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Global Ecological Problems of Modern Society

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Abstract: *At the modern stage of society's development, ecology is seen as a complex, interdisciplinary science of the relationships of organisms, society and the environment. Ecology is a science that studies the regularities of the life of organisms in their natural living environment and taking into account the changes made in this environment as a result of human activity. In recent years, the mass media has been constantly talking and writing about ecology, environmental problems related to anthropogenic activity. The person with his activity is heavily polluted and continues to negatively affect the environment at increasing rates. This reckless behavior of humans and the whole of society threatens planet Earth with imminent doom, no less than the use of nuclear weapons. Only from the positions of modern science ecology is it possible to develop issues related to the prudent use of the natural resources of the biosphere and the fight against changes brought about in nature by human activity in the age of the scientific and technical revolution. For this reason, it is necessary to seek information and a solution to the key current problems: What are the main pollutants of the atmosphere, hydrosphere and lithosphere? What is the origin of these substances? How does their impact affect life on Earth? What approaches and methods are needed to prevent environmental pollution?*

Keywords: ecology, environmental problem, anthropogenic activity, environmental pollution, pollutant, atmosphere, hydrosphere, lithosphere, ozone layer, ozone hole, acid rains, greenhouse effect, radioactivity, desertification

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Full Paper

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1. Short characteristic

Each historical period is distinguished by its own fateful problems. Today's problems have one feature: they are global and directly affect all mankind, all civilization. The most serious is the environmental problem, which is a real consequence of the interaction between society and nature.

It is an expression of the contradictory nature of this interaction, subject to scientific analysis and research, an indicator of urgent practical solutions arising from the adverse interdependence between man's material production activity and his living environment. The dynamic development of chemistry and ecology sciences, as well as modern technologies, enables all components of the biosphere to be harnessed in material production.

If it start with the political reality formed by the laws of public development, it can be judged that a number of scientific and technical achievements quickly become weapons of destruction of life and nature. This means, in practice, an environmental catastrophe, i.e. an irreversible violation of the environmental balance on a global scale.

2. Global Environmental Problems of Humanity

The most popular global environmental issues are:

- Atmospheric pollution - this problem is addressed by: Destruction of the Ozone layer (the formation of an “Ozone hole”), Acid rains, Greenhouse effect, Radioactivity;
- Contamination of the hydrosphere;
- Contamination of the lithosphere

A. Destruction of the Ozone layer. Formation of “Ozone hole”

The destruction of the ozone layer is becoming an increasingly popular problem. The ozone layer is a protection for life on Earth because it is the only one that fully absorbs solar ultraviolet radiation (UV), which damages living organisms.

The dramatic reduction (thinning) of the ozone layer above Antarctica was first observed in 1970, when a team of English scientists saw a "breakthrough" over the icy continent. Research shows that at a height of 15 to 21 km (lower stratosphere), thinning is almost complete, with a loss of 95%.

Experts are seriously concerned that in the Northern Latitudes, densely populated areas of Eurasia and North America, a significant reduction in ozone can pose a serious risk. The continuing trend towards thinning stratospheric ozone and the possible emergence of an \"ozone hole\" in Antarctica should be a serious concern for mainland Europe because of the potential impact on human, plant and animal health.

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The alert appeared among scientists as early as 1974, but a more serious response was recorded in 1985, when the public was informed by describing the "ozone hole" in the sky. The increased content of simple substances – chlorine /gas/ and bromine /liquid/ is indicated as the reason for the growing thinning of stratospheric polar ozone.

Artificial sources of chlorine and bromine are freons and halons /halogens/. These are artificial industrial substances first produced in the 1930s. Freons are used in aerosol preparations, such as coolers in refrigerators and air conditioners, as frothy substances in the manufacture of insulating and packaging materials, as well as cleaning agents.

Halons /halogens/ are used partially in fire extinguishers. Freon vapour is not oxidized by oxygen in the lower atmosphere, but reaches the stratosphere. There, under the action of light, they are photodisocyed and oxidized. Free chlorine atoms are obtained that interact with ozone molecules repeatedly [7]. Calculations show that in this way a chlorine atom can react repeatedly and cause the collapse of about 100 000 ozone molecules. Direct emissions of nitrogen oxides into the stratosphere when aircraft move also contribute to the decay of ozone. Reactions causing ozone decay have been found to be accelerated by the presence of solid particles, such as ice crystals in polar stratospheric clouds.

The extremely high levels of ozone losses in the low stratosphere above Antarctica are due to favourable external conditions giving rise to large amounts of active chlorine molecules during a prolonged period of low temperatures necessary for the destruction of ozone. The destruction of ozone under the influence of freons can be intensified by spontaneous accumulations of particles in the stratosphere, for example as a result of volcanic activity.

The main potential consequences of thinning the ozone layer are: violation of the thermal structure of the atmosphere, accompanied by possible changes in atmospheric circulation – a strong greenhouse effect; ultraviolet radiation on the Earth's surface. If all other factors remain unchanged, there is no scientific doubt that the destruction of stratospheric ozone will enhance ultraviolet radiation on the Earth's surface. If all other factors remain unchanged, there is no scientific doubt that the destruction of stratospheric ozone will enhance ultraviolet radiation on the Earth's surface. Increased UV - radiation can affect human health, ecosystems, types of substances, on physico-chemical processes in the low layers of the atmosphere.

B. Acid rains

Another important environmental problem is acid rains. They are precipitation from rain or snow with increased acidity falling on the earth's surface. Rainfall should contain the cleanest of all natural waters. However, human activity has a big impact on the purity of precipitation.

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The gaseous chemical compounds – sulphur dioxide (SO_2) and hydrogen sulfide (H_2S) contained in industrial gases are oxidized and hydrolysed in the atmosphere, resulting in sulphuric acid (H_2SO_4). Similarly, the compounds – nitric oxides are converted into nitric acid (HNO_3).

The chemical compound sulphur dioxide (SO_2) is mainly released in the combustion of fossil fuels containing the chemical element sulfur, mainly coal, which are used in energy and in bits. In the lithosphere, the sulfur element is found in the form of iron and copper ores, such as: sulphur pyrite (FeS) and copper chalcopyrite (CuS). When organic compounds containing sulfur are degraded, this element /sulfur/ is released into the lithosphere, atmosphere and hydrosphere in the form of a simple sulfur substance. In the atmosphere, sulfur takes the form of chemical compounds (gases): hydrogen sulfide (H_2S), sulphur dioxide (SO_2), and sulphur trioxide (SO_3). They have anthropogenic or natural origin. As a result of volcanic activity, 1 million tons of sulphur are released into the atmosphere, which take the form of chemical compounds (gases): H_2S and SO_2. The chemical compound H_2S derived from the degradation of organic matter, reaches 100 million tonnes. Much of the H_2S compound is oxidized to the SO_2 compound. When burning fossil fuels and processing raw materials containing sulphur, as a result of human activity, between 70 million tonnes and 100 million tonnes of sulphur dioxide (SO_2) per year fall into the atmosphere. This toxic pollutant of the atmosphere adversely affects plant and animal organisms [2].

In the air, the compound /gas/ sulphur dioxide (SO_2) is oxidized until a sulphur trioxide (SO_3) /compound - gas/ is received. The oxidation process is catalyzed by iron and manganese aerosols in the air, discarded in industrial production. When connected to water vapour in the atmosphere, SO_3 gas forms the chemical compound syric acid (H_2SO_4) and falls to Earth in the form of acid rains.

Nitrogen oxides are formed by the binding of simple substances nitrogen (SS N_2) and oxygen (SS O_2), under the influence of high temperature in internal combustion engines of cars and other vehicles. The chemical element nitrogen forms with the chemical element oxygen five compounds – oxides: nitrous oxide (N_2O), nitric oxide (NO), nitrous trioxide (N_2O_3), nitrogen dioxide (NO_2) and nitrous pentoxide (N_2O_5). Their harmful influence is multifaceted.

Three cases can be considered for their influence:

1/ First of all, nitrogen oxides cause damage to the respiratory system in humans – to the lungs. In the atmosphere, microscopic nitrate particles (NO_3^--ions) are formed from nitrogen oxides, which penetrate deep into the lung tissue. Oxides react with moisture in the lung and form acid (chemical compound HNO_3);

2/ When reacting with water vapour in the atmosphere /with water in the clouds/, two of the nitrogen oxides - N_2O_3 and N_2O_5 form compounds - acids, respectively – nitric acid (HNO_2) and nitric acid (HNO_3). These acids fall on Earth in the form of acid rains /rainfall from rain or snow, depending on the temperature values in individual seasons;

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3/ Under the influence of sunlight, nitrogen oxides react with unburnt gasoline vapour and other organic compounds – hydrocarbons, forming ground ozone or this is the so-called smog – reddish – brown lobster /fog/, which envelops early morning most major cities in the world.

Acid rains are very dangerous for living organisms. They adversely affect freshwater ecosystems by altering the chemical composition and pH of H_2O. The impact of acid rains on agro – ecological systems and forest ecosystems is negative. A large amount of sulfur found in eroded rocks refers to river currents in the World Ocean and is thus taken away from the area of terrestrial ecosystems. The high acidity of these precipitation activates the erosion processes of these ecosystems. Acid rains destroy fish species, slow down the decomposition of organic matter, disrupt food chains in ecosystems, change the behavior of organisms and have many other negative consequences.

The most common substances, that pollute the soil, are sulphur- and nitrogen oxides coming from the atmosphere. They fall into the soil together with precipitation, increase its acidity and significantly reduce the fertility and quality of agricultural production [2].

Soil acidification is also caused by various sulphur and nitrogen compounds falling into them, along with waste organic mass from settlements /cities/, from livestock farms and poultry farms. As a result of complex chemical changes, under the influence of various microorganisms, compounds - sulphur and nitrogen oxides are released from these organic wastes. They form syedary and nitrogen acids that increase the acidity of the soil and the aquatic environment.

* Interesting facts and statistics related to acid rains and their consequences follow. We can judge for ourselves what will happen to our planet if we continue to pollute the air at this rate.

1. Acid rain destroys plants, animals, forests and poisons people's water supplies. Acid rain is very similar to ordinary rainfall, it does not cause burning of the skin and tissues, it has long-lasting negative consequences. Statistics show that about 11% of the Northern Lakes in the Arctic regions are acidic, i.e. dead;

2. Mexico City is the dirtiest city in the world. Trees and other plant species do not thrive in the city, and during the working days heavy smog falls over the city, which does not allow any visibility /fog prevents it from being visible at a distance greater than 10 meters/;

3. Brazil - The soil around the industrial city of São Paulo has such increased acidity that in many places withered trees are visible, and in the local rivers flows reddish water, in which no fish lives. People in this area have serious health problems;

4. China – on the one hand, in this vast country produces the largest amount of the chemical compound sulphur dioxide (SO_2) – a major pollutant of the atmosphere compared to other countries in the world. On the

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other hand, the Chinese are purifying too little fuel – coal and therefore the air is poisonous in every major city in China;

5. Japan – until a few decades ago the Japanese were the largest polluters in the world, but due to strict laws and precautionary measures, the air over the Island of the Rising Sun is very clean. There, pollutants come in along with the air and clouds from China;

6. Canada – produces only half of the total amount of acid pollutants – sulphur and nitrogen oxides, etc. and the other part of the substances comes here together with the air /wind/ from the United States of America (USA). A single plant in Ontario produces all the acidic pollutants in Canada. Over a 25-year period, Canadians have been able to reduce the production of acid pollutants by more than 40%;

7. United States of America (USA) – occupy second place after the Community of Independent States (CIS) in the production of chemical compound sulphur dioxide (SO_2 - main pollutant of the atmosphere). In addition to the US poisoning the air in half of Canada, they destroy their own nature methodically and consistently;

8. The Commonwealth of Independent States (CIS) – even after the collapse of the USSR, the CIS remains one of the most important producers of sulphur dioxide. The toxic substances emitted and the acid rains falling have an impact even in Siberia and at the North Pole;

* The problem of acid rains in European countries

9. Czech Republic - large territories with an area of tens of square kilometers in the Central Czech Republic have been turned into "dead zones" by acids. The number of sick people with respiratory problems, especially in children, in the central parts of the Czech Republic is much higher than in other regions of the country. In some places, even water is forbidden to drink /only bottled water is used for drinking purposes/;

10. Sweden – Swedish scientists are the first in the world to do studies on the problem of "acid rains". In Sweden, all pollution comes from other countries, and in this country there are more than 18 000 poisoned and destroyed lakes, and in some places the water is inedy drinking;

11. Switzerland – large quantities of pollutants are carried by air mainly from neighbouring European countries. Southern regions are most affected in this respect. The southern mountain ranges of the Alps have already begun to perish;

12. United Kingdom (England) – produces the largest amount of pollutants in Europe (sulphur and nitrogen oxides), but is not moved by the European Union's accusations that it pollutes the whole of Europe; a group of English specialists claim that the problem of "acid rain" has not been investigated thoroughly enough and these accusations are unfounded;

13. France - dry acid deposits destroy trees in western and eastern France, which has agreed (by agreement) to cut its production of the main gas - sulphur dioxide by half. To that end, however, the French

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government has decided to expand its nuclear industry, which faces a decisive retaliation from Western European environmentalists.

C. Greenhouse effect

Another global environmental problem is the Greenhouse Effect. Since life first originated on Earth, the natural release of water vapour, gases: carbon dioxide (CO_2), methane (CH_4), nitrogen (N_2), nitrogen oxides and other gaseous substances has helped to maintain the temperature of the Earth within which life can exist. These substances act as a greenhouse, protecting the atmosphere from the solar heat.

Human activities enhance the natural greenhouse effect. The combustion of solid fuels, coal, oil and natural gas leads to the release of gaseous substances, such as: CO_2, CH_4, N_2, called greenhouse gases. The felling of forests that process carbon (C) from the atmosphere during the photosynthesis process increases the level of CO_2.

Over the past century, humanity has significantly changed the chemical composition of air: the level of carbon - C increased by 25%, NO – by 19% and the CH_4 - by 100%. As a result, planet Earth is warming extremely fast. Climate research over the past three or four decades has shown that the Earth's temperature is rising.

The four registered as the hottest years are: 1998, 2002, 2003 and 2004. In the summer of 2003 alone, 10% of alpine glaciers melted [8, 9]. There are many dangers. Global warming would affect ocean currents that regulate the temperature of individual areas. Regional climate change would lead to drought and, as a result of drought, disasters such as hunger and misery in many parts of the world. Global warming would lead to the disappearance of forest massifs and species due to the change in their natural environment and to the expansion of the deserts. The strong manifestation of the greenhouse effect in the last decades of the 20th century and in the 21st century, as well as the associated global warming, is primarily due to anthropogenic activity.

Sharply increased combustion of fuels (coal, oil, earth gas, wood) is the main cause of the emission of huge amounts of CO_2, CH_4 and other greenhouse gases and aerosols.

Since the beginning of the Industrial Revolution, the atmospheric concentration of the compound – CO_2 gas, which is the main causative agent of the Greenhouse Effect, has increased by nearly 30 %, the concentration of N_2O by 15 % and the CH_4 has doubled. In the coming decades, an uncontrolled increase in the concentration of heat-absorbing gases will cause extreme changes in the behaviour of the global earth climate. Direct manifestations of the long-term trend for global warming can be [8, 9]:

- hot waves and periods of unusually warm weather;

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- extreme porches and storms, heavy snowfall in the northern regions / in the northern part of the northern hemisphere / and extremely high temperatures and sushi in the southern part of the Northern Hemisphere;

- melting glaciers in the polar regions and high mountains;

- warming of the Arctic and Antarctica, partial disintegration of the coastal ice crust and melting ice blocks;

- increase in sea level from 15 cm to 100 cm as a result of the indicated phenomena; Flooding of fertile low land and coastlines.

D. Radioactivity. Nuclear reactions

This is one of the most serious environmental problems. Numerous studies have proven that the atomic nuclei of certain chemical elements (HE) under certain conditions can break down. The phenomenon of "radioactivity" was discovered by the French physicist - professor at the Paris Museum of Natural History Henri Beckerel in 1896.

This scientist found that uranium-containing ore without external impact emits rays that leave traces on a photographic plaque. Later, the phenomenon was called natural radioactivity [1]. Chemical elements whose atoms break down in a way are called radioactive elements.

Such elements are, for example: uranium – U /Z = 92/, torius – Th /Z =90/, francis – Fr /Z=87/, radium – Ra /Z = 88/ etc. Three types of radiation α - , β - and γ – rays - were found in radioactivity tests. They have a certain penetrating ability. α - and β - rays deviate from an external electric field.

The three types of rays can cause the conversion of atoms into ions and are therefore called ionizing rays or radioactive rays. They differ both in their properties and in the way of their impact on living organisms. The decay of the nucleus of a chemical element can also be triggered in an artificial manner when the atoms of the chemical elements are fired with neutrons, with accelerated electrically charged particles or with γ-rays /gamma-rays/.

Nuclear reactions associated with a change in the atomic nuclei of part of the elements (change in the number of protons or neutrons leading to the formation of a new chemical element or isotope of the same element) result in artificial radioactive isotopes of the chemical elements concerned. The acquired ability of the atomic nuclei of chemical elements to emit ionizing /radioactive/ rays is called artificial radioactivity.
This phenomenon was discovered in 1933 by the French scientists /spouses/ Irene and Frederic Jolio-Curie. Many radioactive isotopes are artificially obtained, such as: uranium – ($^{236}_{92}$U), krypton – 91 ($^{91}_{36}$Kr), barium – 142 ($^{142}_{56}$Ba).

The measurement unit for radioactivity is becquerel (symbol - Bq). 1 Bq = 1 decay for 1s [1].

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Environmental pollution with radioactive substances is the result of attempts with nuclear weapons and in accidents in nuclear power plants (NPP). The air nuclear explosion is carried out several hundred meters above the earth's surface, which is why no earth's mass falls into the fiery orb. The radioactive cloud quickly rises to an altitude of 15–20 km. In the case of a ground nuclear blast, a large amount of soil is sucked into the fireball. This soil melts, evaporates, and after a while it condenses again to soil particles on which radioactive substances adhere.

Due to their severity, soil particles are deposited at the site of the blast and there remain 80 % of radioactive substances. The area on which radioactive particles are deposited immediately after the blast is called a trace. It predominates the products of isotope division of the chemical element uranium - uranium – 235 / ^{235}U / or of plutonium – 239 / ^{239}Pu / with the main importance of γ- radiation /gamma – radiation/.

The smaller particles in the cloud fall very slowly, which leads to a radioactive trace reaching a length of several thousand kilometers. Small particles remain in the first layer of the atmosphere, that is, in the troposphere. The deposition of these particles on Earth occurs mainly through rainfall.

In normal operation of the atomic power plant, discards into the atmosphere do not lead to an increase in the radiation background. Radioactive gas accidents and especially explosion accidents are dangerous. The bulk of the radioactive substances are deposited at the site of the accident and only at strong horizontal currents, such as air currents and winds, can be moved to thousands of kilometers.

E. Desertification

Desertification is the development of desert conditions as a result of human activity or climate change. This is a process of damage to the land, as a result of which the soil spreads like a desert in anhydrous and semi-anhydrous areas. There's a loss of plant cover and soil. The reasons for the appearance of the "desertification" process are:

1/ Destruction of forests (cutting down forests), most often without learning enough factors, such as climate and topography on the land;

2/ Global warming, which can turn much of the drought into a desert.

Restorative and precautionary actions taken against the "desertification" process include: irrigation, planting trees and lawns, erecting barriers against sand dunes, and careful and prudent use of water resources.

F. Water pollution /hydrosphere contamination/

This is also a very serious and difficult to solve an environmental problem for all humanity. Biogenic emissions of phosphorus and nitrogen can / as simple substances / can cause significant environmental and

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economically negative consequences. This can be pollution of groundwater or eutrophification of rivers, lakes, and especially of the host seas.

These problems are directly related to social and economic aspects, such as: consumption of drinking water, tourism and fishing /these are sectors affected/; agriculture, food industry, wastewater treatment /responsible, impactful sectors/.

Effective management of biogens on a scale throughout the river basin for optimal use of resources and prevention of biogenic emissions, for example, in the field of wastewater treatment and agriculture, requires adequately modelled activity at international, national and regional level.

a) The circle of water in nature

In order to properly assess the nature and complexity of the main problems of using and protecting water resources, it is necessary to know the water circulation in the biosphere. It is expressed in the continuous course of interconnected processes of evaporation, condensation and drainage. Under the influence of the solar heat, huge amounts of water pass from the earth's surface to the atmosphere, where they form atmospheric moisture.

Very rarely, this moisture corresponds to the equilibrium pressure of water vapor above the surface of the seas and oceans. Air currents that raise water vapor into the atmosphere above the surface of the Earth violate this balance, causing the evaporation of new amounts of water.

Water vapours that are caught in the atmosphere, encountering cold air currents, condense into small droplets or ice crystals measuring in the order of 0.001– 0.01 mm and form the clouds. When droplets or crystals of the same size are formed, the dispersed phase is relatively stable.

When creating conditions for violation of the monodispersity of the condensed phase in the clouds, the so-called "Osvald maturation" occurs. Larger particles absorb smaller ones, overhesit, and when they reach sufficient size fall to the ground in the form of rainfall from rain or snow.

It is possible that when reducing or even eliminating the repulsion between the parts (by adsorption of ions with opposite loads), they are aggregated and form larger drops. The phenomenon is known as coalescence and also leads to rainfall.

Part of the water that fell to the surface of the earth drained from it, and through the springs, streams and rivers returns to the oceans and hence closes the cycle. Another part is absorbed by the soil layer where soil moisture forms. Soil moisture returns to the atmosphere mainly in two paths. One is through direct evaporation and the other is evaporation through plants, which is known as transpiration.

There is also a third time, which is expressed in the participation of the water taken by plants in the process of assimilation of CO_2 in photosynthesis. The total volume of water included in the cycle is constant.

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In individual places, there may be a change in the speed of movement of these flows of vapour and condensed water. In fact, the movement of the entire mass of water should not be considered continuous. Water can be temporarily "stored" (even for hundreds of years) in the ocean, in the Earth's surface, in the atmosphere. The calculations show that only about 500 000 m3 of water annually participate in the circle [5].

b) Types of pollution and types of water pollutants

Earth's waters are exploited by humans to meet a variety of his needs, such as drinking needs, transport, household, agriculture, electricity extraction, disposal of various waste. Many of these activities, when no nature-consistently, strongly violate the ecological balance of the planet (for example: irrigation needs, waste disposal).

Most human activities, especially in the early and middle of the last century, were critical factors that led to the strong pollution of earth's waters. In modern times, the idea of sustainable development is born and developed, that is, achieving synchronisation between humanity and nature without stopping scientific and technical progress. However, this idea, while widely applied and partly successful, has so far not been proven in relation to the entire planet Earth. There are many conditionalities and unexplained moments. In general, water pollution negatively affects water ecosystems.

The following is a classification of impurities grouped by several features:

1/ According to the source of pollution:

** Point contamination. Point contamination is present when the discharge or direction of pollutants is allowed into the waters from a specific source (for example, oil spill). Usually there is a result of omissions, negligence and incorrect storage of different waste;

** Diffuse contamination. In general, diffuse pollution is caused by water passing to or through a pollutant, retaining part of it and transporting or ingesting it elsewhere. A large percentage of diffuse pollution leads to such deterioration of water quality that they become unfit for fishing and swimming.

Such pollution occurs during rainfall, melting of snows or irrigation with water from canals located above or below the ground. These flowing waters collect the pollutants and deposit them in rivers, lakes and coastal reservoirs, or bring them into the groundwater. This type of pollution also leads to a change in the vegetation of the reservoirs, their shape and flow.

Diffuse pollution is very widespread because it occurs at all times and in a variety of human activities, damaging the qualities of water, soil and air. Agriculture, logging, grazing, sanitation systems, shipping, traffic, construction, physical changes of water basins and currents, not least habitat degradation (habitats), are potential sources of diffuse pollution.

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Irresponsible and uninformed households also seriously contribute to this type of pollution. The most common diffuse pollutants are sludge and organic matter. They are washed away and entered into the water basins from arable land, small and medium-sized farms for domestic animals, construction and other similar human activities.

Another common source of diffuse contamination are pesticides, pathogenic organisms (bacteria and viruses), soil salinity, oil, sludge, toxic chemicals and heavy metals. Millions of dollars are needed to rebuild the places degraded in this way. Most types of pollution affect the area around the pollution source. However, sometimes pollution can affect areas hundreds of kilometres away from the source and is called transboundary pollution (for example, nuclear pollution).

2/ According to the origin of the pollutant:

** Natural sources - some of them are volcanic activity, polluting with dust particles, gases, etc., various waters passing through layers with high sulfur content and other poisonous substances;

** Anthropogenic sources – the most significant water pollutants on the planet.

3/ According to the type of pollutant:

** Chemical contamination– organic and inorganic, depending on the released compounds;

** Radioactive - contamination by radiation of radioactive particles;

** Mechanical – contamination with insoluble particles causing clouding of water;

** Thermal – artificial increase in the temperature of the reservoir from various activities;

** Biologically, which in turn is: Microbiological - contamination with pathogenic microorganisms; Introduction of uncharacteristic species - the so -called introdation of species in foreign ecosystems. It is the introduction of species (such as fish) from one ecosystem to another in which they have never encountered (for example, North American and Asian species imported into Europe).

4/ According to the duration of action of the pollutant:

** Fusillade (single) – accidental release of a pollutant, most often in accidents;

** Periodically – rare, may be associated with seasonality in the yield of a product (for example, fruit processing);

** Continuous – the most common, consists in the constant release of polluting substances into the waters (e.g. from factories, sewage).

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5/ According to the type of water pool:

** Pollution of surface water. Surface waters are the natural water resource on Earth. They are located on the Earth's surface and include the oceans, rivers and lakes;

** Pollution of groundwater. A large amount of water on the ground is located below the surface - in the soil or below rocks and aquifer rock structures. People often use these sources to supply drinking water (from wells). Usually, groundwater is polluted as a result of human activity.

Most often this is done by seeping pesticides through the soil, thus causing serious problems related to the quality of drinking water [5].

c) Pollution of water with heavy metals

1/ General characteristic. Classification of heavy metals.

Heavy metals are a group of chemical elements having a relative atomic mass of Ar > 40 and a density of ρ > 5 g/cm3. Not all heavy metals are toxic or harmful, many of them are vital for animals and humans, since they make up a number of enzymes and microstructures of cells.

These are the: iron, cobalt, manganese, copper, selenium, etc. The heavy metals group covers about 2/3 of Mendeleev's periodic table. The greatest danger to human health is mercury, cadmium and lead metals. According to UNESCO's 1980 decision, seven more heavy metals were added to them – vanadium, cobalt, manganese, copper, nickel, tin, strontium, and three metaloids – arsenic, selenium, antimony. Later, two more metals – zinc and titanium – were added. By degree of danger, heavy metals are divided into three main groups, from the highest degree of toxicity to the lowest for human health:

- First group: mercury, cadmium, lead, arsenic, selenium, zinc, titanium;
- Second group: cobalt, nickel, molybdenum, copper, chromium;
- Third group: barium, vanadium, manganese, strontium, aluminum.

The most dangerous are metals from the first group. They are kept in the environment for a long time and are biotransformed in even more toxic compounds. Their ability to accumulate in organisms and create permanent residual amounts are a prerequisite for prolonged toxic effects on the human body. Toxic heavy metals in the majority are cations, easily accumulating in the soil, which are difficult and slowly separated from it. For example, the period of semi-detachment from the soil of cadmium is 110 years, zinc is 150 years, copper – up to 1500, lead – up to several thousand years, this indicator depends on soil pH, humus content, cation exchange emcolement and other soil characteristics.

Heavy metals are a natural component of the Earth's crust. Through geological weathering, volcanic activity and other natural processes, they are in a continuous circle. This cyclic process is a source of

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background levels of heavy metals in the environment. The main source of heavy metals contamination in the doontropogenic period of the biosphere is the emissions of aqueous solutions of geyser and volcanic origin, the dissolution of rock materials from precipitation and rivers, and the treatment of solutions in the ocean, where their concentration is maintained by the balance "bottom sediments - water solution".

The anthropogenesis of heavy metal streams should be sought as early as the Ancient Age, when iron, copper and zinc metals were extracted and used for various purposes – weapons making, ceramic materials, vessels, etc. The load on the biosphere with heavy metals is greatly increasing as the industry develops, especially in the last decades of the 20th century.

The problem is getting bigger due to the fact that for heavy metals, in principle, there are no self-purification mechanisms – they only move from one natural reservoir to another, interacting with different categories of living organisms, and everywhere leave visible negative consequences of this interaction.

The quantities of heavy metals which, as a result of human activity, are emitted into the biosphere and included in the range of substances repeatedly exceed those of natural origin and are involved in the biogenic cycle. According to the latest data, the amount of lead that enters the atmosphere from human activity is 340 times greater than that coming from natural sources, for cadmium – 19 times greater, for mercury – 275 times.

Human energy and mineral resources consumption is the main cause of contamination of the biosphere with heavy metals. It is considered that where the extraction speed of an element exceeds 10 or more times the speed of its transmission in the geochemical cycle, that element should be considered as a potential pollutant.

Heavy metals accumulate mostly in the soil and sediments of water basins, but these are not secure end landfills. From the soil they can be extracted through plants, groundwater, surface water with increased acidity. By bacterial processes are also extracted in a solution metal ions from the bottom mass, which are then included in the circle. In these processes, due to the absence of chemical or biochemical degradation of metals, slowly but continuously increases their amount in the flow of the circular.

In the early 1990 s, scientific research and debate began to need to optimize the ways to evaluate and control the spread of heavy metals. The subject of attention are metals cadmium, lead and mercury, given their proven highly toxic effects on organisms.

The widely used "very permissible concentrations" are insufficiently reliable, because they are mainly in accordance with the harmful effects on humans, and also refer only to the soluble forms of the elements. It should be borne in mind the fact that the fall of metals in living organisms takes place in the form of aerosols from the air or soluble forms such as: Free ions, complex compounds with organic or inorganic ligands.

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Essential for their spread is the chemical composition of water surfaces, which is highly dependent on the pH of the medium. As it increases, the solubility of the salts of these metals increases, both in the suspended particles and in the bottom nanos, and hence their direct toxic effect increases.

For this reason, the indicator "Critical load" is introduced, which according to modern knowledge takes into account the maximum load limit with a polluting substance, below which the sustainable development of ecosystems is maintained. This indicator is a measure reflecting the specificities of a particular ecosystem, including all its constituent components. Critical loads are an indicator characterizing the state of equilibrium for an ecosystem.

A real idea of the respective water bodies is obtained taking into account the metals imported with the rainfall. When the delayed quantities exceed the critical loads by value, irreversible changes occur in the system and urgent measures are required to restore equilibrium [5].

d) Pollution of water by nitrates and nitrites

1/ General characteristics

Nitrates are chemical compounds - nitric acid salts, which are widely used in agriculture (for fertilization with mineral fertilizers); in the food industry (such as colors and preservatives); For the production of paints, medicines, plastics, glass, explosives and more.

Nitrates enter the human body through drinking water and food products. The permissible amount of nitrates in drinking water is up to 50 mg /l. In some settlements, drinking water may contain a significant amount of nitrates (mainly from run-off water from arable agricultural areas).

The main sources of water contamination with nitrates are the following excessive or improper use of organic and mineral fertilizers in agriculture; waste water from domestic, livestock production and from plants producing nitrogen mineral fertilizers, medicines, plastics, glass, explosives.

Nitrates are natural constituents of plants (they enter them from the soil when fertilized) and a major source of nitrogen needed for their growth. In ripe vegetables and fruits contains a minimum amount of nitrates. The amount of nitrates in plants is different and depends on some factors, such as temperature, sunlight, soil moisture, nitrogen level in the soil. Nitrates themselves are not toxic. A danger to human health are substances that can be formed by nitrates that get into the body (before or after ingestion with food or water) – nitrites and nitrosamines. Nitrites connect to hemoglobin in the blood, as a result of which a compound called methaemoglobin is formed. Methaemoglobin is incapable of transporting oxygen to organs and tissues, as a result of which a condition known as methaemoglobinemia develops, characterized by bruising of the skin and mucous membranes (cyanosis). Nitrates are most dangerous when converted into

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nitrites even before ingestion. This conversion can be done with improper storage of food products (high temperature and reduced oxygen content in the room) or during cooking, especially when frying. With low acidity of gastric juice, nitrites can turn into nitrosamines, which have a carcinogenic effect. When large doses of nitrates enter the body, after 4 to 6 hours, nausea, shortness of breath, diarrhea, bruising of the skin and visible mucous membranes occur due to the accumulation of high amounts of methaemoglobin and unoxided blood. At the same time, general weakness, dizziness, sometimes seizures, pain in the back of the head and palpitations are felt.

The use for a long time of food and water with a high content of nitrates leads to the development of an allergy, a violation of thyroid functions, an affecting the musculoskeletal system and nervous system. Impaired metabolism can become the cause of various diseases. According to the World Health Organization, the harmless amount of nitrates for an adult person is 5 mg/kg of weight per day, with the allowable daily amount of up to 500 mg.

When nitrates occur in the human body above this limit concentration (LC), they already pose a potential health hazard [5].

2/ Sources of water pollution with nitrates and nitrites

Sources of pollution are "point" and "diffuse".

* "Point" contamination occurs when the release or discharge of polluting substances into the waters from a specific source is allowed, in this case nitrates (e.g. permeation of manure from a thoris). It usually occurs as a result of deficiencies, negligence, mismanagement and storage of organic fertilizers, but most often due to lack of facilities for this purpose.

Pollution can also be caused by point sources of negligent storage and storage of fertilizers near drilling and wells, resulting in the dissolved fertilizers entering groundwater directly.

* "Diffuse" sources – this type of contamination is due to the permeation of water from the earth's surface or from the general movement of nitrates into the soil. Diffuse contamination is the result of the application of organic or mineral fertilisers in quantities exceeding the needs of nutrient crops or the existence of a thin surface soil layer which cannot absorb nutrients.

* Contamination can be obtained when fertilizers are imported under inappropriate soil or climatic conditions. If agricultural crops or grazing vegetation are unable to absorb the nutrients available, then a significant proportion of them are lost by leakage into the Polish drainage system, into nearby rivers and lakes or penetrate into the lower soil layers, leading to groundwater contamination.

* Water pollution with nitrates and nitrites from agriculture

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The presence of known small amounts of nitrate ions in surface and groundwater is natural and is due to their entry from the soil. In the soil, nitrogen is bound in the form of complex organic substances (humus). Nitrates are not permanently related to soil particles and are easily washed away by fallen rainfall.

Even with optimal dose fertilization due to intensive agricultural activity, water pollution with nitrates is inevitable. Increased nitrate administration may occur for the following reasons: a) non -specialized application of organic and mineral nitrogen fertilizers in minerals - the wrong period of use and wrong dosage, and in the organic - the doses are unknown; b) In intensive animal husbandry, when there is no possibility that the separating liquid fertilizer is stored incorrectly or used at the wrong time.

The result is a high nitrate content in groundwater. The increased nitrate content of surface water is relevant when, due to high phosphate content, phosphates are no longer phosphates and nitrates become a minimum factor for plant growth. This is valid for surface water basins, such as lakes, as well as the Black Sea.

The groundwater situation is different: when using groundwater /drinking water/, containing nitrates, nitrates penetrate the human body. Plants whose growth is stimulated by overdosed nitrate fertilization can also store excess amounts of nitrates. For example, when consuming vegetables, large amounts of nitrates enter the human body. The migration of nitrates from soil to groundwater is a seasonal and temperature-dependent process. When the soil layer freezes, the movement of the water is completely blocked and the migration is stopped. At high summer temperatures, the growth intensity slows down, reducing the amount of nitrates absorbed.

* Pollution caused by industrial livestock production.

Animal waste is very rich in nitrogen, phosphorus and potassium and these natural fertilizers are often used. The average nitrogen data are: in beef fertilizer - 5 kg/t; in pork fertilizer - 4 kg/t; in bird fertilizer - 15 kg/t. It follows from these data that the use of manure and flushing waters from farms can also be sources of biogenic elements. Therefore, it is necessary to take measures to reduce the risks of nitrogen pollution. Such are, for example, the ration of protein, wastewater treatment, proper storage of natural fertilizers.

* Pollution caused by the use of nitrates and nitrites in the food industry. Nitrites are toxic to humans, but are much more toxic to unwanted microorganisms that develop in meat and canned food. Therefore, they are used as antimicrobial supplements to stabilize the color of the meat products, and also have a beneficial effect on the formation of pleasant aromas.

The antimicrobial activity of nitrates and nitrites depends on a number of factors (pH, t°, oxidation-reduction properties of the environment). The effects of nitrites on the microorganisms are due to the intracellular formation of the chemical compound nitric oxide - NO, which blocks an essential stage of their

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metabolism. The nitrites also affect the bad smells of amines and help to produce pleasant odors of canned meats. With industrial wastewater of this type of industry, nitrates and nitrites also fall into the waters.

* Risks to the environment and man due to pollution by nitrates and nitrites

The high content of nitrates in superficial waters creates conditions for eutrophification, resulting in the appearance of excessive algae and other aquatic plants that absorb oxygen from the water and lead to the death or migration of fish and other aquatic inhabitants. Mass growth of harmful algae species, which are toxic to humans and animals, is also possible.

Thus, water ecosystems are disturbed significantly, and they also lose their economic significance as a resource for tourism, recreation and entertainment. Even more dangerous can be the high content of nitrates in the catchment area for drinking water. In this case, there are serious health risks. When sources of nitrates are waste or animal fertilizer, waters can also be contaminated with microorganisms or fecal bacteria.

These waters are unsuitable for drinking unless properly purified. In the pair of nitrate / nitrite ion, the second ion can play the role of reducer, and in the pair nitrite / nitroso ion – the role of oxidiser. Therefore, the probability of nitrite ion reacting with different molecules or ions is high, which is the cause of its toxicity. For this reason, the main risk to human health is nitrite ion, not nitrate ion.

The conversion of nitrates into nitrites requires energy and in a biological environment can be carried out under the action of the enzyme nitrate reductase. This enzyme exists in plants and bacteria, but is completely absent in animals. In the oral cavity of a person there are bacteria that transform about 1/4 of the accepted nitrates into nitrites.

The first known cases of compound poisoning - nitrites dates from 1895 and are registered in cattle. The nitrites that are present in the stomachs of animals have been found to come from the reduction of nitrates from the green corn. This type of poisoning was called methemoglobinemia.

Nitrites directly affect hemoglobin, since they oxidize Fe (II) to Fe (III) and do not allow hemoglobin to perform its function as a diet pigment. The natural level of methaemoglobin in the blood of a healthy person is 0.8 %. Signs of methaemoglobinemia become noticeable once the content of methaemoglobin reaches 10% (the color of the skin and mucous membrane changes). When reaching 70 % poisoning (the disease is called asphyxia) can lead to death. In the elderly, deaths are rare, since in them the body has effective functions of protection. It is more dangerous in babies (infants – in them in gastric juice there is no hydrochloric acid - the pH is about 7 and the middle is favorable for reducing nitrates).

Nitrozoamines. Nitrite ions, respectively nitric acid, may interact with amines. Studies in rats have shown that the compounds – nitrozoamines have carcinogenic properties – 75 % of the nitrozoamines studied cause tumors of the liver, stomach, kidneys, pancreas and other organs.

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3. Problems with pollution of the lithosphere

A. The soil and the need for its conservation:

The lithosphere is the highest hard shell on our planet and is made up of the Earth's crust and mantle. The Earth's crust includes rocks, minerals and soil, and is continental and ocean. The soil is a natural body with complex construction and special properties.

"Soil" is called the surface loose layer of the Earth's land, which is formed by the influence of organisms, climate and relief on the soil -forming rocks and has the property of fertility. It is a complex system that is inhabited by huge quantities of microorganisms that are actively involved in all processes related to the circle of substances in nature.

The chemical properties of the soil are determined by the humus content and the acidity of the medium, and according to their reactions, the soils are: sour, alkaline and neutral. Soil contamination disrupts and worsens the structure, its quality composition and fertility.

Causes of pollution may be irrigation water containing physical and chemical substances above the permissible limits, such as: solid waste, industrial dust, chemicals, etc.

Soil pollutants are: mechanical, physical, chemical and biological [3]. For the protection of soil, a quantitative and qualitative assessment of land resources, improvement of legal and administrative and economic measures for the conservation of land resources, the development of long-term programs to limit erosion in the various forms of occurrence and scientific use of intensive factors in agriculture, such as chemicalization, mechanization and irrigation, should be organized.

B. Human interaction with the lithosphere - is carried out through a series of changes:

- development of rich and large mining locations of minerals, which leads to the depletion of mineral reserves;
- modification of the relief of the Earth's surface due to an artificial change of the landscape;
- changes in the balance of substances at the top of the lithosphere and its surface due to anthropogenic contamination of the atmosphere and soil;
- change in the condition of the aboveground and underground hydrosphere;
- change of the water-heat balance of the earth's surface;
- violation of the geostatic field at the top of the lithosphere;
- modification of the mountains as a result of construction and operation of engineering facilities;
- geophysical changes - occurrence in the lithosphere of various physical fields, which lead to corrosion of metal objects in the earth and their destruction (seismic, acoustic, electromagnetic changes).

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A characteristic feature of the modern stage is the global impact of man on the environment, which is accompanied by unprecedented intensification and globalization of negative effects on nature. At all stages of its development, man was closely related to the environment.

But with the advent of high industrial society, the dangers of its intervention on nature increase sharply. With each passing day, the volume of this impact is expanding, it becomes more and more dangerous. (http // ekologiq.dokumentite.com/art/antropogenno-zamyrsqvane-na-litosferata / 82959 / p2 [14])

Every community and country strives to survive and beneer, but they do not always respect the interests of other communities and states.

Is it the man's fault or not?! After all, we cannot continue to live as guests on this planet because we are part of nature. And even with some actions to help her, with many other actions, we do lasting harm.

The rapid development of the packaging industry in recent decades has led to a triple increase in the volume of municipal waste in industrial countries compared to the period 1980 - 1990. Where to dispose of countless polyethylene bags, plastic bottles, aluminium cans and other used packaging? Burying them in the ground, we pollute the lithosphere [15].

Soil is the surface layer of the lithosphere. With improper operation, the soil is irretrievably destroyed. Due to the fact that a variety of physical, chemical and biological processes take place here, each contamination of the soil leads to their violation.

C. Sources of soil contamination:

Although conditional, sources of soil pollution and destruction may be grouped into the following categories [3]:

1/ Construction waste. They would appear mainly during the construction of the facilities. Therefore, it is necessary to make a preliminary estimate of their quantity and, respectively, their disposal or destruction.

2/ Fuel - lubricants. This type of pollution mainly affects the soils, but the water is not protected, both surface and groundwater. If they do not comply with the relevant standards for their storage, they are able to seriously and permanently pollute the soils, and it will take a lot of effort and resources for their disposal.

3/ Transport. The use of different types of vehicles can lead to pollution of the atmospheric air and hence the soil, with different composition and concentration of toxic compounds. Some of them are distracted in the airspace, but others may fall too close to the source of contamination and thus permanently contaminate the soil cover.

4/ Soil destruction. Under the influence of vehicles and a certain kind of activities, soils can be highly threatened by destruction and destruction. It is appropriate to recall here that, as a result of accelerated erosion, over 2 billion hectares have been lost in the last 100 years, about 27% of the active agricultural land

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used worldwide. Therefore, when using military polygons, sufficient means are always provided for the restoration and reclamation of disturbed soil cover.

Soil erosion is a worldwide environmental problem. The natural factors for erosion are water and wind. Improper use of mineral fertilizers and pesticides, as well as the accumulation of heavy metals, are the most common causes of soil pollution. Therefore, we have to keep the soil and the world clean in order to live in a better and clean world.

D. Transfer of soil pollutants along food chains, environmental consequences of pollution

With the help of water, surface pollutants penetrate the soil, one part of them passes into the groundwater resources, and another is digested by plants and accumulates in them. It is known that currently 60 % of the nitrogen required for plants is fed through man-made fertilisers and the annual quantity of nitrogen compounds of anthropogenic origin used now amounts to 60 million tonnes. Excess quantities in the form of nitrates accumulate in plants, pass from them directly into humans or animals and therefore adversely affect the vital and physiological processes.

In small quantities, molybdenum is a mandatory trace element. Its characteristic feature is that it accumulates in significant quantities in legumes and especially in alfalfa. Cows willingly consume such alfalfa, but in their milk the concentration of the molybdenum element tenfold exceeds the limit quantities, it becomes dangerous for calves and therefore for humans. The element cadmium also passes from the soil into plants, and hence into animals and man, damaging the kidneys and bone system [3].

As a result of soil contamination reduces its biological activity, its structure is destroyed, which leads to intense erosion activity; production and quality of agricultural production. All this, on the one hand, causes people's health to deteriorate and, on the other hand, requires the search for new alternative solutions, for which significant funds are required.

Increasing the concentration of nitrates above the limit quantity leads to a decrease in production or deterioration of soil quality and makes groundwater unfit for use. Agricultural production is difficult to realize on the world market, it is necessary to pay for insuscepts, which aggravates the economic performance in total for the country, the particular company or enterprise. Low-quality food products are not suitable for consumption, and consuming such products leads to severe poisoning and the cost of restoring people.

E. Methods for preventing and limiting soil pollution

- First of all, we should point out the choice of new short -duty and unusual technologies in public production - agriculture and industry.
- Secondly - reconstruction and construction of new drinking water treatment, air filters and more.

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- Third - optimization fertilization and watering in accordance with scientific -reasoned norms.

- Fourth, based on biotechnology to produce new biological and hormonal plant-protective preparations, which are environmentally friendly and harmless to humans and warm-blooded animals.

- Fifth - optimization of the varietal structure in agriculture, in order to minimize the need for fertilization and plant -protective events.

Undoubtedly, soil conservation is an extremely important problem that should find solution in the coming years.

Globally and regionally, the problem of protecting and protecting the lithosphere (land, soil) stands out as one of the most important tasks of environmental and food security.

Research by the United Nations, UNEP, FAO and other governmental and non-governmental organizations shows that the irrational use of arable land for non-productive purposes, its global pollution, the lack of adequate care to protect and enhance soil fertility, mass monoclonal and monosort agriculture, uneven distribution of arable land, can put humanity in the face of a food crisis that is growing in places of catastrophe.

The outcome is strict compliance with international arrangements for the protection of land, soil wealth and fertility, for organic farming, for integrated measures to combat diseases and insect pests [14].

4. Methods for preventing environmental pollution

Two methods are available /two options/ to solve this problem: the first method is to replace the processes in the polluting technology with others that are less polluting or non-polluting; The second method consists in the following: In a production process related to polluting emissions, purifying facilities are placed on their way to the environment. The principle of operation of these facilities is different - physical or chemical processes take place. For example, electrofilters are used to capture dust particles [7, 12].

Chemical processes consist in the absorption of harmful components of gases into solutions or solid high porous substances. For example, easily burning pollutants are subjected to a burning process in special devices to the chimneys. Appropriate processes for reducing pollutants in wastewater flows are precipitation and filtration.

In the case of organic substances, biochemical methods are applied, in which the relevant organic pollutants serve as food for certain types of microorganisms /nitrifying/ and become final products - chemical compounds – carbon dioxide and water.

In this way, wastewater is processed from sewage in cities - a similar biochemical method is used in urban wastewater treatment plants equipped with so - called biopools. Many dangerous and toxic substances are used in the "agrochemistry" direction. This is necessary to protect the harvests and is profitable, profitable

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activity. In order not to be dangerous preparations - pesticides for the environment, new chemical compounds are being developed with a specific orientation of action in order to be safe for other organisms in the environment. Pesticides are created with such a structure that facilitates their rapid deactivation and conversion into harmless substances under the action of light, moisture from air and soil.

The problem of using renewable resources or recycling of some waste is very important and is gradually solved. For example, household waste from big cities contain a high percentage of glass, paper and plastics. All these waste can become raw materials for recycling instead of filling the landfills. The only condition is that the term "separately" collection is used to be collected separately (the term "differentiated") is used to facilitate and stimulate processing enterprises.

A major problem for modern energy is to find and use alternative energy sources. There has already been an answer to this question. For this purpose, various branches of solar technology have been created. This is understandable because it is known that solar energy is huge, and for now, energy is used mainly from plants - only 0.1%. The devices that use the energy of the sun are: Solar collectors and Solar electricity elements.

Solar collectors – these are systems of blackened pipes, absorbing the sun's rays most strongly, turning them into heat.

Operating principle: By water circulating through the pipes, it is warmed and can be used immediately or stored in a tank. In order not to emit the heat of the collector as infrared rays, on top it is closed with glass. It is transparent to sunlight, not omits infrared rays. Such solar collectors save electricity for warming water in boilers and are widely used in many countries around the world.

Solar electricity elements - they are semiconductor photocells (based on silicium), which converts light directly into electricity. The usability of light already exceeds 10%. These photocells are widely used on a large scale - for example, for electric vehicles.

The so - called solar architecture is used as a promising direction of solar energy. Its principle of action is aimed at saving electricity, solely using the energy of the sun, namely an exposure of buildings, special windows, walls of photocells capturing the sun's rays, as well as solar collectors that accumulate the warmth of the sun in huge water tanks and as a result, there is hot water for everyday life and heating.

Conclusion

Possible scientifically sustained approaches and methods to prevent environmental pollution are reduced to: use of various chemical products, biochemical methods for wastewater treatment, as well as the conduct of emission disposal processes /separated substances/ by industrial plants. Prudent energy consumption, the finding and use of alternative energy sources are important for the protection of the environment.

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