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Considerations on pollution at European level

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Abstract. Human activity has caused profound changes to the environment, and not infrequently the resulting effects have proven to be irreversible. Man becomes the main responsible and the most dangerous actor on the scene of pollution to the environment. Today, nature is exploited and polluted more than at any time in history. Any source of pollution becomes a disturbing factor for the smooth running of phenomena encountered at the level of natural ecosystems. Even if each ecosystem has the capacity for self-regulation, this function may be outdated in the face of dosage and the force of polluting elements. Contemporary European society feels most strongly the need for anti-pollution policies, but especially for the immediate implementation of measures to stop various phenomena and actions harmful to the environment and human life. Although the problem is real and topical, various economic and social interests reduce the number of participants with an active role in greening. This raises the need to raise broad awareness of environmental issues and encourage civil initiatives, a task that is shared between various environmental non-governmental organisations and the European Union. It currently has a broad set of rules on environmental issues, including: air quality, chemical safety, climate action, nature protection, waste management and water quality. When it comes to climate, nature and chemicals, the EU has been a pioneer in environmental and health protection, inspiring others around the world to follow suit. However, the European Union's achievements are not just a thing of the past, but its attitude towards environmental protection is future-oriented. The preservation, protection and improvement of the quality of the environment, the protection of human health and the prudent and balanced utilisation of natural resources are objectives of the European Union's environmental policy. This policy is based on the precautionary principle, as well as on the principles that preventive action should be taken, that environmental damage should, as a priority, be rectified at source and, last but not least, that the polluter pays.

Keywords. pollution, sources, factors, effects, European Union

1. General aspects regarding the pollution phenomenon at European Union level

1.1. Sources of pollution found at European level

For a broader understanding of the phenomenon of pollution encountered in the Member States of the European Union, we must identify the origins and causes underlying the decrease in the quality and quantity of the main human needs.

The main element indispensable for existence, and perhaps the most affected, is air. Air, along with other components of the environment, is vitally important. Its pollution has its source in two broad categories of totally opposite sources, namely natural and artificial.

Although natural sources of pollution are much smaller and significant air pollution occurs only in exceptional cases, they are not negligible. Thus, a significant source of air pollution is represented by volcanic eruptions that scatter toxic products with negative effects

on the environment into the air, among which we mention the accentuation of the greenhouse effect that contributes to the amplification of the global warming phenomenon. Volcanic ash together with water vapour, volcanic dust and numerous other gases exert negative influences on atmospheric purity. At the same time, volcanic activity comes from most of the suspensions in the Earth's atmosphere.

Another significant factor contributing to atmospheric pollution is dust storms and sandstorms. These storms occur in reaction to cyclones passing over deserts, sand and dust are lifted from dry surfaces carrying the particles they deposit elsewhere. An increase in the amount of dust in the atmosphere has as its main effect air pollution and, consequently, climate change. According to the Weizmann Institute of Science in Israel, airborne dust particles affect the health of people, but also ecosystems, precisely because of bacteria transported thousands of kilometers from one area to another, with drug resistance.

Fires of vegetation masses emit large amounts of smoke and ash, hinder the development process of plants and contribute to the appearance or intensification of respiratory problems. They occur when climate humidity naturally drops below the critical threshold.

Other natural sources of pollution are plant and animal residues that "release after decomposition a series of gaseous substances that impure the air"¹.

As regards the origins of man-made pollution, the European Environment Agency points out that the combustion of fossil fuels in electricity generation, transport, industry and households, waste treatment, industrial processes and solvent use also contributes to air pollution. Production processes, municipal and industrial landfills, household activities or construction sites are also among the major sources of air pollution at European level.

Industry is currently the main polluter, both at European and global level. The industry, be it extractive, energy, steel, chemical or food, causes undeniable damage to human health, living things and agriculture, by not forgiving any living environment, contaminating both air, water and soil.

Transport is another important source of pollution. Thus, smog produced by car exhaust gases is an ongoing problem of pollution.

"Urbanization, the development of industry and transport cause emissions with high concentrations of pollutants into the atmosphere, emissions that lead to harmful effects on nature and all living organisms."²

Even the World Health Organization is sounding the alarm, as the data made available to the public show that approximately 70% of the population residing in urban areas of the world breathes polluted air and only 10% of the global population breathes air whose quality is within acceptable limits.

At the same time, there are a number of pollutants, such as sulfur dioxide, nitrogen oxides and ammonia that cause acidification, a process that is at the origin of acid rain that pollutes forests, rivers, lakes and other natural areas.

The second element, without which life on Earth could not be possible, is water. As important as it is, it contributes to the alteration of its qualities.

We cannot always determine the source of water pollution, as this may be an unauthorised release of hazardous substances from a company or contamination caused by

¹ Florica Braşoveanu – "Environmental Law", Pro Universitaria Publishing House, Bucharest, 2014

² Gheorghe Copacinschi, Vitalie Mîrza, Zinaida Ciobanu, Aculina Velea – Environment. Scientific information about "Sources of atmospheric air pollution", no. 3 (21) June 2005

agricultural or industrial works. This leads to water pollution with nitrates, phosphates, toxic heavy metal ions and pesticides.

However, the main sources of pollution come from the discharge of domestic wastewater, which often contains synthetic detergents, the overflow of industrial residues containing organic and inorganic waste, the dumping of solid waste that silts rivers and shipping channels and hinders the process of photosynthesis in water basins, the purification of natural waters with microorganisms, oil spills or the use of coastal inland or ocean waters as cooling waters in thermal power plants and nuclear power plants.

Last but not least, we mention the sources of soil pollution found at European level and not only, as pollution is particularly evident in the case of this natural resource.

The main sources of soil pollution are residues, namely household, industrial, agrozootechnical and radioactive.

Soil, like air and water, is an environmental factor with a particular influence on health.

At the same time, there are a multitude of factors that reduce biodiversity, including: changes in land use, namely the conversion of forests into land for culture, accompanied by habitat loss and fragmentation, but also the disappearance of plant and animal species, climate change, changes in nitrogen deposition, increased CO₂ concentration in the atmosphere, biotic changes, landscape degradation, oil spills into the sea, extensive trade in different species and biotechnologies. Anthropogenic activities through deforestation, expansion of agriculture, drainage of wetlands, alteration of shoreline and watercourses, mining, road construction and expansion of urbanisation also contribute significantly to biodiversity loss.

Industrial progress has transformed human needs, man having higher and higher demands, superior, elevated, corresponding to the social trend, and the repercussions of this climb that stand at the top of Abraham Maslow's pyramid are felt at the level of the environment.

The abundance of sources and kinds of pollution must awaken our prudence in carrying out social activities, creativity in finding new environmentally friendly ways, acceptance of strict rules related to the protection of the environment and the resources it offers unconditionally, as well as the intention to please future generations with the gifts offered by nature today.

1.2. The rise of pollutants in the current European context

In the beginning, all life on the planet lived together in harmony, and the repercussions of human activity on the environment were minimal. However, with population growth and the attempt to find solutions to address the problems related to the lack of food and resources needed to meet human requirements, the pace of pollution of the most essential components of the environment, namely air, water and soil, has accelerated.

Currently, the amount of food needed to feed the entire population exceeds production, a phenomenon that alarms specialists, as they predict on the basis of studies carried out the outline of a world famine in the not so distant future.

At European level, industry together with domestic pollution occupy the leading places among sources of artificial pollutants.

The result of mass production, transport and living standards adapted to citizens' needs is continuous environmental pollution. Thus, with the Industrial Revolution, which began at the end of the eighteenth century in Great Britain and extended to the rest of the civilized states, a form of urban pollution, namely smog, took shape into a major problem. Before this revolution, when most products were manufactured by hand or with rudimentary mechanical tools, polluting effects were not present to such a significant extent.

The development of human society has been accompanied by various stages of environmental pollution.³ Initially, there was microbial pollution related to the putrefactive process of household waste thrown around human settlements, followed by artisanal pollution related to small workshops processing various metals, skins or ceramics, and in the nineteenth century industrial pollution reached its peak in countries such as Germany or Great Britain. This development with negative impacts on the environment is followed by fundamental pollution through which entire regions are heavily polluted. The last two types of pollution that we will mention are: agricultural pollution through the use of fertilizers and pesticides and accidental pollution related to various technological accidents.

Over time, man has conceived nature as an inexhaustible source and an unlimited receiver of the most varied waste. As a result, with technical progress and anthropogenic changes, major soil degradation over large areas, disappearance of plant and animal species, depletion of deposits and other signs specific to pollution could be visible.

Anthropogenic causes include the expansion of agriculture to the detriment of forests and grasslands, overgrazing, intense fishing, tourist pressure, overpollution, overuse of chemical fertilisers and insecticides and inappropriate use of some lands, especially in times of drought. The expansion of arable land and overgrazing favor the shattering of fine particles and the destruction of fertile soil cover, and excess irrigation practiced on semi-arid lands produces strong salinization of soils.⁴

The advance of polluting factors has led to the conclusion of conventions at European level both to warn states about the critical situation of the environment and primordial resources, and to ensure the best living and working conditions for present and future generations. At the same time, this evolution of polluters and humanity's concerns to regulate its relations with the surrounding nature has led to the birth of a new branch of law that has as object of research the legal norms in the field of environmental protection at European and global level, but also to the introduction of alternative subjects in school curricula aimed at greening. Thus, it is desired to rationally manage resources, avoid imbalances by preserving nature, preventing environmental pollution and ecological reconstruction of the environment.

The World Conference on Air Pollution and Health on October 29, 2018, referred to the fact that breathing air globally is so polluted that it causes 6 million deaths per year. The most affected are children, who develop acute respiratory infections, chronic diseases, have problems in the process of neurological development and cognitive abilities or risk being born prematurely.

Nor can we ignore the impact of armed conflicts on nature and its landscape. "In the case of concentrated artillery strikes or massive aerial bombardments, explosive munitions cause less human or material loss and more damage to the natural environment by destroying and dislodging the soil, as well as infecting it with toxic combat substances." The effect could be observed as early as World War I, with the improvement and diversification of types of weapons, including the use of new lethal chemicals, so that after World War II phytotoxic weapons were used that cause complete deformation or drying of plants and bacteriological weapons that lead to illness or death of both people, animals and plant organisms. At the same time, the sinking of oil tankers during the two world wars led to pollution of marine ecosystems,

³ Miecik, I. (1990) – *Reflections on a typology of historical pollution: complementary conceptions*, in vol. „The silent count down”, Springer Verlag, Berlin

⁴ Dan Bălăceanu, Mihaela Șerban – "Global changes in the environment. An interdisciplinary evaluation of uncertainties", CNI Coresi Publishing House, Bucharest, 2005

in addition to the conventional practice of spilling hydrocarbons into the marine environment on the order of millions of tons. The great theorist of the art of war, Sun Tzu, argued that: "Those who are experts in the art of war subdue the enemy army without a fight. They conquer cities without besieging them and bring down a state without prolonged operations." Unfortunately, many armed conflicts left behind desolate strips of land and significant ecological damage.⁵

Thus, in the current context, threats to the environment are more and more numerous and complex, and exponential demographic growth and excessive industrialization through toxic waste discharges into flowing waters, seas or oceans, emission of pollutants from active plants, use of chemical fertilizers, development of thermal processes and the use of hydrocarbons, lead to amplifying the phenomenon of pollution on the environment.

1.3. Effects of pollution on the environment and human health

Society's pressure on the environment unfortunately has global and not just local echoes. Changes are encountered in climate, biogeochemical cycles, hydrological cycle and water resources, sea and ocean levels and more.

The climate is constantly evolving due to both natural causes and especially anthropogenic activities. These radiative forcing factors generate an increase or decrease in temperatures, altering the mechanism of climate change. Such climate changes have major effects on Europe. Some species adapt and change their environment, but others are in an ongoing struggle for survival.

Earth's temperature is closely related to the content of greenhouse gases that play a key role in self-regulating the climate system.

"For the last 1,000 years before the Industrial Revolution, the share of greenhouse gases remained relatively constant."⁶ But since then, a number of anthropogenic activities, such as burning fossil fuels, land use change, in particular through deforestation and various industrial activities, increase the amount of greenhouse gases in the atmosphere and damage the ozone layer.

The most important greenhouse gas emitted by human activities is carbon dioxide, the alarming share of which affects the balance of the climate system.

One of the most significant consequences of global warming on Earth is the rise in the level of the Planetary Ocean. The general trend of climate warming due to the greenhouse effect has a direct influence on sea level rise, with long-term impacts for coastal areas and severe consequences especially for island and low-lying countries. This increase could lead to flooding of island communities, having direct effects on natural habitats, plant and wildlife species, but especially on water supplies for consumption.

Water resources, indispensable elements of life, once modified quantitatively and qualitatively, have a direct impact on the quality of the environment and human activities as a whole. Climate change, but also environmental degradation as a whole affects these resources, with increasing pollution phenomena generating a decrease in the amount of water available.

Climate warming is increasing rainfall in some regions through increased winds and evaporation, the incidence of extreme events such as floods and droughts, melting glaciers and reduced snow cover, and a dynamisation of the hydrological cycle.

⁵ Anane Ivan, Elements of criminal procedural law, Pro Universitaria Publishing House, Bucharest, 2015

⁶ Dan Bălțeanu, Mihaela Șerban – "Global changes in the environment. An interdisciplinary evaluation of uncertainties", CNI Coresi Publishing House, Bucharest, 2005

The expansion of droughts and desertification produces strong effects characterised by significant fragility of ecosystems and includes a complex of degradation phenomena of soils, water resources and vegetation.

As the biosphere is sensitive and reacts differently to climate change, climate warming influences plant and animal physiology, distribution, phenology and coping mechanisms.⁷

Human activities also put increased pressure on forests through forest degradation and deforestation, artificial burning of land clearance areas, fragmentation of the area and conversion of land use to other uses, increasing annual carbon emissions into the atmosphere.

Climate change also affects the health of the population, as increasing the frequency and intensity of heat and cold waves leads to an increase in the rate of death and disease. "Changes in the daily and seasonal distribution of air temperature, as well as moisture, can lead to increased concentrations of solid polluting or allergenic particles in the air, leading to respiratory diseases."⁸

The high amount of ultraviolet radiation reaching Earth generates an increase in cases of skin cancer and an increase in mortality caused by skin malignancies. At the same time, too long exposure to these radiations decreases the body's immunity to substances that enter the body through the skin and cause a number of eye diseases. Land plants and agricultural crops do not have an easier fate, their growth is stopped, and aquatic life is affected by the decrease of fish population and phytoplankton production.

At the same time, the development of urban areas and the allocation of land for infrastructure projects lead to the restriction of habitats and the inclusion on the list of endangered species of many mammals, birds, fish and reptiles from the marine diversity found in the European community.

Simultaneous exposure to several pollutants worsens people's health, with children and the elderly most affected.

However, it is difficult to accurately estimate the impact of local and global environmental changes on population health, as other factors may contribute to the emergence or intensification of diseases, such as: migration of a group of inhabitants from one region to another, lowering living standards by increasing poverty in rural/urban areas, or increasing resistance of certain bacteria to drugs.

2. Protection of environmental components at European level

2.1. Air quality

Air pollution is the most significant problem for the evolution of all forms of mobility and in terms of protecting human health, since emissions from the transport sector are a major challenge and because a significant reduction in emissions, such as NO_x, CO₂, is necessary for the European Union to achieve its long-term climate targets.⁹

The particularly serious implications of air pollution are particularly characteristic of urban life. The increase in industrial production, automobile circulation, electricity and heat production, "have been accompanied by the release into the air of significant amounts of

⁷ Hughes, L. (2000) – „Biological consequences of global warning: is the signal already”, *Tree*, vol. 15, no. 2, Elsevier

⁸ Dan Bălțeanu, Mihaela Șerban – "Global changes in the environment. An interdisciplinary evaluation of uncertainties", CNI Coresi Publishing House, Bucharest, 2005

⁹ Official Journal of the European Union, Information and notices, C 298, 23 August 2018

invisible particles of carbon dioxide, nitrous oxide, methane, dust and other pollutants that affect the atmosphere slowly but surely and progressively”¹⁰.

Air pollution also affects the ozone layer, which protects the biosphere from the harmful effects of ultraviolet radiation.

An important aspect of air pollution is that through the respiratory system most of the harmful substances enter the human body.

Due to the direct and indirect harmful action of polluted air on man and the environment, it was found necessary to adopt legislative, administrative and medical-sanitary measures with a role in preventing and combating air pollution to allow the existence and extension in time of the concept of sustainable development.

European Union legislation sets air quality standards, maximum limits for pollutants emitted by Member States and standards for vehicle emissions.

Directive 96/62/EC¹¹ provides a clear definition of polluting element and lays down objectives for ambient air quality in the Community with a view to avoiding, preventing or reducing air pollution. Thus, the term pollutant designates any substance introduced directly or indirectly by man into the ambient air which may have harmful effects on human health and/or the environment as a whole.

Directive 2001/81/EC¹² establishes national ceilings for Union Member States on emissions of nitrogen oxides, sulphur dioxide, volatile organic compounds and ammonia in order to achieve interim environmental targets. These ceilings have flexibility in how they comply. The purpose of the Directive is to limit emissions of acidifying and eutrophication pollutants and ozone precursors in order to improve the protection of the environment and human health within the Community against the risks of adverse effects from acidification, soil eutrophication and ground-level ozone towards the long-term objectives of not exceeding critical levels and loads and of effectively protecting all individuals against known risks for health caused by air pollution by setting national emission ceilings, taking the years 2010 and 2020 as a reference.

Another general instruction is Directive 2008/50/EC¹³ which requires Member States to designate competent authorities and bodies responsible for assessing ambient air quality, approving measurement systems, ensuring accuracy of measurements, analysing assessment methods, coordinating on their territory any Community quality assurance programmes organised by the European Commission and cooperating with other Member States and the Commission. Whereas in order better to understand the impact of air pollutants and to develop appropriate policies, it is necessary for Member States and the Commission to collect, exchange and disseminate information on air quality; Up-to-date information on ambient air concentrations of all regulated pollutants should also be easily accessible to the public. The provisions of Directive 2008/50/EC also envisage limiting maximum nitrogen emission levels for diesel vehicles. However, it has been noted that more effective and stringent enforcement of standards dealing with vehicle emissions in the Community environment is needed, as the intended aim has not been achieved.

¹⁰ Florica Braşoveanu – "Environmental Law", Pro Universitaria Publishing House, Bucharest, 2014

¹¹ Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management

¹² Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants

¹³ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe

Funding for specific Union projects and programmes in the field of air quality and environmental protection comes from the collection of fines imposed on vehicle manufacturers to remedy the environmental damage they have caused, resources from infringement proceedings launched against Member States for breaches of European emissions legislation and from excess emissions premiums for new passenger cars.

Created in 1992, the LIFE programme co-finances projects on a large territorial scale, as regions of neighbouring countries often need to cooperate to meet the challenges of climate change and sustainable development, including improving air quality. In its proposal for the new LIFE programme for 2021-2027, which is currently under discussion, the European Commission has foreseen a significant increase in financial resources for environmental and climate action projects.

Air pollution is Europe's biggest environmental health risk. The Ozone Web site, launched by the European Environment Agency, offers users for the first time the ability to monitor and identify ground-level ozone pollution incidents across Europe. The European Environment Agency's European Air Quality Index allows users to understand more about the quality of the air they live in. By displaying up-to-date information for the whole of Europe, users can gain new insights into air quality in different countries, regions and cities. According to the portal, the lowest air quality is recorded in Punta Umbría, Guadalajara, Valle, Kransen and Uppsala Kungsgatan.

It is necessary to set objectives for ambient air quality which avoid, prevent or reduce harmful effects on human health and the environment as a whole.

Policies to improve the environmental performance of cars are envisaged to ensure progress on decarbonisation targets and air quality, inter alia by stimulating electrification or transitioning to alternative fleet engines.

The European Commission proposes that market surveillance authorities for verifying vehicle emissions also use remote sensing technology to help identify those issues, such as high levels of air or noise pollution, but also for which vehicle models should be further investigated. In doing so, they should cooperate and coordinate their activities with the authorities responsible for periodic roadworthiness tests in accordance with *Directive 2014/45/EU*.¹⁴

The Commission also reviewed previously set emission limits with a view to improving and complying with Union air quality limits and levels recommended by the World Health Organisation and presented proposals for new technology-neutral Euro7 emission limits applicable by 2025 for all M1 and N1 vehicles placed on the Union market.

The European Union has committed to the transition to a low-carbon economy, the main objective being to reduce them by at least 80% by 2050 compared to 1990 levels, even reaching an economy neutral in terms of environmental impact.

Transport continues to make an exaggerated contribution to Europe's greenhouse gas emissions, poor air quality and noise. Thus, in several European metropolises, cars with Euro 0, 1, 2, 3 pollution standards and those that are not classified in any pollution class are subject to restrictive traffic rules, and many Western cities are considering banning diesel engines with real high emissions.¹⁵

An alternative to traditional fuels is the eco variant found in filling stations in America or Brazil, namely bioethanol, fermented alcohol distilled from corn or sugar cane, which emits less carbon dioxide when burned. However, there are also disadvantages, as excessive

¹⁴ Directive 2014/45/EU on periodic roadworthiness tests for motor vehicles

¹⁵ Buzescu Gheorghe, Particularities of contravention law, Sitech Publishing House, Craiova 2017

cultivation is implicitly required to saturate the amount of raw material required, which implies massive deforestation and contamination of groundwater with the resulting waste substances. That is why specialists in the field recommend only adding gasoline with ethanol and not replacing it altogether, in order to consume less oxygen from the air and use oxygen from the ethanol composition.

Finding a replacement for oil and fuels derived from it, and reducing carbon emissions from the air are still fundamental problems, as ethanol is only a transitional stage towards the use of renewable fuels.

The Convention on Long-range Air Pollution, concluded in Geneva in November 1979, draws our attention to a rather obvious detail, namely, that pollution, especially air pollution, has no borders. Thus, the Convention outlines the scenario of long-range transboundary pollution producing harmful, harmful and disruptive changes in the composition of the entire atmosphere.

Jacqueline McGlade, former executive director of the European Environment Agency, said in 2012 that in many countries air pollutant concentrations were still "well above the legal and recommended limits set to protect the health of European citizens", but also that air pollution reduces people's life expectancy by about two years in the most polluted cities and regions.

Part of the protection also relates to the penalty, as it is necessary to outline the concept of liability for environmental damage, including damage to the atmosphere. The polluter must come up with compensation for the damage caused, as "nothing can evade the composition of a system without putting something appropriate in place". Thus, the transposition of responsibility for air pollution into accepted Community rules is an extension of the polluter pays principle, which has gained legal substance through its inclusion in European Union legislation.

Therefore, broader and stricter policies are needed to address improvements in air quality in the Union and to comply with the ambient air quality limits set as well as the levels recommended by the World Health Organisation.

2.2. Water quality

Water is essential for life forms on the planet, for agriculture, to saturate crops spread over thousands of hectares, for the daily consumption of humans and other species, but this precious resource is becoming increasingly demanded and threatened.

The quality of water and water sources is deteriorating at an alarming rate, with serious consequences for the environment and the health of the European population.

Excessive drainage work, the use of chemical fertilizers and the discharge of harmful substances into the water affect its quality and harm various species of fish, waterfowl and plants dependent on wetlands.

Oceans and seas cover more than 70% of Earth's surface, they feed us, regulate the climate and generate most of the oxygen we breathe. They also serve as the basis for much of the global economy, supporting sectors ranging from tourism to fisheries to international shipping.

Despite their importance, oceans face unprecedented threats as a result of human activity. Every year, around 8 million tonnes of plastic waste ends up in the world's oceans. At the same time, climate change is damaging coral reefs and other key ecosystems, overfishing threatens the stability of fish stocks, nitrite pollution contributes to dead zones, and nearly 80% of the world's wastewater is discharged without treatment.

Another polluting factor found in significant quantities in oceans and seas is represented by oil, most of which is provided by land sources, followed by shipping and shipping accidents of oil tankers that have produced real environmental disasters, as well as collisions, shipwrecks, strandings, explosions or fires. Only in the Black Sea basin "about 110,000 tons of oil are discharged annually, which makes the effects of pollution felt in the ecological balance of the entire basin."¹⁶

Human uses and discharges strongly influence water ecosystems and their condition and functionality. This has implications both for society, as water quality can directly affect human health and nature.

Agriculture is the main cause of groundwater and surface water pollution. It is precisely for this reason, since its inception, that European Union water policy has focused on reducing pollution of the two categories of waters mentioned. Furthermore, groundwater or surface water with high nitrate concentrations may pose a risk to human health.

The European Union is helping countries protect and restore freshwater and marine ecosystems to sustain their services for future generations. Thus, the legislation of the Community organisation aims to protect water and groundwater from pollution and sets and updates quality standards for drinking water and bathing. It also determines requirements for flood management.

Over the years, the EU has adopted a number of pieces of legislation aimed at protecting and managing European waters. This started in 1975 with a directive on the quality of surface waters intended for the production of drinking water in the Member States (75/440/EEC)¹⁷, followed by the first Bathing Water Directive (76/160/EEC), the first Directive on protection against pollution of groundwater by certain dangerous substances in 1979 (80/68/EEC) and the first Drinking Water Directive (80/778/EEC). Many of the directives were later repealed and replaced by other legislation.

Directive 2006/7/EC¹⁸ protects public health and protects the aquatic environment in coastal and inland areas from pollution. In order to manage water quality, Member States monitor bathing water during the bathing season, collecting a minimum of four samples. Thus, throughout the bathing season, local or national governments publish monitoring results to inform the public about possible risks to the health of the population.

In the 1990s, the Nitrates Directive (91/676/EEC) and the Urban Waste Water Treatment Directive (91/271/EEC) entered into force, followed by directives that focused on protecting human health, aquatic resources and targeted agriculture as a source of emissions.

Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption arose from the need to protect public health from the adverse effects of any contamination of water intended for human consumption by ensuring that it is wholesome and clean, which requires Member States to take all necessary measures to ensure that regular monitoring of the quality of water intended for consumers is carried out, for the purpose of verifying that the water supplied complies with the requirements laid down in the provisions of the Directive and, in particular, with generally accepted parametric values.

¹⁶ Ion Milan, Marian-Traian Gomoiu – „Causes and consequences of pollution of the marine environment with hydrocarbons”, *GEO-ECO-MARINA 14/2008 – SUPPLEMENT NO. 1, Earth Sciences, Knowledge and Environment – Annual Scientific Communication Session*

¹⁷ Răzvan Călin; Cristian Teodor – „Environmental Policy”, Tritonic Publishing House, Bucharest, 2007

¹⁸ Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality and repealing Directive 76/160/EEC

The Water Framework Directive (2000/60/EC) established a system for setting water quality standards and introduced measures to prevent and limit water pollution.

Directive 2006/11/EC of the European Parliament and of the Council of 15 February 2006 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community requires Member States to take all necessary measures to eliminate pollution by organohalogen compounds and substances which may form such compounds in the aquatic environment from inland surface waters, territorial seas and internal coastal waters, mercury, cadmium and its compounds, persistent mineral oils and petroleum hydrocarbons or with persistent synthetic substances which may float, remain suspended or sink and interfere with any use of the waters and to reduce pollution of those waters by metalloids, metals and their compounds (lead, selenium, arsenic, uranium, cobalt, thallium), biocides, toxic organic compounds, cyanides or nitrites.

All directives in the water industry are designed to protect consumers and water users, including the environment, from harmful effects.

In 2018, Head of Unit Marine Environment and Water Industry Matjaž Malgaj announced plans to modernise the DWD by updating safety standards and tackling new and emerging pollutants. Thus, the European Parliament adopted rules to improve water quality and access to drinking water for all citizens of the Community.¹⁹

As water is an essential resource for life, it is important that the public has up-to-date information on the quality of drinking and bathing water and on urban waste water treatment. The European citizens' initiative 'Right2Water' highlighted the level of interest in water issues. In response to this initiative, the European Commission has committed to do more to increase transparency in water quality, supply and treatment.

"Waste water: water originating from domestic, social or economic activities containing polluting substances or residues which alter its original physical, chemical and bacteriological characteristics."²⁰

Society depends on satisfactory and sustainable water management. Historically, the primary purpose of water treatment has been to protect human health by reducing waterborne diseases.

Thus, at European Union level we encounter both a quantitative protection of water, achieved by its rational use, and a qualitative protection, achieved by preventing and combating pollution.

Member States need mechanisms to enable cooperation and exchange of information between them, especially if an action has an effect on water quality along a border. National reports and maps that can be viewed online are also suitable and useful to transparently present assessments and results to both the European Commission and the general public.

2.3. Waste management

Human will always produce waste, and not eliminating it from his living environment makes it impossible to continue specific activities, but also life itself. Key actions are therefore prevention, followed by preparing for re-use, recycling, recovery and, only where necessary, disposal, which includes landfilling and incineration of waste without energy recovery.

¹⁹ Buzescu Gheorghe, *Place and role of the civil servant in the state apparatus*, Sitech Publishing House, Craiova, 2017

²⁰ Florica Braşoveanu – "Environmental Law", Pro Universitaria Publishing House, Bucharest, 2014

Actions are needed to collect waste and packaging, abandoned on green spaces, in public places or in other places not allowed by the rules in force, as a part of the population does not store household waste and garbage in places specially designed for this purpose to be taken over by an authorized sanitation operator and bring harm to the health and comfort of the entire community, while altering the quality of natural and anthropogenic factors. Thus, one of the recycling targets for 2020 set by the European Union focuses on the management of municipal waste, which is essential for the health and well-being of the Community space and which still poses problems in many Member States.

Directive 2004/12/EC²¹ provides that the management of packaging and packaging waste requires the establishment of return, collection and recovery systems in Member States. It also tasks the latter with facilitating consumer information and public awareness campaigns on these topics of Community interest.

There are, however, European citizens who are aware of the enormous impact of human actions on the environment, and one of the biggest anthropogenic footprints is plastic. Single-use plastics are the leading cause of pollution in the oceans and soil. While there are many ways in which we can individually reduce the amount of plastic in our daily lives, there remains a need for a major change that involves replacing the linear economy with a much more efficient alternative, namely the circular economy, which accepts only biodegradable products or with 100% recycling potential. Thus, we can take as an example a Mexican company that found an ingenious way to produce single-use plastic cutlery, using avocado seeds, which are completely biodegradable, the decomposition process being completed in 240 days.

This year, the European Parliament voted to ban single-use plastic items at European level in a bid to reduce pollution of seas and oceans, but the measure will come into force in 2021. The European Union is also encouraging Member States to reduce the use of plastic packaging. Thus, an effort to reduce bottled water consumption would help people save money and have a positive impact on the environment by reducing CO₂ emissions and plastic waste.

European Union legislation aims to improve waste management and sets requirements for waste streams. Recent developments aim to enable a transition to a circular economy, involving a reuse of products.

The European Commission is currently implementing the 2015 Circular Economy Action Plan and has called for the swift adoption by the European Parliament and the Council of proposals to revise waste legislation.

Today's economy is based on a linear model of resource consumption, which consists of taking – doing – disposing. Thus, companies collect, extract raw materials, use them to manufacture various products, which they then sell to consumers, so that the latter throw them away when they no longer meet their needs.

According to the latest ESTAT data, six Member States have already reached the 50% recycling target for municipal waste, while nine countries need to significantly step up their efforts to reach this target by 2020. The Commission intends to monitor the state of fulfilment of the 2020 targets by publishing an early warning report in 2018.²²

²¹ Directive 2004/12/EC of the European Parliament and of the Council of 11 February 2004 amending Directive 94/62/EC on packaging and packaging waste

²² EU Environmental Implementation Review: common challenges and how to join efforts to deliver better results - COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS, Brussels, 3.2.2017, COM(2017) 63 final

Directive 1999/31/EC on the landfill of waste aims to provide, by means of stringent technical and operational requirements for waste and landfills for waste, measures, procedures and guidelines to prevent or reduce, as far as possible, negative consequences on the environment and, in particular, pollution of surface water, groundwater and air, the soil, and the environment in general, including the greenhouse effect, and any subsequent risks to human health arising from landfilling activities throughout the life cycle of the landfill.

Directive 2012/19/EU on waste electrical and electronic equipment complements general Union waste management legislation and lays down measures to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste electrical and electronic equipment, and by reducing overall impacts of resource use and improving the efficiency of such use, thus contributing to sustainable development.

Directive 2000/53/EC takes into account the situation of end-of-life vehicles, as the Community generates between 8 and 9 million tonnes of such waste. In doing so, it prioritises reuse and recycling and requires Member States to take measures to ensure that economic establishments set up systems for the collection, treatment and recovery of end-of life vehicles.

Another significant problem is the waste of food, whether natural or processed."The relationship between people and food is complex and has multiple valences. During a lifetime, a person consumes about 60 tons of food, eats an average of 70,000 meals and devotes 13 years of wakefulness to eating food."²³

In early 2016, France became the first European state to pass a law obliging supermarket chains and hypermarkets to donate unsold food to those deprived of a good fate through charities, instead of instant waste labeling. A similar provision exists in the Netherlands that requires any food in the last days of guarantee to be donated to food banks if it has not found a potential buyer. The same process is followed by stocks of unsold clothes and toys.

However, we see this solution as a middle solution because the problem is much more delicate, with implications for the gap between rich and poor, which requires the lower class to survive and the foam of society to dissipate.

In Chinese culture it is said that if you give a hungry man a fish, you feed him for only one day, but if you teach him how to fish, you feed him for life. Therefore, although food donation is a noble idea and a charitable gesture, ensuring a decent income and educating people about shopping management would be a more effective solution.

Both the management and the transboundary flow of hazardous waste remain the main issues for the European space, the most comprehensive document being represented by Regulation (EC) No 1013/2006 on shipments of waste. Thus, a producer of waste may have an interest in transporting it to another State, since in the country of origin or exploitation the disposal operation would be far too costly and the host country may present much more economically advantageous storage or processing possibilities or flexible and accessible regulations.²⁴

2.4. Nuclear area

The effects that nuclear energy has on the environment raise serious concerns that need to be taken into account, especially before the decision is taken to build a nuclear power plant

²³ Gordon M. Wardlaw, Anne M. Smith - *Contemporary Nutrition: Issues And Insights*, St. Louis, McGraw-Hill College, 2004

²⁴ Anane Ivan, *Investigation of criminal investigation bodies*, Pro Universitaria Publishing House, Bucharest, 2014

or to make an additional one, as nuclear waste is difficult to manage and accidents become a regional concern. Nuclear explosions have environmental consequences that cannot be concretely assessed and produce the highest amounts of nitrogen.

The effects and consequences of the nuclear field have long been underestimated, until the middle of the twentieth century when a power of 702 megatons was released by fusion and nuclear fission. Thus, 1963 led to the signing of a treaty banning nuclear experiments in space, atmosphere and water.

Due to the expanse on the surface of the globe, the seas and oceans receive most of the radioactive substances.

The disposal of radioactive waste is a primary problem, as it is widely practiced to immerse it in the sea, and its evolution over time is unknown. It is wrong to believe that the burial or immersion of radioactive waste in certain containers is not subject to corrosion.

Waste from nuclear power plants can remain active for hundreds of thousands of years. There is still no solution to tackle radioactive waste.

At the same time, the cooling systems of nuclear power plants present two problems, in the sense that, on the one hand, when water is taken from an ocean source or river, fish are accidentally caught in the inlet of the cooling system, and on the other hand, the water used to cool the power plant returns to the ocean or river about 25 degrees warmer than the original water. Thus, the increased temperature kills some species of fish and plants.

Pursuant to Article 35 of the Euratom Treaty, Member States must ensure that an appropriate programme for monitoring the level of radioactivity in the environment is established.

Member countries shall require undertakings responsible for a nuclear reactor or reprocessing facility to monitor and report radioactive releases.

The Community shall also ensure that medical radiological equipment, practical techniques and ancillary equipment appropriate for medical exposure involving high doses for the patient are used, such as interventional radiology, nuclear medicine, computed tomography or radiotherapy.

Directive 2013/59/Euratom²⁵ covers industries processing radioactive materials extracted from the earth's crust or naturally present in construction materials, gaseous and liquid radioactive effluents from nuclear reactors and reprocessing plants released into the environment, metals resulting from the dismantling of nuclear installations, manufacturing, production, processing, handling, disposal, use, holding, storage, transport, import and export from the Community of radioactive materials.

The Official Journal of the European Union sheds light on Directive 2014/87/Euratom²⁶ which requires Member States to establish and maintain a national legislative, regulatory and organisational framework for the nuclear safety of nuclear installations.

It is the licence holder who bears major responsibility for the nuclear safety of a nuclear installation. This liability cannot be delegated and includes responsibility for the activities of contractors and subcontractors, whose activities could affect the nuclear safety of such a facility.

Nuclear safety requires nuclear installations to be designed, located, constructed, commissioned, operated and decommissioned in such a way as to prevent accidents and, in the

²⁵ Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation

²⁶ Council Directive 2014/87/Euratom of 8 July 2014 amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations

event of an accident, mitigate its consequences and avoid early and massive radioactive releases.

Threats against terrorism are another concern that needs to be addressed, but a satisfactory plan to protect nuclear power plants from this phenomenon is not in place.

Nuclear power plants use uranium as fuel, and the uranium mining process releases large amounts of carbon dioxide into the environment, although nuclear reactors do not cause air pollution during operation.

At the same time, various scientific studies have shown an increased rate of cancer among people living near nuclear power plants.

Thus, nuclear energy protesters propose the use of combined solar, wind and geothermal energy methods.

Last but not least, we mention the illegality of nuclear weapons ab initio, the first debates on this issue being started in the 50s in academic forums, intensifying due to the risks considerably increased in the following decade. The cumulative effects of nuclear weapons are taken into account, namely the generalized nature of the damage and destruction caused by the shock wave and fire, but also the effect of ionized radiation. The use of any kind of nuclear weapons constitutes a true act of genocide.

The issue of illegalizing nuclear weapons was also raised at the establishment of the United Nations. Thus, on 24 November 1961, the General Assembly of the forum adopted the Declaration on the Prohibition of the Use of Nuclear and Thermonuclear Weapons, which stated that the use of such weapons is contrary to the spirit, letter and purposes of the Charter of the United Nations and constitutes a direct violation of the Charter, since the use of nuclear and thermonuclear weapons is directed not only against an enemy or enemies, but against all mankind, including the peoples of the world not involved in war suffering.

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