

A STUDY ON THE GLOBAL FACTORS OF ENVIRONMENT POLLUTION

Constantin IVAN

Department of Electricity-Magnetism-Materials Science-Electronics-Plasma Physics.

West University of Timisoara. B-dul V. Parvan 4, Timisoara, Romania

Abstract

The impact of the world's 6.3 billion people on the environment is unprecedented. The rate of population growth increase the demand for natural resources such as water and fossil fuels, and so, are creating pressure on environmental systems, population health, and environmental relationship. Other forces, such as public policies, technological development, and culture, can ease or worsen to affect the environment characteristics. In paper is analyze the main factors which change the Earth's biophysical and biochemical properties of atmosphere, having strong influence on human health and climate changing.

It is known that the limited resources of the Earth, due to the excessive growth of the world's population, to the technological and technical development but also to various human activities, determine the change of the content and structure of the environment. The increase in carbon dioxide concentration of the air, which results in the increase of the average temperature of the Earth due to the greenhouse effect, the acid emanations which combined with fumes produce acid rains, as well as nuclear activities and radiations that determine the destruction of the protective ozone layer, are the consequences of an irrational industrial development. This proves that the environment, mankind's natural asset, can no longer absorb the noxious effects of human activities that affect the quality of our lives. Due to the increasing of the technical and material devices and to the human being's integration in the environment, protecting and preserving the environment has become a global problem. Under these circumstances the technical and social devices which should be used are interdisciplinary and may be achieved through the politic, economic and social involvement of every country, region, city, and last but not least of every citizen. Man's actions, at the individual and industrial level, influence the quality of the environment directly, determining the change of its structure and content.

The growth of the world's population (Fig. 1), the change of the normal structure of the atmosphere due to the increase in carbon dioxide concentration (Fig. 6) and of the average temperature (Fig. 7) through the greenhouse effect, the alarming decrease of the oxygen

generator afforested and green areas (Fig. 8) (Fig. 9), the decrease of the polluting oxide concentration of the atmosphere, the experiments and nuclear radiations that modify the ozone layer (Fig. 10) and so on, involve important factors of local, national and global responsibility.

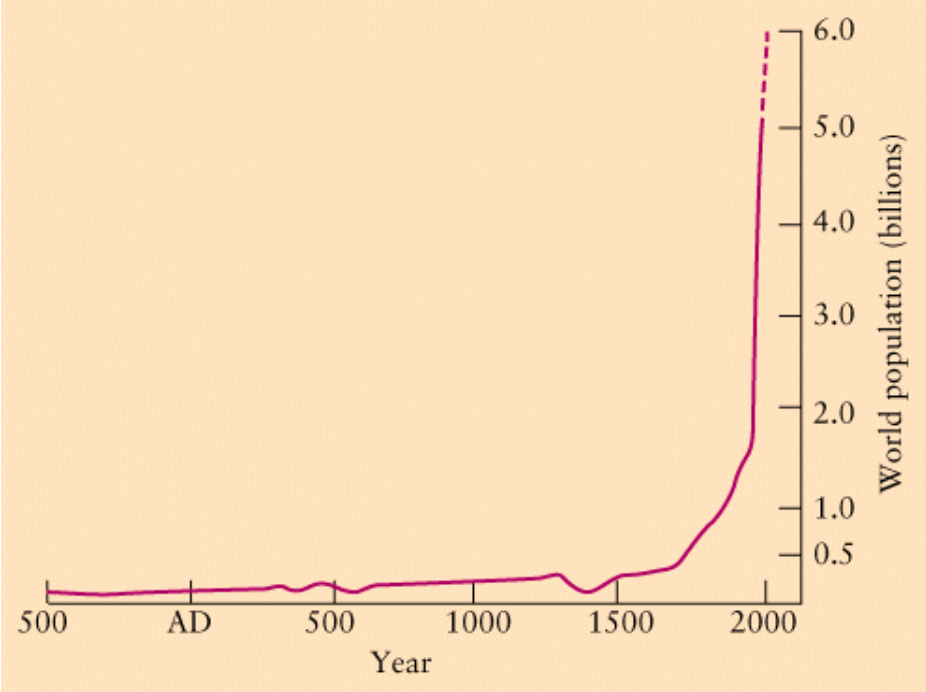


Fig.1. The evolution of the Earth’s population

The figures show the evolution of the Earth’s population along 2500 years up to the present. These data are estimated by the United Nations Population Fund and the USA Census Bureau [1]. We should underline the increase of the population starting with the XVIIIth century, which continued in the XXth century as well. Besides that, the Population Division of the United Nations Economic and Social Department [2, 3, 4] published for the first time the estimated increase of the population, in all parts of the world, until 2300. This report took into consideration the morbidity decrease after 2050, the increase of the average age, no migration after 2050 and an average fertility of 2.35 for women; in this case the population would be of 3.2 billion. This study is presented in figure 2.

In the “average” scenario, the fertility was considered at 1.85 and thus the population goes from 6.3 billion to 9.2. The ‘zero’ scenario takes into consideration equal global percentage for births and deceases. In the ‘small’ scenario the fertility was considered at 0.25.

The impact of the world’s population (6.3 billion) on the environment is unprecedented. Mankind disregarded its effect on the environment during the last 300 years, in comparison with the period when a couple of hundred million people lived on Earth.

During the XXIst century almost 1/3 of the Earth’s surface is affected. For example, gas, coal and oil combustion increased the carbon dioxide concentration, thus altering the global climate and people’s health. The number of the population and its activities are the factors that changed the environment. The Earth’s natural resources and its population are interdependent. Fig. 3 presents the population of the major regions in the world in the year 2000 and the estimation for 2050.

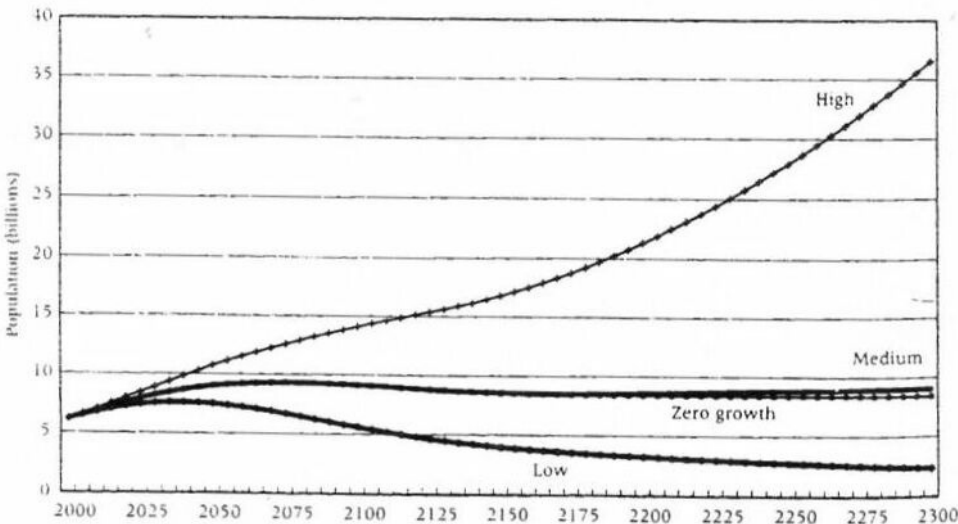


Fig.2. The world’s population according to the different growing scenarios: high, average, zero and small, between 2000-2300 [2, 4]

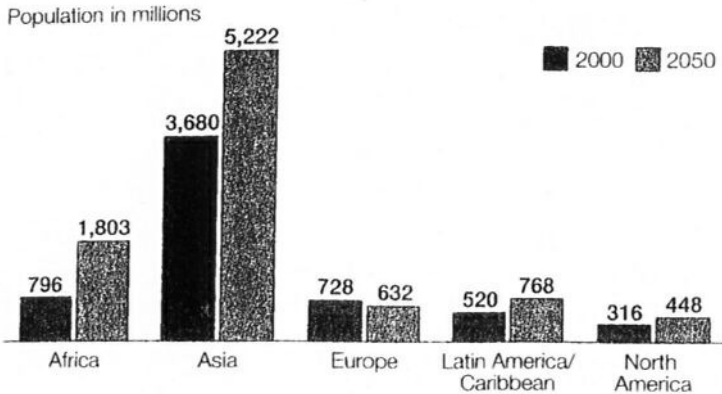


Fig.3. The population of the major regions in the world in the year 2000 and the estimation for 2050

The human being can influence the environment in different ways. The increase of the population does not necessarily produce serious changes of the environment. Fig. 4 presents the increase of the rural and urbane population between 1950 and 2030. [6]

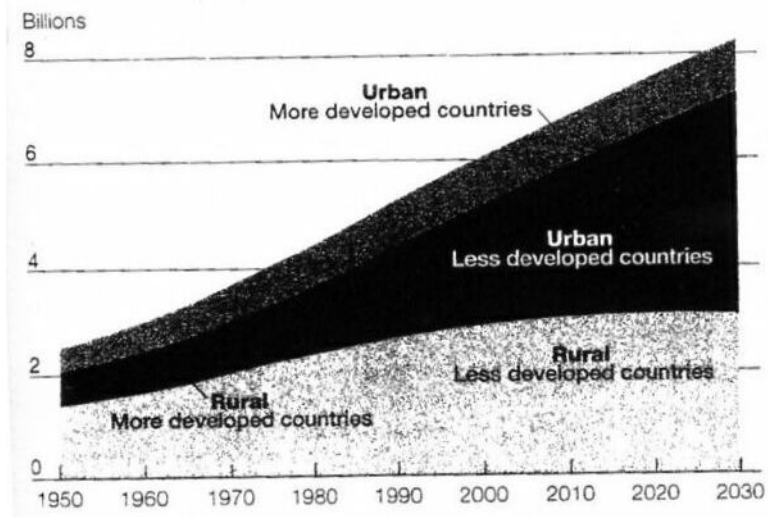


Fig.4. The increase of the rural and urbane population between 1950 and 2030

Man’s creativity determined a technological development that allows obtaining a larger quantity of food from smaller surfaces, but also cleaning the residual waters and protecting vast surfaces of the Earth’s biodiversity. Car discharge and industrial polluting substances are well-known. Fig. 5 presents the increase of vehicles that use liquid fuel between 1960 and 2020.

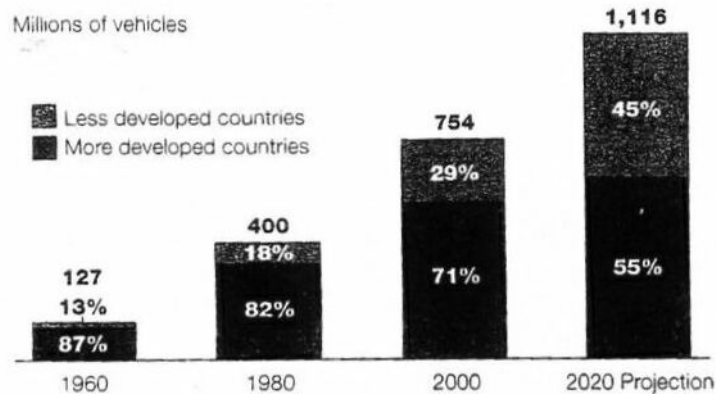


Fig.5. The increase of vehicles that use liquid fuel between 1960 and 2020

The chart shows the values of the carbon dioxide concentration (ppm) obtained by the USA National Oceanic and Atmospheric Administration from Hawaii. The carbon dioxide concentration of the atmosphere increased by 13% between 1958 and 1995. The shape of saw-teeth results due to the fact that plants absorb more carbon dioxide during spring and summer than during autumn and winter.

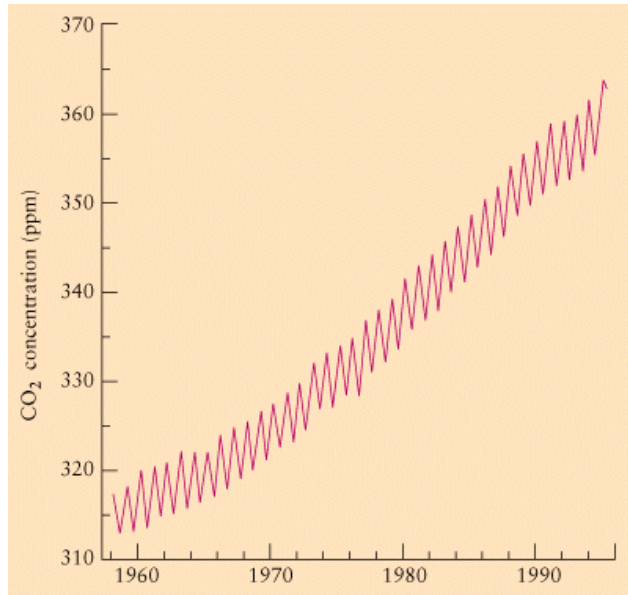


Fig.6. The global evolution of carbon dioxide concentration of the atmosphere

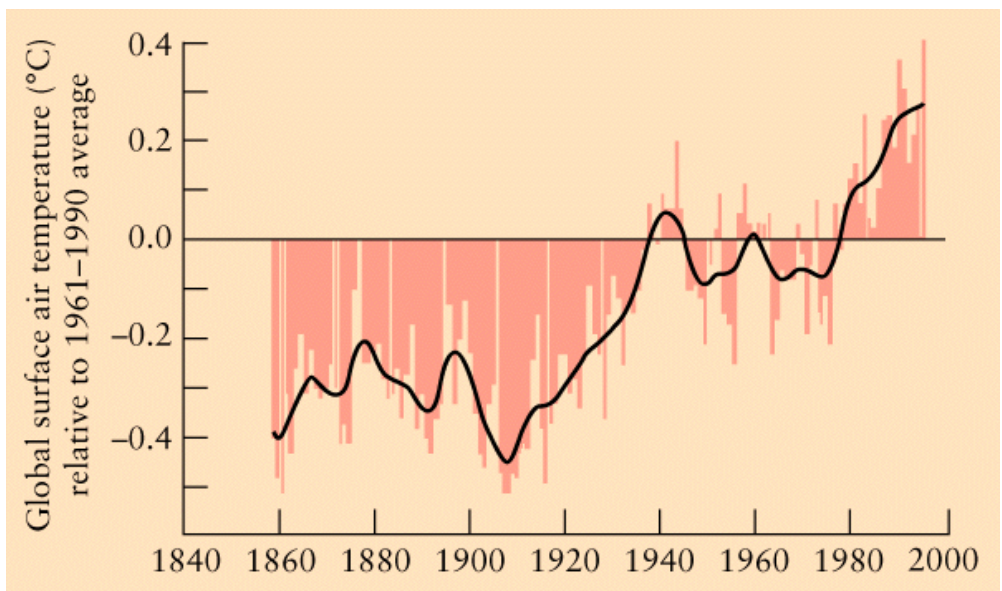


Fig.7. The global environmental temperature evolution

The chart from fig. 7 shows a medium warming of the Earth's along 140 years. The vertical scale has as a reference the average temperature between 1961 and 1990.

Fig. 8 is presented according to rainbow colours, starting with red until blue and purple. The largest phytoplant concentration is in the areas marked with red while blue and purple mark the areas with low vegetation; black and green represent the forests situated in rainy regions, light green and golden represent the savanna and farming lands. Yellow signifies desert areas. One can notice the large desert areas. These desert areas increase with the increase of human activities.

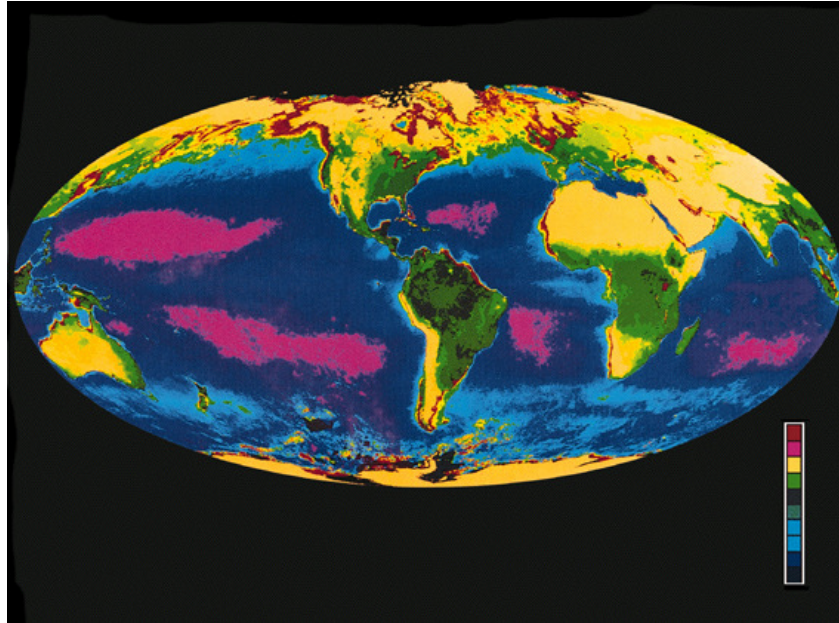


Fig.8. The distribution of green and afforested areas in comparison with desert areas



Fig.9. Massive deforestation in the Amazon

This photo was taken by the NASA spaceship, in 1997, and it represents the Brazilian state of Rondonia, situated in the rainy areas of the West Amazon, at the border between Brazil and Bolivia. The grey regions are deforested and more widespread than the afforested ones. According to NASA specialists, similar deforested areas are found in Central America, Africa, Asia and Australia.

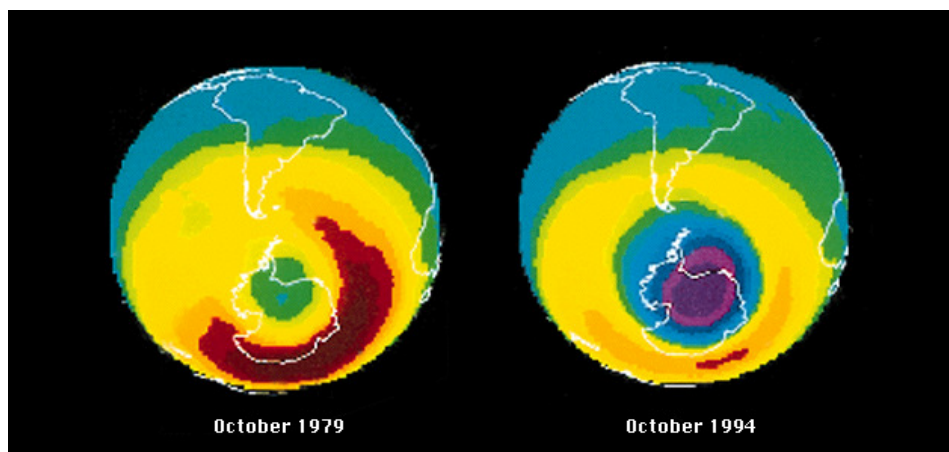


Fig.10. The ozone layer affected by car discharge [1, 3]

The images in fig. 10 show comparatively the stratospheric ozone distribution above Antarctica in October 1979 and October 1994. White and red show a higher ozone concentration. According to the rainbow colours, starting with red, one can notice the decrease of ozone concentration. The lowest concentration may be found in the purple areas.

On 5th June 1992, at the UNO Conference on climate changes, in Rio de Janeiro, was signed the International Convention for the protection and preservation of the environment. As a consequence the Romanian Parliament passed the Law 24 from 1994 [7]. The signing parts of the convention expressed their concern about the effects on the world's population, which are caused by the changes of the climate, determined by the change of the structure and content of the environment.

On 11th December, at Kyoto, a protocol to the UNO Convention was passed. It includes the commitment of all countries to limit the quantity and reduce the car discharges that produce the greenhouse effect, between 2002-2012, in comparison with 1980.

The A appendix to the Kyoto protocol lists the greenhouse effect gases: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrocarbon (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF₆).

In our country some norms for the environment protection were legislated, according to the international and European norms and legislation. Although we made some progress in this respect there are still a lot of polluting sources that pollute the environment producing discomfort to the population, illnesses and deceases.

Thus, detecting and neutralizing the polluting sources, drastic punishments for breaking these regulations, making some financial sources active, for the implementation and supporting the activities in this domain are a must. It is required to detect, know and neutralize the polluting

substances of each area but also to encourage environmental protective behaviour for each individual and community.

References

- [1] Universe, William J.Kaufmann Publishing House, New York, 2005
- [2] Environmental Degradation Rates, by Philip H. Howrd, ect. Lewis Publishers, Inc., 1991
- [3] Enciclopedia of Environmental Studies by Wiliam Ashwarth, Charles E.Little, Facts On File, Inc. New York 2001
- [4] U.S Environmental Protection Agecy, 2001 Toxic Realease Inventory
- [5] Handbook of Environmental Data on Organic Chemicals, Fourth Ed. vol 1 and 2, John Viley & Sons Inc., New York, 2001
- [6] The United Nations and world Population in 2300, Population and Development Review, vol. 30 [1] 177-187, 2004
- [7] State of Ohio Environmental Agency, Division of Air pollution Control Report, 2004