
The Risks of Environmental Pollution on the Human Health and Environmental System in Light of Urban Expansion

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Abstract

Our study sought to identify the major risks posed by environmental pollution to human health. It focused on various aspects, such as forms, factors, and sources, with the aim of highlighting its most alarming effects on the world. Together these elements pose a major threat to the health systems of humans and nature, with all their components today. With uncontrolled urban expansion and the absence of effective measures to protect the planet, the environment, humans, and public spaces, numerous risks have resulted that threaten humans and living organisms and portend future natural disasters unless society recognizes these risks and seeks to reduce and address them for a clean and safe planet for all.

Keywords: Risks - Pollution - Environment - Health - Urbanization.

ملخص

سعت دراستنا إلى تحديد المخاطر الرئيسية التي يُشكّلها التلوث البيئي على صحة الإنسان. اذ ركّزت على جوانب عديدة الأشكال والعوامل والمصادر، المتعلقة بها بهدف تسليط الضوء على آثاره الأكثر إثارة للقلق للعالم. بحيث تُشكّل هذه العناصر مجتمعةً تهديدًا كبيرًا للأنظمة الصحية للإنسان والطبيعة بكل مكوناتها اليوم. ومع التوسع العمراني غير المنظم، وفي ظلّ غياب التدابير الفعّالة لحماية كوكب الأرض والبيئة والبشر والأماكن العامة، نتجت

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عن ذلك مخاطر عديدة أصبحت تهدد الانسان والكائنات الحية وتنشئ بكوارث طبيعية في المستقبل مالم يدرك المجتمع هذه المخاطر ويسعى الى الحد منها ومعالجتها من أجل كوكب نظيف وآمن للجميع.

الكلمات المفتاحية: المخاطر - التلوث - البيئة - الصحة - العمران.

Résumé

Notre étude vise à identifier les principaux risques que représente la pollution environnementale pour la santé humaine. Elle s'est concentrée sur divers aspects, tels que les formes, les facteurs et les sources, afin de mettre en évidence ses effets les plus alarmants sur la planète. Ensemble, ces éléments représentent une menace majeure pour les systèmes de santé humaine et naturelle, dans toutes leurs composantes actuelles. L'expansion urbaine incontrôlée et l'absence de mesures efficaces pour protéger la planète, l'environnement, les humains et les espaces publics engendrent de nombreux risques menaçant les humains et les organismes vivants et laissant présager de futures catastrophes naturelles, à moins que la société ne reconnaisse ces risques et ne s'efforce de les réduire et de les gérer pour une planète propre et sûre pour tous.

Mots-clés : Risques - Pollution - Environnement - Santé - Urbanisation.

The existential relationship between man and the environment has gone through various eras, some of which may be positive and compatible with the delicate balance of this universe and the environmental elements. Others may be negative and lead to deviations that pave the way for future environmental problems that are difficult to address. God's harnessing of the universe to man, and His colonization and management of these components, was based on preserving it without tampering with it, disturbing its balance, or over-consuming its wealth and treasures. Humanity has evolved through several phases on this planet, reaching a point where the environment was abundant in resources and unspoiled by human activity, with no form of pollution impacting life on Earth. In light of the ongoing changes, a number of frightening manifestations appeared on the horizon.

At that point came the phase of forming small groups; through which man lived in form of small, dispersed groups, participating in hunting and gathering fruits. It can be said that man, at this level, did not affect the environmental balance in his region. Next, came

the agricultural stage, which preceded the industrial one, during which humans became food producers and negatively affected the environment as farmers, animal breeders, and forest burners for use as pastureland. Then, the first industrial revolution emerged with population groups gradually growing, professional crafts developing, and factories being built. This was followed by the stage we are living in now, which is the second industrial revolution, where the exploitation of natural resources increased. This led to water, air and soil pollution and increased chemical waste, which has caused massive damage to living organisms and plants, to nature in general, and to humans in particular. The latter in itself contributed in the emergence of many health problems in social life, which were represented by the emergence of serious diseases as well as congenital deformities in humans that did not exist before. There have also been serious damages to living organisms through extinction, death, genetic deformation, etc.

Many societies have sought to develop strategies to protect the environment by developing plans that reduce the risks of exposing humans, animals, plants, and material wealth to danger and destruction. This is considered as a continuous process of suicide that humans practice against their rights and the rights of nature in general. In this respect, many national organizations and associations have emerged. As concerns the international organization, it works to protect the environment from the dangers of pollution, extinction and disappearance. It also seeks to raise awareness, in the social environment by highlighting the dangers of environmental pollution to the public health of humans and living organisms in general. These organisms represent an essential partner in the environmental balance and the continuation of life on this planet and its outer shell. The main question was: What are the risks of environmental pollution on the human health and environmental system in light of uncontrolled urban expansion?

Objectives

The study sought a number of objectives, including:

- Identifying the factors and sources of environmental pollution on the human health system.
- Identifying the risks of environmental pollution on the human health system.

- Identifying the effects of environmental pollution on the human health system through urban expansion.

Concepts

Environment

The scientist Henri Thoreaux was the first to coin the word ecology in the 19th century, but he did not define its meaning. As for the German scientist specializing in life sciences, Ernest Haeckel, he coined the word ecology by combining the word Oikos, home or place of existence, and Logos, which means science. He defined it as the science that studies the relationship of living organisms with the environment in which they live, The word appeared at the end of the 19th century in the English language 'Environment' and the pronunciation in French is not identical to the English language, to denote the sum of the surrounding external conditions that influence the growth and development of the life of living organisms. (Tarrat: 2008, 20) Thus, humans live above the surface of the earth within the scope of three systems: the biosphere, which consists of the atmosphere, land, water, and the living organisms that live in it; the technical environment, which consists of the cities, villages, factories, and farms that man has built; and the social environment, which consists of the religions that man believes in and the laws and legislation that he enacts. Moreover, there are traditions and customs that he believes in; and any violation of this balance between these systems lead to a reduction in the quality of the environment, its deterioration, and the emergence of problems in it. (Saber, 2000, p. 7).

Health

It is stated in the definition of the World Health Organization that public health is "the science and art of preventing disease, prolonging life, and promoting health through organized collective effort, by preserving the health of the environment, combating communicable diseases, spreading health awareness and education, and providing medical services And health and motivation for early diagnosis and rapid treatment by establishing social and voluntary services to provide the minimum level of health care and social well-being for every citizen". (Āl-Mashaqbah, 2012, p. 38) Therefore, we believe that health is the safety of the body, mind,

and soul from all manifestations of negativity that hinder life or the person's general mood becomes sour, which makes him/her see himself/herself as a burden on society due to his loss of health. Health is not only the absence of disease, but also a state of physical and mental well-being and fitness resulting from positive factors, such as adequate feeding, housing and training. (Schramme, 2023, p. 212).

Pollution

Pollution is considered a pathological phenomenon that the peoples of the Earth suffer from, and it is the result of wrong human behavior and incorrect actions in dealing with environmental surroundings. The concept of environmental pollution is also the inappropriate transformation of all or most of our surroundings as a result of human and natural activities during its direct or indirect effects of changes in energy methods, radiation levels, and physical and chemical composition which disturb the natural balance of the environment and affect the lives of living organisms. (Aishour, 2018, p. 150).

Pollution is any contamination of the air, water, or land that results from human activity. Pollution results from inefficiencies in the manufacturing process, both operational practices and improperly designed and utilized equipment. Pollution is the result of unused raw materials or byproducts from the production process. Pollution represents a loss of profits in manufacturing. (Hagler Bailly Consulting, 1995, p. 8).

Risks

It was stated in the Middle Dictionary that the word "risk is the premeditation of destruction." (The Middle Dictionary, 1999: 88), and from a technical standpoint, the word "Risk" means the possibility of exposure to loss, and the expression is used in economics to indicate a situation characterized by incomplete predictability of alternative outcomes, but there is no outcome among them that enhances the same possibilities." (Badawi, 1982, p. 360) Risks are the potential for outcomes that may affect the individual or their natural and social environment, leading to negative outcomes including loss of balance, whether environmental or social. The Concise Oxford Dictionary refers to the chance of hazard, bad consequences, Loss. Risk is a condition in which there is

a possibility of an adverse deviation from a desired outcome that is expected or hoped for. (Outreville, 1998, p. 2).

There is no agreed definition of risk. If we study the risk literature, we find that the concept of risk is used as an expected value, a probability distribution, as uncertainty and as an event. Some common definitions are:- Risk equals the expected loss .- Risk equals the expected disutility .- Risk is the probability of an adverse outcome .- Risk is a measure of the probability and severity of adverse effects .- Risk is the combination of probability and extent of consequences .-Risk is equal to the triplet (s_i, p_i, c_i) , where s_i is the i th scenario, p_i is the probability of that scenario, and c_i is the consequence of the i th scenario, $i = 1, 2, \dots, N$, .- Risk is equal to the two-dimensional combination of events/consequences and associated uncertainties (will the events occur, what will be the consequences. (Aven & Renn, 2010, p. 2).

Urbanization

Linguistic concept

People's estimates of the Earth's age: "They inhabit it, and it is inhabited and inhabited, and among them is inhabited, and God colonized people to inhabit it, and the earth was inhabited by the inhabited one, so it is inhabited and inhabited." (Ibn āl-Sayyid ā l-Mursī, 1996, p. 180).

Terminological concept

Urbanism refers to the concept of human urbanism and includes the planning and design of a city or community and is called the science of human settlement. (Mihoubi, 2023, p. 13) Urbanism is the coming together of culture, which represents the world of ideas and what falls within its framework, and the city, which means the world of things. Thus, civilization is urbanism in general, or human activity towards ideas and things. (Āl-Mutarjī, 2021, p. 246).

Risks of environmental pollution

The natural environment contains four areas or systems that relate and interact with each other. The most important of these systems are as follows: the geosphere, which includes the upper layer and the Earth's interior; the hydrosphere, which includes seas, fresh and salt lakes, groundwater, and springs, and constitute about 75% of the Earth's land and the gaseous atmosphere. Given

that, the air cycle is divided into two main parts: the horizontal and surface systems, and the biosphere, which includes all living organisms, including animals and plants, with which humans coexist.” (Bozghaya, 2008, p. 50) The risks of environmental pollution were not the result of coincidence or absolute inevitability, but in fact they were the result of irrational and abnormal behavior and action on the part of man in his rights, in the rights of living creatures, and in the rights of the universe as a whole. Therefore, we conclude that environmental pollution has factors that were the basis for the occurrence of this Environmental pollution and its continuity over time, which can be summarized as follows:

Environmental pollution factors

There are many factors that cause environmental pollution, including the natural factors: Volcanoes are considered one of the most important natural sources of emission of particulate matter and hydrogen sulphide gases, sulphur dioxide and methane. As for accidental fires, they are the main source of emission of coal water, carbon monoxide, and nitrogen oxide. Swamps play an important role in emitting many decomposition gases into the atmosphere, and plants and trees play an important role in balancing atmospheric gases through the process of photosynthesis. As for the decomposition of these plants, it is a major source of carbon, just as every metal or element found on Earth can be transported into the atmosphere in the form of fine atoms carried by the wind, and sometimes these atoms may contain natural radioactivity. (Badah & al., DT, p. 134).

Bacterial pollution factor

It is one of the most dangerous types of pollution and causes infectious diseases, as the water of rivers, streams and canals is polluted with high percentages of organic and inorganic substances suspended in it, especially in the flood season and causes turbidity in the water. Surface water is also polluted with organic substances resulting from microorganisms. Pollution correspondingly occurs with human waste resulting from wastewater. Furthermore, there is pollution with industrial waste from oil refining, textile, and iron factories. Besides, there is also thermal pollution of the waters of

rivers and streams, which affects marine wealth. (Badah & al., DN, p. 130).

Human factors

Pollution has affected all elements of the surrounding environment, including water, air, food, and soil. The problem has become more and more severe with the emergence of dangerous nuclear radioactive pollution that is harmful to humans, animals, and plants, as a result of the use of corn, whether in war or peace. Water in the seas and rivers has become polluted within limits. There is a large amount of chemicals, waste, oil residues, and heavy metals, and the air in most populated areas has different proportions of its constituent gases, good and harmful, as a result of internal combustion machines in factories and cars, with the shrinkage of green spaces. Pollution has also reached food through pesticides, preservative chemicals, and others. "From harmful additives, the soil has become polluted due to pesticide residues, chemical fertilizers, and excess salts." (Aishour & al., 2018, p. 153).

Types of environmental pollution

The natural environment, especially in the last millennium, has been exposed to many dangerous pollutants, the source of which was man who was the main actor. Among the most important of these pollutants, we mention the following:

Air pollution

Air is an essential element in all aspects of life that all living organisms need, and air plays an essential role in human health, as the amount that a person breathes per day is more than ten times the amount of water that he drinks, and the more the air is pure, clean Pollution helps maintain the health and growth of all living organisms naturally without the proliferation of diseases resulting from pollution. Air pollutants consist of solid and liquid particles, gases, germs, pesticides, mineral dust, and deadly radioactive, biological, and chemical materials that come from industrial factories and wars. (Tarraf, 2008, p. 33). Exposure of humans and the environment to air pollution is a major challenge, and an issue that raises global concerns for public health. The World Health Organization (WHO) estimated that approximately 2.4 million people die before life expectancy each year due to fine particles,

including 800,000 deaths due to fine particles less than 10 microns in outdoor urban air and 1.6 million due to fine particles less than 10 microns in Indoor air although the study did not include all causes of death likely to be linked to air pollution. The annual death rate is due to particulate matter less than 10 microns in the outdoor air in different regions of the world. The largest number of deaths before estimated life expectancy occurs annually in developing countries in Asia and the Pacific in addition to the effects on human health, air pollution has adverse effects on crop yields, forest growth, ecosystem structure and function, materials, and visibility. Air pollutants, once released into the atmosphere, can be carried by winds, mix with other pollutants, and undergo transformations chemically, and eventually deposits on various surfaces. (G E O 4, 2007, p. 84).

Table 1: The basic components of the air and the percentage of pollutants caused by each human activity

from natural %factors	from human activities %	basic air pollutants
30	70	Sulfur dioxide
40	60	Carbon monoxide
80	20	Carbon dioxide
95	5	Nitrogen oxides
80	20	95 Dust and smoke
60	40	Ammonia
50	50	Hydrogen disulphide

Source: The author (Āl-Rikabi, 2020, p. 22).

Table 2: Number of deaths due to air pollution in millions annually

Number of deaths	Geographic region
3.8 million	Southeast Asia region
3.5 million	Western Pacific region
2.2 million	African region
1.4 million	European region
854000	Middle East region
874000	American region

Source: The author (Āl-Rikabi, 2020, 46).

Table 03: Pollution indicators in Arabic Cities

Pollution Index	City (State)	Rank
93.73	Cairo/ Egypt	8
90.47	Beirut/ Lebanon	20
80.16	Alexandria/ Egypt	51
79.84	Casablanca/Morocco	52
72.73	Jeddah/Saudi Arabia	80
71.23	Al Riyadh/ Saudi Arabia	85
70.53	Tunisia / Tunis	89
66.84	Doha/Qatar	104
66.01	Jubail / Saudi Arabia	111
65.45	Algiers/Algeri	114
54.68	Sharjah/ UAE	166
52.50	Dubai/ UAE	175
47.52	Abu Dhabi/ UAE	191
43.66	Jaffa / Palestine يافا	201
39.54	Muscat, Oman	216

Source: The author (Āl-Rikabi, 2020, 22).

Soil pollution

Among the causes of soil pollution are humans through their irresponsible, frivolous and random actions that have led to soil pollution. These processes which result from a lack of awareness of their dangers include the following: Burying nuclear and industrial waste in the ground, especially in colonial or poor countries, the random spreading of landfill sites and their expansion at the same time led to soil pollution as a result of the toxic substances they contain, and the decomposition of organic materials and their leakage into the soil, unsustainable agricultural practices by farmers or agricultural companies using heavy agricultural pesticides and chemical fertilizers that cause various damages to the soil over time and use. “The poor growth of many types of harmful crops that absorb the nutritional value of the soil without any significant benefit for these crops in the agricultural production aspect, which causes the soil to lose its properties and makes it unsuitable for agriculture in the long term. (Āl-Rikabi, 2020, p. 27).

Sources of soil pollution

There are many sources of soil pollution, especially with the wide spread of industry and the introduction of biological and chemical materials into the world of agriculture, which led to the complexity of the matter through the necessity of linking production and its returns to these dangerous materials. The sources of pollution can be summarized as follows:

- Pollution resulting from landfilling and waste.
- Soil pollution due to natural fires or intentional fires in forests or parks.
- Soil contamination due to the dumping of radioactive materials.
- Soil pollution due to chemical fertilization.
- Soil pollution due to the use of pesticides.
- Soil pollution due to inappropriate use of wastewater without taking into account environmental conditions.

Water pollution

Water is considered the basis of all forms of life in the atmosphere and the source of its continuity. It covers about 71% of the Earth and constitutes about 65% of the human body, 70% of vegetables and about 90% of fruits. Therefore, it is considered the source of life for all creatures. Living things include humans, plants, and animals, and are also one of the most important and abundant natural resources of all, so humans depend on them in all aspects of their practical life, including agriculture, industry, and other various activities. (Bozghaya, 2008, p. 61).

Drinking water pollution

Water pollutants refer to the substances which are capable of making any physical, chemical or biological change in the water body. These have undesirable effect on living organisms. As mentioned earlier, the water used for domestic, agricultural and industrial purposes contains some undesirable impurities when it is discharged. This contamination leads to the pollution of water, which is generally called the fresh water pollution. Fresh water pollution may be classified into two types: surface water pollution and ground water pollution. (Manahan & Stanley, 2017, p. 33). With the industrial progress and tremendous technological development in our time, today among the outcomes of this development and change in the negative aspect, is the pollution

that man has caused to his natural (environmental) surroundings. One of its dangerous consequences has been for the human being itself and for the animals and vegetation with all its multiple components, is the phenomenon of water pollution. Especially drinking water, which is like liquid gold. If you put the universe on one side of the scale and the other on the other, the scale will tip in its favor, without a doubt. The problem of polluted drinking water is something that politicians, scientists and researchers are working to reduce because it threatens the lives of many people around the world.

Rather, it was the result of several reasons and factors that helped in its emergence and spread, and the hand of man is considered the real perpetrator in committing the crime against himself and the universe as a whole.

Effects of Marine pollution

The pollution in the oceans can cause many types of problems to marine organisms as well as human beings and can affect the economy of a country. Many of such effects are described below:

Effect of Toxic Wastes on Marine Animals: Oil spill is threatening marine life in one way or another. It spreads over the surface of the water to form a thin film called oil slick. It prevents sunlight from reaching marine plants in the ocean, which affects the process of photosynthesis. Skin irritation, eye irritation, lung and liver problems can impact marine life over a long period of time according to the National Oceanic and Atmospheric Administration.

Disruption of the Cycle of Coral Reefs: The coral reefs are the productive ecosystems, and they offer many benefits to people. These coral reefs are threatened by the sediments from deforestation carried by the runoffs, and the agricultural and industrial chemicals reaching through river discharges. For example, River Ganga is estimated to carry 1.5 billion tons of sediments per year due to deforestation and intensive farming in India, Bangladesh and Nepal through which it flows to Bay of Bengal.

Affects Human Health Hydrocarbons and benzpyrene gets accumulated in food chain, and the consumption of such fish by man may cause cancer. Similarly, the presence of harmful wastes in the waters affects the food habits of aquatic organisms and human health. When the dumping ground is closer to fishing areas,

and the toxic substances are consumed by the fishes, they get accumulated in their fat tissues, then the humans consuming these affected fishes can face unwanted health issues. For example, Minamata disease in Japan was caused by methylmercury (MeHg) poisoning that occurred in humans who ingested MeHg contaminated fish and shellfish from Minamata Bay. (Malan & Sharma, 2017, p. 15-16).

Sources of water pollution

There are several sources that cause water pollution in rivers and lakes, including the following:

Factory wastes, whether liquid or solid

These wastes can be toxic, such as compounds of lead, cadmium, arsenic, mercury, cobalt, and aluminum. (Shakur, & al., 2007, p. 56). Factory water and wastes contain 60% of the total polluting substances in seas, lakes, and rivers. Most of the pollutants are exported from factories such as tanning, lead, mercury, copper, and nickel factories, paint, cement, glass, and detergent factories, dairy sterilization factories, slaughterhouses, and sugar refining factories in addition to hydrocarbon pollution resulting from oil pollution. This problem emerged clearly during the Second Gulf War. (Bozghaya, 2008, p. 64).

Wastewater, filth, and waste from homes, buoys, and boats

Liquid waste from agricultural land is produced due to the spraying of pesticides and agricultural fertilizers: The use of pesticides and chemical fertilizers in agriculture has increased recently, and some of these materials are washed away by rainwater.

Washing utensils and clothes: Washing utensils and clothes as well as pouring washing water in places where there is water leads to water pollution, as does urination, washing animals, and throwing the bodies of dead animals in canals and rivers. All of these actions lead to negative and dangerous consequences for humans, animals and plants (Āl-Rikabi, 2020, p. 24). An important source of water pollution is the domestic sewage system. The latter pollutes wells and rivers which serve as vital sources of drinking water. It is estimated that Kathmandu produces 150 tons of waste each day, nearly half of which is dumped into the river.

More than 40 million liters of wastewater are generated every day in Kathmandu, over 80% of which comes from households (Pandey, 2006, p. 131).

Radioactive and dangerous materials

Water today is suffering from radioactive contamination as a result of the increased risks of nuclear reactors and increasing nuclear experiments. We should also not forget the horrific explosion of the “Chernobyl” nuclear reactor and the dangerous leakage that spread to the areas adjacent to it, in addition to the radioactive waste that is thrown into the depths of the seas and oceans. Besides, in some regions of the world, radioactive elements {logical} contaminants are caused by radioactive elements. Sources of radioactive material could be soils or rocks the water moves through or some industrial waste. Erosion of natural deposits of certain minerals (radioactive) may emit radiations (like a, b). Radiological elements (viz. U226, Ra226, Ra228 and Rn228) tend to be a greater problem in groundwater than in surface water. All types of radiological contamination increase the risk of cancer. Some of the radioactive contaminants with their MCLs are listed in Table. (Sharma & Bhattacharya, 2016, p. 8).

Sewage is not the only cause of water pollution; industrial waste is also a significant polluter giving rise to contamination with heavy metals. A recent research conducted by the Community Development Organization has concluded that the chemicals discharged by the factories are more harmful than the sewerage that flows into the river. Out of the 4,271 industrial establishments around the country, 72 percent are concentrated in the capital city. Most of them discharge untreated water into the river. The effluent discharged by the factories contains detergents, non-biodegradable materials and toxic chemicals hazardous to health and hygiene. (Pandey, 2006, p. 131).

Ocean acidification

The marine oceans similarly did not escape human arbitrariness, and their unconscious and irresponsible actions, as human pollutants, reached them and destroyed a large part of their vital life. Increased ocean temperature and loss of oxygen coincide with ocean acidification and constitute the deadly trio of climate change pressures on the marine environment. Ocean acidification has the potential to alter marine ecosystems and affect many ocean-related

benefits to society, such as coastal protection or the provision of food and income. Acidity affects coral reefs, a fifth of which have been lost in the world, and about 35% of them are at risk of disappearing in the coming years. (Āl-Rikabi, 2020, p. 26). An important fraction of the burden of water-related diseases, in particular water-related vector-borne diseases, is attributable to the way water resources are developed and managed. In many parts of the world, the adverse health impacts of dam construction, irrigation development, and flood control may lead to an increased incidence of malaria, Japanese encephalitis, schistosomiasis, lymphatic filariasis etc. 1.3 million people die of malaria each year, 90% of whom are children under 5. There are 396 million episodes of malaria every year. About 200 million people are infected with schistosomiasis, 20 million of whom suffer severe consequences. Six million people are blind from trachoma and the population at risk is about 500 million. Drinking water supplies that contain high amounts of certain chemicals (like arsenic and nitrates) can cause this type of serious disease. (Pandey, 2006, p. 131).

Health conditions that must be met in drinking water

In order for water to be suitable for use in all aspects, especially for it to be suitable for drinking, a number of conditions must be met, the most important of which are the following: The water must be colorless and odorless, have an acceptable taste, and be free of suspended materials. The water reaction must not be acidic because the acidity of the water causes it to dissolve metals such as lead, causing poisoning. The chemical examination must indicate that there is no contamination with organic materials, as well as the percentage of salts that does not exceed a certain degree according to the specifications, Water should not contain pathogens of diseases. (Badah & al., p. 142). The World Health Organization report for the year 2018 on drinking water, sanitation, water pollution, diseases and the risks resulting from them: The World Health Organization report for the year 2018 on water pollution and related matters stated the following: -844 million people lack even basic drinking water services, including 159 million people who depend on surface water. Globally, an estimated one billion people use drinking water contaminated with feces. It is estimated that contaminated drinking water causes 502,000 diarrhea deaths every year. -By 2025, half of the world's population will live in areas suffering from water shortages. In low- and middle-income

countries, 38% of health care facilities lack an improved water source, 19% do not have improved sanitation facilities, and 35% lack water and soap for hand washing. Water pollution causes 240 million people to become infected with schistosomiasis. “About 2.4 billion people lack sanitation services in the world.” (Āl-Rikabi, 2020, p. 52).

Sources of environmental pollution

This pollution has real sources that led to its appearance in the last decade on a large scale, the most important of which are the following:

Sources of air pollution

The air is the true outlet for all living organisms, and it cannot be dispensed with except in the event of death. If this air is exposed to pollution, it leads to the slow death of these living organisms. The sources of pollution are numerous, but the most significant are as follows:

Carbon dioxide

It results from the combustion of billions of tons of fuel, whether from industrial facilities, power stations, or means of transportation. More than 20 billion tons of CO₂ are released every year, which represents 0.07% of the amount of gas naturally present in the air. (Āl-Rikabi, 2020, p. 28). Various human activities also lead to an increase in the percentage of carbon dioxide gas in the atmosphere, and these activities include burning forests, grasses, paper, and coal. Carbon dioxide gas also escalates as a result of burning fuel in factories, gas stations, and internal engines in means of transportation. An increase in the percentage of carbon dioxide in the atmosphere leads to an increase in the temperature of the atmosphere, and thus an increase in the Earth's temperature and a change in the global climate. This phenomenon is called the “greenhouse” phenomenon, and it can cause health damage to humans due to the effect of rising temperatures. This leads to the melting of quantities of ice in the North and South Poles, causing the water levels of the seas and oceans to rise and changing the percentage of dissolved salts in them. (Shukur, & al., 2007, p. 52).

Carbon monoxide

Carbon monoxide gas is produced as a result of incomplete combustion of organic materials, that is, when there is a lack of oxygen during the combustion process. Carbon monoxide is a colorless, odorless gas that is toxic to humans because the hemoglobin in human red blood cells has a strong tendency to bind with it, to a greater extent than with oxygen, in an atmosphere contaminated with this gas or when its concentration increases in the surrounding atmosphere. In humans, due to the entry of a large amount of this toxic gas into the body, where it combines with hemoglobin in the blood, the result is a decrease in the efficiency of the blood in transporting the necessary oxygen to the body's cells, which causes functional damage to the systems and organs of the human body. In severe cases, a large increase in monoxide gas can lead to Carbon that enters the human body leading to suffocation and death. (Shukur, & al., 2007, p. 53). The population of industrial cities represents 20% of the world's population and produces 90% of global production. They release pollutants into the air about 74% of the amount of carbon dioxide gas that causes an increase in the Earth's temperature and a change in climate, or what is known as global warming, as it contributes to the equivalent of 55% of the causes of this phenomenon. (Bozghia, 2008, p. 58).

Nitrogen oxides

Gaseous nitrogen compounds are formed when nitrogen gas and oxygen combine at high temperatures, as is the case when gasoline and diesel are burned in various means of transportation. The most important of these compounds are nitrogen monoxide and nitrogen dioxide. These gases are toxic because they form nitric acid in the lungs, which causes serious infections, and children are also greatly affected by these oxides. (Shakur & al., 2007, p. 53). Nitrogen oxides are considered one of the most common and widespread. This gas is produced by fuel combustion processes in the air at high temperatures. It also results from the combustion of organic materials and also from the revenues of cars, trucks, and some industrial facilities and power generation plants that operate at high temperatures. It also has a negative effect on the ozone layer when it reaches the upper layers of the atmosphere. (Buzghaya, 2008, p. 59).

Sulfur dioxide gas

Sulfur dioxide gas is produced when most types of fuel are burned because they contain sulfur compounds. This gas is also produced as a by-product in some industries related to extracting some metals from their ores, such as extracting copper from copper sulfide. Volcanoes are also considered natural sources that contribute to the release of sulfur dioxide gas into the air. (Shakur & al., 2007, p. 53). Sulfur dioxide gas is considered to have harmful effects if it is present at rates exceeding 3 parts per million in the air. Directly in the respiratory system of humans and animals, it also participates with other pollutants in causing environmental problems, including acid rain. (Bozghia, 2008, p. 58).

Ecosystems

Major changes occurred in the Earth's ecosystem in 2003, from which we can summarize the following:

- In February 2003, a snowstorm blew from the North Pole towards the northern regions of the Atlantic Ocean. The temperature reached 45 degrees below zero, and led to the death of about 220 people, the freezing of heating pipes, and the devastation and destruction of property.
- In February 2003, a 5.7-magnitude earthquake occurred in Mexico, described as the most violent in Mexican history. It was called the earthquake of the twenty-first century. It destroyed more than 20,000 homes, 90 hospitals, and 100 schools, not to mention state institutions, hundreds of deaths, and dozens of homeless people.
- On May 20, 2003, an earthquake occurred in Algeria, killing more than 4,000 people and wounding 8,000. On May 20, 2003, hot winds that reached 50 degrees blew in Australia, igniting fires in the south and north, eliminating a third of the forests and forests, and 100,000 square kilometers of Australia's area became afflicted.
- In late May 2003, Europe was exposed to severe storms and heavy rains that it had never experienced before. This led to water levels rising to more than two meters in the streets of Germany and France. In May 2003, for the first time in the history of India, Sri Lanka and Bangladesh, the temperature dropped to 25 degrees below zero in 75% of the area of these countries causing the death of 288 people due to the cold.

- On August 30, 2003, Europe was exposed to a heat wave and fires that it had never witnessed before, killing 21,000 people in France alone, with deaths exceeding 13,300 deaths. (Tarraf: 2008, 110-111)

The Role of Nitrogen Oxides in Ground-Level Ozone Formation and Its Impacts

Nitrogen oxides (NO_x), primarily nitrogen dioxide (NO_2) and nitric oxide (NO), are significant atmospheric pollutants that play a crucial role in the formation of ground-level ozone (O_3)-a major component of urban smog. These gases are mainly produced through the combustion of fossil fuels in vehicles, industrial facilities, and power plants. When NO_x reacts with volatile organic compounds (VOCs) in the presence of sunlight, a photochemical reaction occurs, leading to the generation of ozone at the lower levels of the atmosphere.

While ozone in the stratosphere protects life on Earth by absorbing ultraviolet radiation, at the ground level it poses serious environmental and health risks. Exposure to elevated levels of ground-level ozone can cause or aggravate respiratory diseases such as asthma, bronchitis, and chronic obstructive pulmonary disease (COPD). It also impairs lung function and can lead to increased hospital admissions, especially among children, the elderly, and those with pre-existing conditions. In addition to human health impacts, ground-level ozone negatively affects vegetation, reduces crop yields, and damages forests by impairing photosynthesis and stunting plant growth.

Urban Expansion and Its Role in Intensifying Environmental Pollution Risks

Urban expansion -characterized by the spread of cities into surrounding rural areas- significantly contributes to environmental degradation and pollution risks. This process, often driven by population growth, economic development, and infrastructure demands, alters natural land cover and increases the concentration of pollution sources such as vehicles, factories, and construction activities.

One primary mechanism through which urbanization increases pollution is the “urban heat island” effect, where dense urban areas experience significantly higher temperatures than surrounding

regions. This rise in temperature accelerates photochemical reactions, including those that form ozone, thus worsening air quality. Furthermore, impervious surfaces like asphalt and concrete prevent water absorption, leading to more polluted storm water runoff carrying heavy metals, oils, and chemicals into nearby water bodies.

Urban sprawl also typically results in longer commutes and increased vehicle emissions, thereby elevating air pollution levels, especially of NO_x and particulate matter. Additionally, the demand for energy, water, and waste disposal grows with urban density, often exceeding the capacity of existing infrastructure and leading to increased solid waste accumulation, water contamination, and industrial emissions.

In summary, the unplanned or poorly managed expansion of cities directly amplifies the environmental burden by altering natural ecosystems, increasing pollutant concentrations, and straining local resources. Sustainable urban planning, pollution control policies, and green infrastructure development are essential to mitigate these impacts.

The erosion of the ozone layer

The ozone layer is a type of oxygen composed of three atoms (O₃). It forms the Earth's atmosphere, and is about 25 kilometres away from the Earth, and its thickness will not exceed 3 millimeters. It performs a basic function, the mission of which is to protect all living organisms from the danger of annihilation. It separates the Earth from the sun's ultraviolet rays. It preserves the atmosphere and maintains its natural order in the universe. Preserving and protecting this layer means preserving the aspects of life, its growth, and its survival. Scientists have estimated that the ozone present in the atmosphere coincides with the age of the universe, that is, billions of years ago, and its role is extremely important in the emergence and development of life on the face of the Earth. (Tarraf, 2008, p. 131). The consequences of this appearance are very serious changes that affect the natural environment, humans, and all creatures. The reality is that the hotter weather, the rise in temperature, and climate change abolish the four-season system to become a two-season system in the world. The first season is cold with storms and floods that wash away arable soil, and the second is hot, extending drought and

increasing desertification. In the two seasons, food security will collapse and the world will be exposed to the most dangerous natural disasters such as earthquakes and floods. (Tarraf, 2008, p. 133) The ozone layer forms the protective shield for humans and all living organisms from the damage of short-wave ultraviolet rays coming from the sun. It is distinguished by its ability to absorb this type of rays that, if they penetrate to the earth, may destroy life. above the surface or cause severe damage to humans and living organisms. The ozone layer consists in its entirety of a group of gases in homogeneous proportions. (Āl-Rikabi, 2020, p. 31).

Global warming

The phenomenon of global warming indicates that the atmosphere currently contains 380 parts per million of carbon dioxide, which is the primary gas causing global warming, compared to 275 parts per million that was present in the atmosphere before the industrial revolution. The global warming process occurs through several stages, including:

- Solar radiation reaches the Earth's atmosphere and some of it is reflected back into space.
- The rest of the sun's energy is absorbed by the land and oceans and heats the earth.
- Heat radiates from Earth into space. Some of this heat is trapped by greenhouse gases in the atmosphere, keeping the Earth warm enough to sustain life.
- Human activities such as burning fossil fuels, agriculture, and land clearing increase the amount of greenhouse gases released into the atmosphere.
- "This traps excess heat and causes the Earth's temperature to rise." (Āl-Rikabi, 2020, p. 33).

Wars, like anything else, have contributed to the emergence of global warming, especially the excessive use of bombs and bullets, all of which produce carbon dioxide and carbon monoxide, which are the most common greenhouse gases that led to climate change. The melting of 5 million cubic miles of ice on Earth, leading to a rise in sea levels, will have devastating effects on many countries and cities of the world, as water levels are expected to rise by about 216 feet, for example:

- The North American continent: The Atlantic coast may disappear, along with Florida and the Gulf Coast, and the hills of San Francisco and California will become just a thing of the past.

- The South American continent: The Amazon River Basin in the north and the Paraguay River Basin in the south will become part of the Atlantic Ocean.

- The continent of Africa: Some lands may be lost as a result of a significant rise in temperature, and Alexandria may be submerged in the waters of the Mediterranean Sea. As for rainfall, it is steadily decreasing over Egypt, from 2.5% in 2030 to 13.22% in 2100.

- The continent of Europe: London will become a city to remember, while Venice will sink under the waters of the Adriatic Sea, and the Netherlands will become one of the islands surrounded by water from all directions, while most parts of Denmark's cities will be exposed to this.

Asia: Floods may sweep China and the coastal mountains may become mere islands.

The continent of Australia

Most of it becomes desert, and as a result of the rise in water levels, what resembles an inland sea is created. It will also lose most of its famous beaches now. (Äl-Hawari, 2019, p. 93-94).

Phenomena expected as a result of global warming

Scientists expect that in the future, as global warming continues, several phenomena and events will occur that may pose a threat to both humans and nature. These phenomena are:

- Melting ice causing sea levels to rise.
- Sinking of low-lying islands and coastal cities.
- Increased floods.
- The occurrence of droughts and the desertification of large areas of land.
- Increase in the number and intensity of storms and hurricanes.
- The spread of infectious diseases in the world.
- The extinction of many living organisms.
- The occurrence of agricultural disasters and the loss of some crops.
- Increased probability of extreme weather events. "Increase in forest fires."

El Nino phenomenon

The El Nino phenomenon is a natural climatic phenomenon that affects the Pacific Ocean, every four to twelve years, as the surface water temperature rises significantly, especially in the period between the end of the summer and fall, which leads to the generation of water masses and currents. Warm in the tropical regions located on the equator between the eastern coast of Asia, the western coast of South America, and the northeastern coast of Australia, its results included floods, heat waves, hurricanes and fires, which between 1997 and 1998 left about 25,000 victims in the world, in addition to fires that swept through Indonesia, Brazil, Australia, Peru and Ecuador. Agriculture losses were estimated at 96 billion dollars, and palm oil crops in Indonesia fell by half, as well as the fishing crop in Peru. (Āl-Rikabi, 2020, p. 36).

Extinction

Extinction has been considered a fact of life since its inception, and the current few million species are nothing but what remains in our time of the species that existed, numbering more than 500 million species. Almost all previous extinctions occurred as a result of natural processes, but with the expected increase in global population and economic activity, the possibility of an increase in the rate of biodiversity loss is much more likely than its stability. At present, only 7,100 bird species remain out of an estimated 9,040. An additional 20% of freshwater fish species are also believed to have become extinct. Data indicates that 724 species have become extinct since 1600 AD. Currently, approximately 3,956 species are threatened with extinction, 3,647 are at risk, and 7,240 are considered rare. It was also found that about 227 plant species out of a total of 20,000 species have become extinct in the United States of America, and there are 680 species at risk of extinction, and 34% of the 10,290 species of insects and other invertebrates in Germany are classified as at risk of extinction. About 11% of mammals and birds, 3% of reptiles, 2% of amphibians, 2% of fish, 3% of crustaceans, 7% of insects, 32% of gymnosperm trees and 9% of plants are threatened or vulnerable species worldwide. Of these, about 270 thousand species of seed-coated plants are known. (Al-Awdat, 2000, p. 26).

SARS virus

In 2003, health authorities around the world mobilized to limit the growth of a new form of pneumonia called SARS (severe acute respiratory syndrome). After this disease appeared in southern China, it spread to about twenty countries due to long flights, leaving behind more than 800 dead. The virus responsible is a coronavirus, which was transmitted to humans through a small wild animal whose meat is eaten, the civet. Indeed, the Chinese consider this animal a source of delicacy. (Shugo, 2015, p. 90).

Health effects of industrial pollutants

Among the most prominent diseases resulting from the effects of waste are the following:

- Digestive system diseases and rheumatism of the joints and muscles.
- Skin eczema, fungal infections, hepatitis, anemia and cancer.
- Shortness of breath, headache, sore eyes, asthma, and enlarged lungs.
- Convulsions, gout, and inflammation of the brain, liver, kidneys, and brain cells. (Saber, 2000, p. 27).

The catastrophic nuclear accident at Chernobyl demonstrated how harmful pollution can be to human health. Twenty years after the accident, Chernobyl victims are still battling disease, and the health of countless other people around the world is still affected by human-caused changes to the environment. Changes that affect the provision of services, including water, can affect human health. Changes that affect the organization of services affect health through the spread of disease-carrying insects and pollutants into the water and air. (GEO, 4, 2007, p. 47).

Conclusion

Environmental pollution in the modern era is one of the most significant problems facing industrialized societies today. As a result of the widespread proliferation of factories and the hazardous chemical waste they produce, which pollutes the environment, humans no longer live in a safe environment. With the rapid urban expansion occurring in cities worldwide, this phenomenon has become a major threat to human life. This urban

expansion has been accompanied by irresponsible human behavior, turning some areas into hot-spots of environmental pollution.

This occurs through disregard for the legal, ethical, and health standards established for urban planning, and through contributing to pollution, whether intentionally or due to a lack of awareness and knowledge about the dangers of environmental pollution to human health. All these negative human actions have posed a threat to human health, and urban areas have become veritable hotbeds of pollution, breeding diseases and illnesses, and corrupting the environment and social fabric. Cities are no longer safe places under this chaotic expansion. Humans have brought upon themselves environmental and social risks that have undermined their health and turned their lives into a deadly hell.

This is a consequence of violating the laws of nature and the norms and standards of society. If these are the consequences, then civil society organizations must take action within the framework of the law to protect human health from the dangers of environmental pollution. This can be achieved through raising awareness and actively participating in correcting, guiding, and warning about the imminent danger that is eroding human health, thus ensuring a safe and stable life free from disease and illness.

Health is considered one of God's blessings, which man should enjoy and preserve. Human health is a responsibility, both individually and socially. Humans have existed in this universe in a safe environment, free from all dangers. However, man's destruction of nature through pollutants, abnormal behaviors, a lack of respect for biological life and harmful customs and traditions has resulted in a deterioration of this environment.

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