Urban and Industrial Areas: Assessment and Mitigation. Copenhagen: EEA Publications. :<https://www.eea.europa.eu/publications/soil-pollution-urban-industrial>



2- Industrial Waste

The disposal of chemical substances near agricultural lands or rivers results in the accumulation of heavy metals and organic pollutants in the soil. The consumption of products grown in these areas increases the risk of chronic diseases, cancer, and other health disorders¹⁵.

Noise Pollution in the City of Najaf Al-Ashraf

Noise pollution represents one of the prominent environmental issues in the city of Najaf, particularly in densely populated residential neighborhoods and areas close to markets and commercial centers. The main sources of this type of pollution include the widespread use of private electricity generators due to shortages in the national power supply, in addition to heavy traffic, blacksmith and carpentry workshops, and ongoing construction activities. A study on the impact of noise pollution on the Iraqi environment indicated that noise levels in some areas of Najaf exceed internationally permissible limits (65 decibels), resulting in various health effects, most notably sleep disturbances, anxiety, chronic headaches, and reduced concentration, as well as long-term impacts such as high blood pressure and hearing problems. The disease has not only affected humans but also the surrounding environment, where it has a significant impact on animals and birds, and reduces the quality of life in urban areas. For this reason, experts need to implement unified regulatory policies regarding the use of generators in residential neighborhoods and encourage investment in clean energy sources and silent electrical alternatives.¹⁶

It is evident from the foregoing discussion that the city of Najaf Al-Ashraf is facing a multifaceted environmental crisis that includes air, water, soil, and noise pollution. These interrelated factors collectively affect human health and the quality of the urban environment. Studies confirm that the continuation of these conditions without effective intervention will lead to serious environmental and

¹⁵ Al-Hassnawy, H., & Al-Abbasi, M. (2025). Heavy Metals Contamination in Agricultural Soils in Iraq and Associated Health Risks. *Iraqi Journal of Environmental Sciences*, 12(1), 55–73

¹⁶ Al-Shammari, H. M. H., & Ali, M. J. M. (2009). A study of the impact of noise pollution on the Iraqi environment: A field study in the city of Najaf Al-Ashraf. College of Arts, University of Kufa.



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health deterioration in the near future. Accordingly, improving environmental management, activating local legislation, and monitoring pollution sources constitute essential steps toward building a healthy and sustainable city that preserves its religious and cultural significance. Noise pollution in Najaf, resulting from traffic movement, electricity generators, and industrial activities, directly affects the psychological and physical health of residents. Recent studies have shown that continuous exposure to high noise levels increases stress and anxiety, leads to sleep disorders, and reduces concentration and productivity. Moreover, chronic exposure to noise raises the risk of hypertension and cardiovascular diseases, placing residents at multiple health risks.¹⁷

Sources:

1- Vehicles and Generators

Continuous and high noise levels in residential areas near roads and electricity generators contribute to increased blood pressure, sleep disturbances, and reduced concentration and productivity¹⁸.

2- Industrial Activities

Noise generated by factories and workshops, including waste crushing operations and landfill-related activities, produces persistent disturbing sounds that affect residents and increase levels of stress and psychological anxiety¹⁹.

* Sleep disorders and increased levels of psychological stress.

* Heart disease and chronic illnesses such as high blood pressure, heart disease, and others in the long term.²⁰

¹⁷ Al-Hakkak, Z. M., & Al-Maraashi, D. M. (2023). Study effect of noise pollution from electric generators on human health in Al-Najaf Al-Ashraf City. *Al-Kut University College Journal, Special Issue for Researches of the 1st International Conference for Health and Medical Specialties*, 50-59 :https://js.uokut.edu.iq/article_23960.html

¹⁸ Al-Hakkak, A. (2024). Noise Pollution and Its Effects on Human Health in Urban Iraqi Cities. *Baghdad Environmental Studies*, 8(2), 33–50

¹⁹ IOM Iraq. (2023). *Environmental Health and Urban Noise Exposure in Iraqi Cities*. International Organization for Migration, Iraq Mission Report [.https://iraq.iom.int/reports](https://iraq.iom.int/reports)

²⁰ Al-Hakkak, 2024



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Chapter Three: The Practical (Applied) Aspect

This research project, conducted at a low cost to the community in Najaf, focused on a simple, practical study of environmental pollution. The study began by developing and distributing a questionnaire to residents in various parts of the city to gather information about the extent of pollution in the study area. The questionnaire aimed to assess people's awareness of the most prevalent pollutants in their environment and how to protect it, such as airborne contaminants, solid viruses, and noise pollution, as well as to identify the health problems associated with these factors. The project also included collecting detailed data to help understand the nature of the problem more clearly. Participants were asked about their observations of perspiration in residential areas and its impact on others. This information provided a general picture of the level of environmental pollution from the perspective of the research community, as they are the most exposed to these phenomena. After collecting the questionnaires, the responses were compiled and analyzed to determine the relationship between environmental pollution and its potential health effects. This analysis aimed to identify the most prevalent airborne problems and to gauge the community's awareness of the importance of protecting the environment from pollution sources. This important part of the research involves understanding the environmental reality, with the aim of presenting and discussing the results. The questionnaire covered key themes, including manifestations of environmental pollution in the city, residents' awareness of its risks, its impact on their health and daily lives, and their proposed solutions to reduce this phenomenon. The researcher also relied on direct field observation through visits to specific sites within the city, such as industrial areas, waste disposal sites, fuel stations, and private generators, in order to practically monitor various sources of pollution. Additionally, personal interviews were conducted with several employees working in the environmental, health, and municipal departments in Al-Najaf to obtain further information about the measures taken to address environmental pollution in the city, aiming to reach a comprehensive and accurate analysis of the environmental and health reality in Al-Najaf Al-Ashraf.



Field Study Results

1- The extent of residents' awareness of the environmental pollution problem:

Level of Awareness	Number of Individuals	Percentage
High	48	40%
Moderate	54	45%
Low	18	15%

Source: Prepared by the researcher based on the results of the field questionnaire in the city of Al-Najaf Al-Ashraf, 2025.

The table shows that the majority of the residents of the city of Najaf have a **moderate level of awareness** of the environmental pollution problem (45%), which indicates a general knowledge of the existence of the problem without a deep understanding of its causes or health impacts. The overall awareness rate was 40%, a high percentage indicating that the study community is more aware and capable of reducing environmental pollution. Conversely, the low awareness rate was only 15%, reflecting a degree of intellectual deficiency within some segments of the community. The survey results also revealed that while educational awareness exists in Najaf, it needs to be strengthened through awareness campaigns and educational initiatives aimed at reducing violence and shifting public attitudes towards more effective.

2- Sources of environmental pollution in the study area:

Source of Pollution	Number of Responses	Percentage
Private electric generators	87	72.5%
Traffic congestion and vehicle emissions	92	76.6%
Solid waste and landfills	65	54.1%
Small factories and fuel stations	43	35.8%
Sewage water	51	42.5%

Source: Prepared by the researcher based on the results of the questionnaire and the analysis of field data, 2025.



The results in the table above show that traffic congestion and its resulting emissions are among the most significant sources of pollution in Najaf, accounting for 76.6%. This reflects the impact of traffic within the city. Private generators came in second place at 72.5%, due to residents' reliance on them for electricity. Solid waste dumps followed at 54.1%, then sewage at 42.5%, and finally small factories and gas stations at 35.8%. These results also indicate that a number of daily activities contribute significantly to the high pollution levels in Najaf.

3-The impact of pollution on public health from the perspective of residents:

Type of Health Pollutant	Number of Responses	Percentage
Respiratory diseases (allergies, asthma, chronic cough)	79	65.8%
Skin diseases and irritation	48	40%
Headache and general fatigue	56	46.6%
Does not feel a direct effect	12	10%

Source: Prepared by the researcher based on the data from the field questionnaire distributed to a sample of residents of the city of Najaf, 2025.

The table results indicate that **respiratory diseases** represent the most prominent health effects resulting from environmental pollution in the city of Al-Najaf Al-Ashraf, accounting for **65.8%** of participants' responses, reflecting the direct impact of air pollution caused by private generators and vehicle exhaust. **Skin diseases and irritation** ranked second at **40%**, often linked to water and soil pollution and residents' exposure to chemicals and environmental waste. The results also showed that **headache and general fatigue** accounted for **46.6%** of the sample's responses, indicating the psychological and physical effects resulting from noise and deteriorating air quality. Meanwhile, the proportion of respondents who **did not feel a direct impact** from pollution was limited to **10%**, indicating that approximately 90% of residents suffer to varying degrees from health problems related to environmental pollutants. This underscores the



severity of the environmental situation in the city and the urgent need for effective solutions to mitigate these effects.

4- The impact of environmental pollution on public health:

Assessment Level	Number of Individuals	Percentage
Very effective	10	8.3%
Somewhat effective	25	20.8%
Moderately effective	38	31.7%
Weak	35	29.2%
Completely ineffective	12	10%

Source: Field questionnaire conducted by the researcher among a sample of residents of Al-Najaf Al-Ashraf (2025).

The table results show that respiratory diseases were the most common, at 65.8%, which may be linked to the prevalence of vehicle and generator emissions. The responses also indicated cases of headaches and physical fatigue at 46.6%, in addition to some skin diseases and allergies at 40%. Only a small percentage (10%) reported no direct health effects, indicating that most of the population is affected to some extent by the surrounding environmental conditions.5 Distribution of diseases related to environmental pollution in Najaf.

5- Distribution of disease rates resulting from environmental pollution in the study area:

Type of Disease	Number of Cases	Percentage	Notes
Asthma	28	23.3%	Concentrated in areas near landfills and generators
Respiratory allergies	35	29.1%	More common among children and the elderly
Chronic cough	21	17.5%	Associated with air pollution and traffic congestion
Skin irritation	32	26.6%	Appears more in industrial areas
Skin infections	19	15.8%	Caused by contact with waste or sewage water
Frequent diarrhea	14	11.6%	Linked to water and sewage pollution



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Source: Prepared by the researcher based on the results of the questionnaire, interviews, and field observations, 2025.

Data indicates that pollution in Najaf significantly impacts the health of its residents. Respiratory allergies were the most prevalent, affecting 29.1% of the population, followed by skin allergies at 26.6%, asthma at 23.3%, and chronic cough at 17.5%. These conditions are often linked to air pollution from generators, traffic congestion, and solid waste, particularly affecting children and the elderly. Skin problems are more common among residents living near industrial areas or where waste, refuse, and untreated sewage are present. Frequent diarrhea, affecting 11.6% of the population, is attributed to water pollution and inadequate sanitation. These findings highlight the city's need to improve air and water quality, prioritize sanitation, and conduct health awareness campaigns to reduce environmentally related illnesses.

Chapter Four: Results and Recommendations

First: Results

1. There is a large influx of waste, whether from industrial waste or solid waste dumps, and its impact on residents living near these areas.
2. Carbon dioxide emissions from vehicle exhaust, factories, and generators, including sulfur monoxide, carbon dioxide, nitrogen oxides, and particulate matter, are present.
3. A severe shortage of service equipment, coupled with a low number of workers in the area, leads to waste accumulation in several parts of the city.
4. Residents living near main roads and industrial waste dumps suffer from respiratory illnesses, including bronchial allergies, coughs, and asthma. This is caused by the spread of particulate matter and particulate matter in the air.
5. A gradual lack of awareness among certain segments of the population regarding proper waste disposal practices leads to increased pollution levels. Examples include indirect waste disposal or the dumping of solid waste in the streets.



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6- Through the study, we have concluded that the city of Najaf is experiencing a significant increase in water pollution due to poor sanitation and the city's need to improve water quality, in addition to health awareness, which contributes to pollution.

Second: Recommendations

1. The researcher believes there are no specialized direct motors for troubleshooting minor problems and that there is a need for a technical staff with the scientific and practical skills to address all environmental issues, both now and in the distant future.
2. It is essential to establish new sanitary landfill sites for solid waste, located far from residential areas and water sources
3. Various types of swimming pools should be provided to workers and factories that violate plastic safety standards, with zero tolerance for violations, while prioritizing environmental protection.
4. The number of service sectors and the workforce should be increased, and solid waste in the areas should be reduced.
5. Efforts should be made to raise awareness within the community about environmental issues through educational programs and by significantly increasing the role of the press.

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