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Degradation and Global and Zonal Pollution

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Abstract: This paper presents the environmental degradation and pollution both in the world and in our country. It presents the worldwide soil and air degradation and global air and pollution causes. This refers to fuels, gas pollution from industrial activities, the emissions from burning fuels and carbon dioxide emissions on sectors and burning of fossil fuels. Regarding the situation in Romania, are presented the causes of soil degradation and processes that produce pollution and industries.

Keywords: degradation, pollution, environment, pollutants.

1. INTRODUCTION

Soil is a dynamic and independent body on the surface of the earth's crust, with properties in equilibrium with factors acting on the crust. The formation of soil is a long process and takes place under the action of biotic and abiotic factors.

Soil degradation occurred 4400 years ago when the Sumerians have found phenomenon of salinization on irrigated lands, lands that have become barren and caused their decline of agriculture and civilization.

Soil degradation occurs under the action of natural and anthropogenic factors.

Natural factors are extreme manifestations of natural phenomena such as earthquakes, storms, floods, droughts, which have a direct influence on the life of each person, society and the environment as a whole.

All world regions are likely to be influenced by factors produced by climate change. With an increase in global temperature is likely that both the number and intensity of storms to increase in many regions. It is also possible that many arid regions to become drier and start to expand.

Mankind is currently facing a number of problems, one of them about the environment. These problems have in common the direct and negative impact on human society, character of disaster that can get those phenomena. Humanity seems ever more aware of the deep significance that natural phenomena have for its development.

2. POLLUTION SITUATION IN THE WORLD

One study of United Nations found that after the II World War over 38% of agricultural land has been degraded due to mismanagement of agricultural land (Table 1).

Table 1 oss of agricultural land by degradation after 1944

No. crt.	Continent	Degraded surface (%)
1.	Australia	16
2.	Europe	25
3.	North America	26
4.	Asia	38
5.	South America	45
6.	Africa	65
7.	Central America	74

Soil pollution due to industrial activities was possible because the phenomenon was regarded lightly. Currently, states highly developed have created appropriate legislation that protects the environment from pollution.

Air pollution is very serious because polluted air enters the natural and built environment degrading it with negative influences on biological species. A cause of air pollution is the use of poor quality coal. Table 2 shown the structure of fuel use in Central and Eastern Europe and the European Community average.

Table 2 Structure of fuel use (%)

Country	Coal	Petrol	Methane Gas	Electricity	Heat
Bulgaria	20	42	2	22	14
Czech Republic	45	18	18	8	11
Hungary	35	18	20	12	15
Poland	60	8	6	8	18
Romania	25	40	-	8	27
Russia	20	20	35	8	17
Ec	7	35	33	25	-

Industrial activities produce and issue into the atmosphere a range of gaseous pollutants. The main gaseous pollutants emitted by industrial activities and their share in total emissions are given in Table 3.

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Table 3 Gaseous pollutants from industrial activities

Polluting substance	Amount emitted to the atmosphere (million tons/year)	Share of total emissions (%)
CO_2	3500	50
CH_4	84	24
NOx	30	50
SOx	89	90
Solid particles	23	40
Hydrocarbons	26	50
CFC	1.2	100

Another cause of air pollution is road traffic. Emissions from burning fuels are CO_2, NOx and hydrocarbons, which are presented in Table 4.

Table 4 Emissions from burning fuels (%)

Type of gas	Total transport	Traffic	Railways	by Air	Naval
CO_2	19	93	2	2	3
HC	30	97	2	-	1
NO_x	50	95	5	1	1

In Central and Eastern Europe, mobile sources are responsible for 30-60% of emissions of oxides of nitrogen, 40-90% of emissions of carbon monoxide and less than 10% of emissions of fine particles and hydrocarbons.

Although in 1992 in Rio de Janeiro at the Earth Summit, has signed the Framework Convention on Climate Change, carbon emissions have increased further, as in the table.

Table 5 Carbon emissions from burning fossil fuels

Country	Total emissions (million tons)	% of total emissions	Emissions per capita (tones)
USA	1394	2,9	5,3
Russia	437	7,2	2,9
Japan	302	5,0	2,4
Germany	234	3,8	2,9
China	807	13,3	0,7
India	229	3,8	0,3
Indonesia	56	0,9	0,3
Brazil	62	1,0	0,4
total	3521	57,9	0,9

An important effect of climate change is the process of thermal radiation of the Earth is retained by the components of atmospheric gases, called greenhouse effect, which results in high temperature environment. Responsible for this effect is CO_2 from the atmosphere, nitrogen oxides, NOx, CH_4 methane and organic carbon compounds with chlorine and fluoride, CFC, which affects less the air temperature.

As a result of the greenhouse effect, global average temperatures are 0.6 ° C higher than a century ago, and in the end of next century will be higher from 2.5 to 5.5 0C.

The greenhouse effect depends, in the first place, by the emission of CO_2, which means it will have to reduce CO_2 emissions by 60%.

CO_2 emissions, worldwide, by sectors are given in Table 6.

Table 6 CO_2 emissions by sectors

Activities	Co_2 (%)
Power Plants	37
Household	20
Industry	19
Transport	18
Services (Trade)	4
Refineries	3

The table shows that one third of all CO_2 emissions from power plants, so a possibility to decrease the emissions is to reduce use of fossil fuels.. For countries with economic growth are given in Table 7 CO_2 emissions for the years 1960 and 2005.

Table 7 Carbon emissions from burning fossil fuels

Country	Total emissions (million tons)		Emissions per capita (tonnes)	
	1960	2005	1960	2005
USA	791	1394	2,38	5,3
Russia	396	437	2,33	2,9
Japan	64	302	0,69	2,4
Germany	149	234	2,68	2,9
China	4	807	0,17	0,7
India	6	229	0,06	0,3
Indonesia	1	56	0,02	0,3
Brazil	33	62	0,08	0,4

Emissions into the atmosphere of major pollutants are presented in Table 8.

Table 8 Emissions into the atmosphere for Europe

Country	SO_2 (kg/person. year)	NOx (kg/person. year)	CO_2 (kg/person. year)
Romania	56.1	22.4	7.37
Poland	32.0	15.0	5.10
Hungary	35.8	7.5	5.76
Belgium	44.0	33.5	10.4
Denmark	35.0	55.1	9.94
Germany	73.1	40.2	18.8
Greece	50.6	-	6.48
Netherlands	13.8	36.9	9.30
England	65.8	48.4	9.76
France	21.2	30.8	6.30
Spain	59.4	25.2	5.22

3. POLLUTION SITUATION IN ROMANIA

The causes of land degradation in our country are:

• deforestation of forests - deforestation irrational of the forests to obtain agricultural land and pastures, or their intense exploitation as breeds cutting, especially on land with steep slope or loose rocks leading to the onset of intense rainfall erosion processes going in some cases to total soil washing. On flat land, from wetlands, after deforestation of forests occurred superhumidification phenomena and even swampy land how can be seen in parts of the "Cotmeana" and "Cândeşti" platforms or at the foot of "Obcinile Bucovinei".

• excessive exploitation of vegetation - clearing of shrubs, especially junipers from subalpine floor led to increased erosion, avalanches of snow and

disrupting the flow regime. He emphasized that the Carpathian junipers retain about 50% of rainfall (~6,000 t/ha) while the portions cleared rainfall amount retained is only 1200-1500 t/ha, the rest drain through the slope.

• overgrazing - especially on poor pastures, on the slopes, on soils with light texture and moisture deficiency leads to the onset of strong erosion phenomena that can be seen in the Curvature Sub-Carpathians, the Plateau of Moldavia and Transylvania Plain. Grazing in the forest in the past lead to compaction of soil which in turn causes reduced infiltration, increased runoff processes and washing on the slope, soil poverty and prevent natural regeneration of forest.

• agricultural activities - agricultural crops on inadequate land or with poor agricultural technique such as sloping land cultivation, plowing along with it, triggering an intense erosion leading to increased degradation of these areas. Plowing with deep furrow plows on the land with thin soil, it caused burial of the humus layer and surfacing horizon with carbonate or even of marls and clay that formed soil.

• industrial activity - mines often lead to land degradation either directly by stripping, when exploiting the ore to the surface, or indirectly through vast storage dumps. The collapse of the ceiling galleries may appear chaotic forms, depressions of various shapes and sizes.

• hydro-ameliorative facilities or ways of communication, inappropriate can lead to imbalances triggering the collapse or landslides.

• disposal of household waste and discharges from large animal farms through noxious agent contained can cause soil pollution.

• excessive use of chemicals (insecticides, herbicides, fertilizers) lead to soil pollution with long-term consequences.

Although the phenomenon of soil pollution is old, just recently there were concerns for understanding the phenomenon and to stop it by applying a proper legislation on soil protection.

The main cause of soil pollution is the improper disposal of solid waste from various industries work. Pollution is also produced by deposition of pollutants that affect air and water, or work to exploit raw materials for industry. Industries and types of degradation produced are presented in Table 9.

Table 9 Pollution processes and the industrial branches

Type of industry	Polluting emissions
The chemical industry	- solid waste disposal, deposition on soil of pollutants emitted;
Pulp and paper industry	- waste disposal and atmospheric pollutants deposition;
The construction materials industry	- extraction of raw materials; - metal contamination; - solid waste disposal;
Metallurgical industry	- extraction of metal ores and coal; - storage of ash and slag; - pollution from oil, salts, hydrocarbons and heavy metals; - flotation waste pollution, electrolysis;
Petrochemical industry	- organic waste pollution, tar, salt, oil;

In Table 10 are some areas in Romania severely polluted with heavy metals.

Table 10 The main areas polluted with heavy metals, ppm

The pollutant	Baia Mare	Zlatna	Valea Călugărească	Turnu Măgurele
Pb	210	324	73	108
Cd	7.2	1.4	2.1	2,9
Cu	204	182	416	230
Zn	314	159	572	206

Given the normal and tolerable concentrations of these heavy metals in soil (Table 11), is found exceeding of the normal concentrations of lead, cadmium and copper in all areas in Baia Mare and Valea Călugărească. Tolerable concentrations of lead are exceeded in Baia Mare, Zlatna and Turnu Măgurele, of copper in all areas, of zinc in Baia Mare and Valea Călugărească and of cadmium in Baia Mare.

Table 11 Normal and tolerable concentrations in soil

The pollutant	Normal concentration in soil, ppm	Permissible concentration in soil, ppm
Pb	0.1-20	100
Cd	0.01-1	3
Cu	2-100	100
Zn	10-300	300

Soil pollution may also occur with substances in the air, affecting very large areas of farmland or forest. In Romania are recognized some areas polluted with substances in the air from various industries, namely:

- Copsa Mica, polluted with carbon black, gas (SO_2, CO, CO_2, NO_2) and heavy metals (Pb, Zn, Cd, Cu) from Sometra Plants SA and Carbosin SA. Affected area is over 180,000 ha, and in soil were determined exceeded the maximum allowed by 3-12 times at Pb, 9-15 times at Cd, 5-6 times at Zn and 2-5 times at Cu.

- Slatina, Valea Călugărească, Năvodari, Turnu Magurele, polluted with heavy metals from Slatina aluminum plant and the Chemical Fertilizer Factories. Were determined concentrations with 1.7 times over maximum permitted limit at Cu and Pb in Turnu Magurele and over 4 times at Cu, respectively 2 times at Zn in the Valea Călugărească.

- Tasca-Bicaz Chişcadaga, Alejd, polluted with cement powders from cement plants from that localities.

An important issue related to use of water is the fight against their pollution.

Water use should be seen not only quantitatively but also qualitatively. Neither population, neither economy cannot use poor quality water.

Pollution of flowing waters affects channels, rivers and streams on their course to overflow to the sea. It can contaminate large areas of water such as ponds or artificial lakes.

Pollution of flowing water is usually invisible because pollutants dissolved in water.

In the last decades of the twentieth century Black Sea damaged powerful environmental conditions, due in most part, coastal erosion, eutrophication, insufficient treatment of wastewater, introduction of exotic species, habitat loss and inadequate management. Biological diversity has decreased dramatically. There were accidents of crude tankers leading to oil pollution and the number will probably increase given oil transport routes from the Caspian Sea to Europe. According to GEF surveillance report from 1992, Black Sea is considered the most seriously degraded sea of the planet.

Concerted international action as the Black Sea Environment Programme (Black Sea Environmental Program, BSEP) funded by the GEF has led to some modest local improvements, but has enabled implementation framework for establishing the regional, national, local strategies and coordination strategies. The most important achievement is the establishment of a Strategic Action Plan of the Black Sea, adopted by the Ministry of Environment of the six countries bordering at Istanbul on October 31, 1996. Among other things this plan proposes to reduce pollution and management of living resources.

If the world population will increase in the rates provided and if current water consumption, waste, drought and irrigation (which absorb about 70 percent of global water resources) will remain at levels since now, in 2025, half of the world population will remain without water. And since water is life, dark future, so close, would be the first concern of those who govern the destinies of this planet, until recently so blue. In 2003 was held in Kyoto, under the aegis of United Nations Organization, the third World Water Forum.

In full planetary drought, accompanied by damaging rains, at the end of August 2003 took place in Duşanbe (Tajikistan), International Forum on Water, where it was raised among other progressive disappearance of the Aral Sea, the fourth extension of the freshwater on the planet. All the experts say and show the prospect of humanitarian and ecological disaster.

Concerted actions of all policy makers in the world cannot be delayed even one day. In 2000 over one billion people lacked access to drinking water, two billion, from any source of water, and over 12 million people die every year from lack of water or polluted water.

Pollutants in the waters fall into the following major categories:

- Organic substances, biological waste;
- Inorganic substances;
- Radioactive substances;
- Oil products;
- Pathogenic microorganisms;
- Hot water;

4. CONCLUSIONS

Environmental protection is a priority for socio-economic development and aims to achieve a clean and healthy environment that does not affect the potential development of future generations, is necessary to ensure environmental protection and conservation of natural resources in accordance with the requirements of economic and social sustainable development and better education and public awareness on these objectives.

For effective environmental protection requires a complex of interrelated activities and actions wisely to improve environmental conditions and public health and involves the development of appropriate attitudes of the community, assessing the realism of environmental issues, setting priorities and appropriate strategies solve them and, not least, changing attitudes and behavior towards the environment and civic responsibility, for transmission to future generations a clean and healthy environment in compliance with the three dimensions of sustainable development-economic, ecological and social.

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