

THE EFFECTS OF WATER AND AIR POLLUTION ON THE ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

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Abstract:

Water and air pollution are significant environmental issues with major impacts on sustainable development, particularly in the current era and within the international community as a whole. This importance stems from the inherent value of the ecological system, as well as the risks posed by growing amounts of solid and liquid waste on land and at sea, and the spread of environmental pollution in many countries over time. The inability of nations to confront these dangers, which have surpassed all expectations, has resulted in a situation where waste accumulation, deforestation, environmental crimes and a lack of water and air security are commonplace. These issues directly impact food security, which in turn threatens human health.

Therefore, all forms of pollution are among the greatest dangers faced by nations and governments today, exacerbated by the increasing assault on the environment. Rising pollution rates have reached alarming levels that threaten all life, adversely affecting health, food security, economic stability and water resources. Consequently, environmental pollution in its various forms poses a threat to the environment and hinders the achievement of sustainable development in all its dimensions. This situation violates the fundamental human right to a clean environment.

As the ecological system is a shared heritage of humanity, it must be preserved, as it is essential for human life and that of other living beings. Water and air pollution have numerous health consequences for humans and other living creatures, especially in the current technological age where threats to water, food, and health security are prevalent and impede sustainable development. The pertinent question that arises is: What is environmental pollution, what are its main types, and what risks does it pose to sustainable development?

Keywords: water pollution, air pollution, environment, sustainable development.

Introduction:

The environment is the surrounding medium in which humans live and adapt to natural conditions. Humans influence and are influenced by natural circumstances and the surrounding elements of water, air and soil. These elements are collectively referred to as environmental elements within the framework of Algeria's 2003 Environmental Law and other environmental legislation across various countries.

Despite the diverse regions of nations, the environment is singular, and any impact or pollution in one nation's environment will inevitably affect other countries. Environmental pollution is a transnational crime that transcends borders and spreads at lightning speed. This fact necessitates a rapid response to mitigate its catastrophic effects.

Humans today inhabit a new environmental reality, characterised by a decline in clean air and healthy food. We are surrounded by waste accumulation and the random felling of ancient trees, with pollution directly threatening human health in the form of land, air and water pollution.

Throughout history, humans have striven to adapt to harsh natural conditions and confront dangers that threaten their lives. Humanity's journey began with the discovery of agriculture and fire, followed by the Industrial Revolution and other advancements. In their quest to meet their basic needs, humans began cutting down trees for warmth, marking the first impact they had on the environment. Human encroachment on nature has proliferated in various fields as human activities have expanded across land, sea and air, leading to a polluted world that threatens life in many ways. This pollution is legally considered a crime that requires punishment in order to protect the environment, which is a fundamental human right under both national and international environmental law.

As environmental crimes are classified as transnational crimes, the negative impact is not confined to a specific geographical area or a single state. Due to the severity of environmental pollution, which has reached alarming levels, the international community is sounding the alarm over the threat to life on Earth.

The World Health Organization asserts that approximately 90% of the world's population dies from breathing air contaminated with pollutants that exceed acceptable clean air levels¹. The importance of this article therefore lies in the following points:

The environment is vital for human life and that of all living beings on land, at sea and in the air. It is a shared heritage of humanity, both ancient and modern civilisations, and future generations.

The environment is considered a human right and is subject to significant legal protections under international environmental law and its various branches, both nationally and internationally. Therefore, in cases of environmental violations and degradation, it is essential to establish international criminal and civil liability alongside national legal obligations.

In the modern technological age, humans face severe risks from various types of pollution, especially air pollution, which directly impacts lung health. At best, it leads to serious respiratory diseases such as asthma and various skin disorders.

Water security is jeopardised by the dumping of solid and liquid waste into the sea, which exacerbates pollution due to the direct relationship between these types of environmental pollution and soil contamination². This means that diseases can be transferred directly to humans by consuming plants grown in contaminated soil, particularly radioactive soil.

In light of the foregoing regarding the importance of this topic, we have chosen the following principal issue:

Main issue:

What is environmental pollution, and are water and air pollution the most dangerous types? What risks do they pose to the environment and sustainable development?

Outline of the topic:

To address the previous issue, we will follow the plan below:

First Axis: Environmental Pollution and Its Types

Second Axis: The risks of environmental pollution on the environment and sustainable development.

First Axis: The Concept of the Environment and Types of Environmental Pollution

In this section, we will explore the definitions of the environment and environmental pollution.

¹ - <https://www.ccacoalition.org/ar/news/world-health-organization-releases-new-global-air-pollution-data>.

² - Yazı Bosak and Mjdhan Mohammed, 'Water Security: A Study of the Evolution of the Concept and Its Importance', 'Journal of Law and Political Science', Faculty of Law and Political Science, Khenchela University, Vol. 9, No. 2, 2022, p. 1125.

First: Definition of the Environment (Linguistically and Terminologically):

The environment can be defined as the place of residence³, habitat or home, as can be inferred from various verses in the Holy Quran. Terminologically, it is the physical space in which humans live, encompassing surrounding elements such as water, air, soil, space, living organisms and facilities that satisfy human needs⁴. In other words, it refers to all the natural, material and artificial conditions that surround us and have been impacted by human intervention.

Several definitions of the environment exist, including scientific perspectives from biology, physics and the material sciences, as well as legal definitions, all of which are pertinent to this article. According to the 1972 Stockholm Conference, the environment is defined as ‘the stock of material and social resources available at a given time, serving as a space to satisfy human needs and aspirations’⁵. This encompasses the physical and chemical systems in which humans live, with these components forming an interrelated biological system that supports human life and that of other organisms on Earth⁶.

Environmental pollution is defined as ‘the immediate or future damage affecting any element of the environment resulting from human activities, both natural and artificial, or natural phenomena, manifesting as a disruption in ecological balance’⁷.

Secondly, environmental pollution is defined as follows:

Environmental pollution is defined as the alteration of the nature of an object, material or living element, leading to its contamination and modification. This means the presence of an external substance that alters its quantity, colour, taste, or physical and chemical properties, thus rendering it unnatural and harmful to human and animal health⁸.

Environmental pollution is also defined as ‘the direct or indirect discharge of materials, vapours, heat and noise into the external atmosphere resulting from human activities, which leads to damage to the Earth’s atmosphere and harms properties, water resources and natural resources’⁹.

Third: definition of environmental harm:

Due to the diversity of their causes, circumstances, influencing factors and location of occurrence, there are many types of environmental harm. If pollution occurs in the air, it is termed air pollution; if it occurs in the soil, it is referred to as land pollution; and if it occurs in the sea, it is classified as marine or water pollution. Regardless of the type, they are all dangerous and destructive to the environment and humans.

We can define environmental harm resulting from pollution as ‘the immediate or future damage affecting any element of the environment resulting from human activities — both

³ Majid Ragab Al-Hallou, *Environmental Protection Law in Light of Legislation*, Dar Al-Jamia Al-Jadida, Egypt, 2018, p. 73.

⁴ Majid Ragab Al-Hallou, 'Environmental Protection Law in Light of Legislation', Dar Al-Jamia Al-Jadida, Egypt, 2018, p. 74.

⁵ Najm Al-Azawi and Abdullah Hikmat Al-Naqar, *Environmental Management*, Dar Al-Masira, Jordan, 2007, p. 94.

⁶ Najm Al-Azawi and Abdullah Hikmat Al-Naqar, 'same reference', same page.

⁷ Ahmad Mahmoud Saad, *Survey of Civil Liability Rules in Environmental Pollution Disputes*, 1st edition, Dar Al-Nahda Al-Arabiya, 1994, pp. 61–65.

⁸ Majid Ragab Al-Hallou, *Environmental Protection Law in Light of Legislation*, Dar Al-Jamia Al-Jadida, Egypt, 2018, p. 75.

⁹ Najm Al-Azawi and Abdullah Hikmat Al-Naqar, *Environmental Management*, Dar Al-Masira, Jordan, 2007, p. 102.

natural and artificial — or natural phenomena, manifesting as a disruption to the ecological balance, whether originating within or outside the polluted environment'¹⁰.

Second Axis: Types of Environmental Pollution:

There are several types of pollution, including:

First: Land pollution (waste):

Land pollution is defined as 'the contamination or alteration of the ecological characteristics of the land due to waste or polluting materials that disrupt its natural state and change its nature'. Waste, especially household and medical waste, is considered the largest pollutant on land in all countries. Pollutants from facilities classified as nuclear energy producers, whether for peaceful or military purposes, are also significant contributors. The Mediterranean Protection Agreement defines it in Article 1 as 'pollution resulting from discharges from rivers, coastal installations or other land-based sources'¹¹.

Second: air pollution:

Air pollution is considered the second most dangerous type of pollution because oxygen plays an essential role in sustaining life for humans and other living beings. There is no life without oxygen. Consequently, air pollution is extremely hazardous because it affects not only the national environment, but also the environments of other countries — it is one of the transnational crimes. Due to its severity, the international community has concluded several international agreements to address the risks it poses, including the United Nations Framework Convention on Climate Change. The 1992 Rio Conference also paved the way for the international community to recognise escalating environmental issues¹².

The United Nations also contributed to the 1979 establishment of the Convention on Long-Range Transboundary Air Pollution, designed to protect the atmosphere from widespread pollution¹³.

Thirdly, there is physical pollution, nuclear pollution and oil pollution.

These types of pollution are considered to be among the most dangerous on Earth due to the risks associated with nuclear fission and the advanced technology involved. Nuclear radiation poses an extreme health and environmental risk. Nuclear weapons and other weapons of mass destruction are among the most dangerous inventions in human history¹⁴, as they threaten to destroy all aspects of civilisation and pave the way for nuclear proliferation worldwide.

Fourth: water pollution and oil pollution:

Water pollution refers to the presence of pollutants in water, which increases the concentration of one of its components in an unnatural way — that is, the presence of liquid waste in drinking water or water intended for irrigation. Oil pollution is particularly harmful to the environment, especially marine ecosystems, as ships discharge their cargo into the sea

¹⁰- Ahmad Mahmoud Saad, 'Survey of Civil Liability Rules in Environmental Pollution Disputes', 1st edition, Dar Al-Nahda Al-Arabiya, 1994, p. 61.

¹¹- Hosam Mohammed Sami Jabir, Environmental Crime, Dar Al-Kutub Al-Qanuniyya, Egypt-UAE, 2011, p. 68.

¹²- Amir Taraf, Environmental Pollution and International Relations, 1st edition, University Foundation for Studies and Publishing and Distribution, Lebanon, 2008, p. 37.

¹³- Abdelaziz Meikhemar Abdelhady, International Legal Action Against Atmospheric Pollution, State Doctorate Thesis, Jean Moulin University, Lyon, 1981, pp. 583–590.

¹⁴- Toufik Ataallah, International Humanitarian Law, Legal Library Foundation and Ibn Al-Nadim, Algeria, 2024, p. 188.

every day, threatening fish stocks and causing environmental contamination.

This necessitates the establishment of international responsibility.

Fifth: biological pollution:

This refers to the use of bacteria and viruses to attack ecosystems. These living organisms are extremely toxic and lethal, and have the ability to destroy ecosystems. They have been used multiple times in wars and armed conflicts¹⁵. Notably, the SARS-CoV-2 virus caused global paralysis for nearly four years, resulting in the loss of thousands of lives, particularly in 2020 and 2021.

Next, we will examine the risks that environmental pollution poses to the environment and sustainable development.

Third Axis: The Risks of Environmental Pollution on the Environment and Sustainable Development

We summarise these risks as follows:

- The proliferation of solid, liquid and gaseous waste, which has a negative impact on all state sectors.

- Threats to water and food security, which affect health and human security. For example, Jordan suffers from severe shortages of drinking water.

- Depletion and exhaustion of natural water resources and scarcity of natural resources, especially water and both conventional and renewable energy¹⁶, are also issues. This poses a threat to human security in general given the vital importance of water to all living beings.

Excessive emissions of gases, particularly dangerous carbon dioxide, create a greenhouse effect that threatens life on Earth with complete destruction, leading to various diseases related to the heart, intestines, nausea and skin conditions.

A decline in sustainable development rates and stagnation of the national economy occurs when all funds are consumed in the provision of potable water, as well as the emergence of international disputes over water, as has occurred between Egypt and Ethiopia.

Disruption to the entire ecosystem due to global warming, climate change, earthquakes, floods and rising sea levels is causing the world to fear environmental disaster.

- Pollution rates are increasing at alarming levels in both volume and severity, especially in the technological age, threatening our survival on this planet. If immediate action is not taken to protect the shared environment, this urgency could lead to the extinction of humanity.

- Deterioration in economic and social development levels; the emergence of drought and poverty; lack of access to clean drinking water; widespread waste; deforestation; marine pollution; violations of future generations' rights to sustainable development; and failure to achieve the goals of the 2030 United Nations Conference and its associated plans.

- A decline in the percentage of countries benefiting from clean water for drinking and irrigation, as well as from exports, particularly of desalinated seawater or dam water, especially in international rivers¹⁷, leading to disputes between upstream and downstream countries in exclusive economic zones, in accordance with the 1982 Law of the Sea Convention.

Conclusion:

¹⁵- Najm Al-Azawi and Abdullah Hikmat Al-Naqar, previous reference, p. 106.

¹⁶- Mouna Tawahiriya and Ahmad Shatarbash, 'Water Resource Management Strategy: A Challenge for Sustainable Development in Algeria', *Algerian Journal of Public Policy*, Vol. 4, No. 2, 2016, p. 56.

¹⁷- Yazi Bosak and Mjhdhan Mohammed, 'Previous reference', p. 1137.

Environmental pollution is one of the most significant threats to life. It constitutes a global crisis with multiple risks and causes that affect all nations, as well as terrestrial, marine and atmospheric areas. It endangers the health and security of humans, plants and animals, and undermines the foundations of economic and social development, particularly food security.

As a clean environment is a fundamental human right, it is crucial to identify and address the causes of pollution, enhance environmental governance, and combat environmental degradation. The right to a clean and healthy environment is intertwined with the preservation of water and natural resources for current and future generations in order to achieve the United Nations' sustainable development goals by 2030.

Based on the above, we reach the following conclusions:

1. The importance of water and air security and the dangers of water and air pollution, including their direct impact on human health and life.
2. Water is the lifeblood and economic artery of all nations.
3. The increase in environmental pollution in various forms, such as land, marine and water pollution, in almost all countries to varying degrees.
4. A lack of awareness among individuals of the dangers of environmental encroachment, such as dumping waste in the sea, cutting down ancient trees indiscriminately, and burning forests, necessitates an increase in environmental awareness within society as a whole.
5. Water pollution indicates a lack of water security, which affects health security and can lead to deadly diseases and epidemics, such as the current global pandemic of Coronavirus (Covid-19).
6. Severe impacts on food security, such as inadequate or contaminated food supplies in many countries, pose obstacles to nations achieving sustainable development.
7. Environmental crimes are increasing due to technological and scientific advancements achieved by humanity.

Recommendations:

It is essential to combat the depletion of water and natural resources by adhering to international environmental quality standards and activating environmental governance to enhance water and food security. This approach strengthens health and human security by following the guidelines set by international organisations and environmental management systems in all countries, while rejecting international and national disputes, particularly those relating to water, as it is a vital natural resource for the continuity of life and the human species. This approach encourages dialogue. Water must be preserved and kept away from disputes in all cases, whether in times of peace or during wars and armed conflicts. The construction of dams and seawater desalination plants is also essential, as demonstrated by Algeria's recent inauguration of seven desalination plants. Promoting a green economy is another key recommendation. Judicial authorities also play a crucial role in punishing those who violate environmental rights and in combatting pollution of any kind.

Strengthen legislative protection for water and air to enhance the foundations of sustainable development, in accordance with the United Nations' plan extending to 2030.

Adopt safe sewage disposal methods that meet global standards to improve human health and security.

Embrace green economy technology and renewable energy sources to reduce reliance on environmentally harmful, dangerous and expensive traditional energy sources like fossil fuels.

to foster international partnerships in renewable energy, such as the Algerian-German partnership in the Desertec project, which exploits solar energy in the Algerian desert. Algeria is one of the world's richest countries in terms of solar energy. This opens up broad prospects for sustainable development and achieving social well-being for the entire population.

Enhance international cooperation to combat water and energy scarcity, supporting developing countries in the process, as environmental degradation in one area inevitably affects others.

Promote the sustainable use of water and natural resources and advocate fair and equitable sharing of natural resources within the exclusive economic zone among all countries while preserving global biodiversity as a fundamental human right.

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