

Environmental pollution and implementation of sustainable development goals

Satsita S. Khasanova^{1,*}, and Maryam A. Saydulgerieva²

¹Institute of Economics and Finance, FSBEI HE Chechen State University named after A.A. Kadyrov, Grozny, Russia

²Institute of Public Service and Management, Federal State Budgetary Educational Institution of Higher Education Russian Academy of People's economy and public service under the President of the Russian Federation, Moscow, Russia

Abstract. Environmental problems are getting worse as the industrialization of the social system develops. Due to the severity of the problem of environmental pollution, in accordance with the goals of sustainable development, methods with indicators are used to report and measure the environmental performance of companies and industrial regions to compare environmental efficiency with the economic efficiency of their activities. Environmental pollution is not a new phenomenon, but it remains the greatest global challenge facing humanity and a leading environmental cause of morbidity and mortality. Human activities associated with urbanization, industrialization, mining and exploration are at the forefront of global environmental pollution. Developed and developing countries share this burden together, although awareness and stricter laws in developed countries contribute more to protecting the environment within their territories. Despite global attention to pollution, its impact is still felt due to its serious long-term consequences. The purpose of this work is to display the severity of the problem of environmental pollution, in particular, water pollution, air pollution, radioactive pollution, noise pollution. Pollution of our planet is one of the most pressing problems and its solution must come first, since practice shows the negative impact of pollution on people and their health, animals and the planet as a whole. When writing the article, materials and methods obtained from studying scientific works were used.

1 Introduction

Environmental pollution is the entry into it of harmful substances that are not typical for it, leading to negative consequences. Pollution of the natural environment is caused by the influence of natural factors, or as a result of anthropogenic impact, and pollution due to human economic activity is much larger and is fraught with more serious consequences. One way or another, environmental pollution ultimately directly or indirectly affects the health of humans and animals.

* Corresponding author: sazih@mail.ru

2 Materials and methods

The methods of this research are the analysis and processing of information obtained from the study of scientific articles, books and other works.

3 Results and discussion

The existence of life on earth is possible thanks to the atmosphere. The atmosphere is, first of all, the air necessary for the breathing of living nature and humans and should not harm their existence. Protecting air from pollution is an extremely important issue that needs to be addressed in the near future. The abundance of natural resources on the planet has been depleted throughout the existence of human civilization. Unreasonable use of resources disrupts the natural balance and, in addition, leads to large-scale environmental pollution.

Chemical compounds found in aerosols and antifreeze are destroying the earth and threatening global warming and related disasters. Environmental pollution leads to negative consequences not only in nature itself, but also has a negative impact on humans themselves.

Pollutants can exist in the form of liquids, solids or gases, can decompose quickly, like humus, or take decades, and some harmful substances and pollutants do not dissolve at all (plastics, heavy metals and nuclear waste, etc.) Substance becomes a pollutant when its concentration exceeds its natural content, and this increase in concentration is caused either by human activity (anthropogenic atmospheric pollution associated with emissions of various pollutants) or natural phenomena (activity of volcanoes, weathering of rocks, etc.) [5].

Anthropogenic pollution significantly exceeds natural pollution in scale.

Many pollutants filling the air are the cause of many serious human diseases [2]. Among them, particulate matter (PM), particles of variable but very small diameter, enter the respiratory system when inhaled, causing respiratory and cardiovascular diseases, reproductive and central nervous system dysfunction, and cancer. Although ozone in the stratosphere plays a protective role against ultraviolet radiation, in high concentrations at ground level it is harmful, also affecting the respiratory and cardiovascular systems. In addition, nitrogen oxide, sulfur dioxide, volatile organic compounds (VOCs), dioxins, and polycyclic aromatic hydrocarbons (PAHs) are considered air pollutants harmful to humans. Carbon monoxide can even cause direct poisoning if inhaled in large quantities. Last but not least, climate change due to pollution affects the geographic distribution of many infectious diseases, as do natural disasters. The only way to solve this problem is through increased public awareness combined with an interdisciplinary approach from scientific experts; National and international organizations must respond to the emergence of this threat and provide sustainable solutions.

Air pollution is divided by type of pollutant into primary pollutants, which are formed as a consequence of the activities of factories that pollute the air (sulfur dioxide) and secondary pollutants, which result from the mixing and reaction of primary pollutants. Smog is a secondary pollutant resulting from the mixing of smoke and fog [9].

Main causes of air pollution

1. Automobile emissions as sources of greenhouse gases;
2. Formed as a result of agricultural activities, ammonia is one of the most dangerous gases, and fertilizers pollute the atmosphere with dangerous chemicals;
3. Industrial emissions from plants and factories;
4. Household cleaning products are also sources of toxic chemicals that can affect your breathing.

The consequences of air pollution are: diseases of the world population, which are becoming “younger” every year, are largely a consequence of air pollution [4]. Global warming, which is a consequence of carbon emissions, can lead in the near future to serious environmental consequences due to climate change, melting glaciers, etc.; burning fossil

fuels releases nitrogen and sulfur oxides into the atmosphere, causing acid rain, causing serious harm to people and wildlife in general; Depletion of the ozone layer due to the release of chlorofluorocarbons into the atmosphere leads to a lack of protection from the sun's harmful ultraviolet rays, which cause skin diseases and vision problems; the settling of air pollutants on water bodies leads to the migration of many animal populations, as well as to the extinction of individual populations[8].

The surface of our planet Earth is mostly covered with water: salty and fresh. These water resources are necessary for living beings inhabiting the planet: humans, animals, fish, birds, etc. Water is an integral part of the life of all living things. Fresh water is necessary to quench thirst. On land, in addition to the fact that water is a means of quenching thirst, it is an integral element for the life and growth of plants [6]. The vegetation cover, in turn, is a habitat for animals and birds - forests, jungles, and also a food resource for herbivores.

The effects of water pollution can last for many years.

Contaminated water is the cause of many waterborne diseases and epidemics that are widespread in many countries [1].

Sources of water pollution are industrial wastewater, the use of detergents and fertilizers, garbage, etc. The consequences are infectious diseases, serious human illnesses, and the disappearance of animal populations living in the water.

Soil pollution is the contamination of the soil with an abnormally high content of toxic substances, due to industrial, agricultural activities and the release of toxic substances such as lead, mercury, xenobiotics, polycyclic aromatic hydrocarbons, etc., which also have a serious impact on human health [3].

Noise pollution. Noise is an unpleasant and unwanted sound that causes discomfort to a person.

The volume of sound is measured in decibels (dB). The human ear can detect the weakest sound at 1 dB. As civilizations have grown in population, noise pollution has become a problem. Some of the main causes include vehicles, aircraft, industrial machines, loudspeakers, burglar alarms and other similar devices. Other household appliances such as televisions, transistors, radios, etc. contribute to noise pollution when used at high volumes [2].

Noise pollution can pose a risk to human health in the following ways:

1. Hypertension is a direct result of noise pollution and is caused by elevated blood levels over a long period of time.
2. Hearing loss occurs when human ears are constantly exposed to loud noises that exceed the range of sound that human ears can tolerate, causing eardrum damage and hearing loss.
3. Sleep Disorders: Lack of sleep can cause fatigue and low energy levels during the day, which interferes with daily activities. Noise pollution disrupts sleep cycles, leading to irritation and an uncomfortable state of mind.
4. Cardiovascular problems. Heart problems such as blood pressure, stress and cardiovascular disease may occur in a healthy person, and a person suffering from any of these diseases may experience a sudden increase in levels.

Nuclear pollution. The flow of energy in the form of electromagnetic waves, the flow of energetically charged particles (positively or negatively charged) from one space to another without touching another surface is called radiation.

Radiation depends on frequency and wavelength. If the frequency is greater and the wavelength is shorter, then the energy will be greater or higher. If the radiation energy is high, it will cause more harm to organisms.

What is radioactive contamination?

The rays produced by radioactive decay can cause the atoms and molecules of the medium through which they pass to ionize and convert them into ions. Alpha (α), beta (β) and gamma

(γ) are mainly responsible for the process of radioactivity, and these emissions are produced in a process called radioactive decay.

Alpha radiation contains charged alpha particles. Each alpha particle carries two units of positive charge and reacts strongly with the tissues of a living organism. Beta radiation consists of energetic electrons. Each beta particle carries one unit of negative charge and interacts strongly with matter. Gamma radiation consists of high energy photons. Photons bring strong electromagnetic interaction with matter.

There are two types of radiation - ionizing and non-ionizing radiation

1. Ionizing radiation is high energy, which means it contains higher energy, such as short-wave ultraviolet rays, x-rays, and gamma rays. Charged rays produced during radioactive decay cause ionization of both atoms and molecules of the medium through which they pass, turning them into ions.

2. Non-ionizing radiation involves electromagnetic waves that have long wavelengths, ranging from ultraviolet rays to radio waves. These waves have enough energy to excite the atoms and molecules of the medium in which they move and cause them to vibrate faster. The sun's rays reaching the earth's surface are mainly non-ionizing radiation.

How does radioactive contamination occur?

Radioactive waste from man-made nuclear activities and military/defense related nuclear weapons activities causes many problems. It is important to handle them carefully to protect the environment as well as living organisms for a better and safer future. They come into contact with various radiations. If the level of radioactive radiation exceeds a certain limit, it can harm living things. This harmful effect of radiation emitted by radioactive elements is called radioactive contamination.

There are two sources of radioactive contamination - natural sources and anthropogenic sources.

Natural sources of radiation –

Natural sources are those that are exposed to or occur naturally in the environment from the earth or other external sources. Below are several natural sources of radiation:

1. Natural minerals or radioactive minerals are found under the earth's crust. An example is uranium.

2. Cosmic rays are highly ionizing electromagnetic radiation. Their sources are outside the Earth, like stars.

3. Radioactive minerals such as uranium, thorium, radium, and potassium isotopes are found in the lithosphere.

Anthropogenic sources of radiation

Anthropogenic sources are those that are created or arose by mistake or as a result of human activity, resulting in human exposure to radioactive materials [3]. Below are several anthropogenic sources:

1. Medical X-ray

2. Smoke detector

3. Fireplace lanterns

4. Nuclear medicine

5. Nuclear power plant

Radioactive contamination can be prevented in many ways [7]. Basic ways to stop radioactive contamination:

1. The nuclear reactor must be stored in sealed containers to prevent the possibility of leakage of radioactive material. In addition, the reactor must have a proper cooling system to prevent coolant leakage.

2. Nuclear testing should be banned or should be carried out under very strict circumstances so that it does not affect the environment or other people.

3. Radioactive waste must be properly processed so that it does not harm anyone or nature.

4. Industrial waste containing radioactive materials should be disposed of after they have been neutralized or in a place where they will cause less harm.

5. Proper monitoring should be carried out from time to time to know about any hazard in advance [10].

Thus, the level of anthropogenic impact on the environment has now reached the level where nature has ceased to cope with self-regenerative processes. To solve the problems of anthropogenic impact on the environment in the process of economic activity, within the framework of sustainable development goals, the prospects for the development of “industrial ecology” are considered. “Industrial ecology” implies the use of “sustainable” technologies by business entities in the process of their activities. In Russia, there has not yet been a large-scale implementation of such innovations, and it lags behind Western countries in the field of industrial ecology, unlike foreign countries in which environmental trends appeared 30 years ago, they went through a large number of evolutionary stages and brought production to a state in which in which creating products without taking into account environmental factors has become unprofitable.

4 Conclusions

1. Environmental pollution includes air, water, soil, radioactive and noise pollution;
2. The level of environmental pollution requires the immediate implementation of programs that help reduce the anthropogenic impact of humans on nature;
3. In accordance with the implementation of sustainable development goals, environmental technologies are being introduced to reduce the level of environmental pollution in the process of economic activity;
4. In Russia, the level of implementation of environmental technologies is at a low level, which mediates the need to update “green” innovations in the process of economic activity.
5. To achieve a profound effect of environmental programs, it is necessary to promote environmental behavior at the population level on a mass scale.

References

1. A.G. Bannikov and others. *Fundamentals of ecology and environmental protection* (M.: Kolos, 1996) 304.
2. G. Fellenberg, *Environmental pollution*, (M.: Mir, 1997) 232.
3. N.M. Mingazova, O.Yu. Derevenskaya, O.V. Palagushkina, L.R. Pavlova, E.G. Nabeeva, A.I. Galeeva, I.S. Shigapov, N.R. Zaripova, R.I. Zamaletdinov, R.R. Mingaliev, *Astrakhan Bulletin of Environmental Education*, **2**, 32 – 38 (2014)
4. A.A. Karmanova, *International Journal of Applied Sciences and Technologies “Integral”* **1** (2019)
5. A.V. Vasiliev, D.E. Bykov, A.A. Pimenov, *News of the Samara Scientific Center of the Russian Academy of Sciences*, **1(6)**, 16 (2014)
6. V.A. Ryadchik, *Pollution and environmental protection, Forum of young scientists*, 2(30).
7. Yu.G. Markin, *Ecologist. Bulletin of Russia*, **7**, 54-58 (2017)
8. D.A. Filatov, V.S. Ovsyannikova, *Ecologist. Bulletin of Russia*, **10**, 22-25 (2017)
9. S.S. Khasanova, Kh.M. Dzhabrailova, Kh.A. Mezhieva, *Economics and entrepreneurship*, **5 (142)**, 1359-1364 (2022)
10. S.S. Khasanova, I.M. Pedaeva, Kh.A. Delmikhanova, *Economics and entrepreneurship*, **6 (143)**, 40-44 (2022)