

ENVIRONMENTAL MONITORING AND SUSTAINABLE DEVELOPMENT

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Abstract: *The interest of any individual to achieve progress and growth and the entrepreneur's desire to make a profit at all costs, show that humans have a consumptive and destructive nature, that is, man has often forgotten that he is part of the natural system, so that imbalances have been created, leading on the long-term to the deterioration, degradation and destruction of the natural environment, the effects being already felt worldwide. Educating and training people is an essential element that must be included in all programs regarding ecology and sustainable development, the only way to ensure a future.*

In order to eliminate the repercussions of climate change, population growth, poverty, water crisis, drought, depletion of resources, loss of biodiversity and to ensure social progress, economic and human development, clear actions are necessary, summarized in specific and measurable objectives, that are subject to some of the national strategies .

The ecological / integrated monitoring involves obtaining an accurate, overall image of the environment's quality state at a moment in time as well as the evolution tendency on the two basic components - the biotic and abiotic environment - in their interaction.

Sustainable development allows a nation to plan, implement and monitor the progress of society in order to achieve long-term goals, to meet the needs of current generations, but without preventing future generations to meet their own needs. We need to establish specific projects that enable us move on to a high added value generating model, generated by the interest in knowledge and innovation, aimed at continuously improving the quality of life of humans and the relationships between them, in harmony with the natural environment. Given the fact that Romania has an economy based on intensive use of resources and the natural capital is facing the risk of damage that may become irreversible, the assimilation and practical application of all the principles and practices of sustainable development is required. To integrate all the objectives of sustainable development at the heart of economic activity one should consider the tax and legal regulations to bring changes in the way of production and consumption.

Keywords: *environment, natural environment, artificial environment, ecosystem, ecology, ecologic balance.*

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1. Introduction

The interrelationships between the economy and the natural environment were born with human society. They have multiplied and developed as the society and the economy have changed.

There are a series of relationships between, humans, economy and nature:

- independency;
- dependency;
- interdependency.

History has shown that mankind was first interested in survival and then in a better life. People were interested in economic growth and development, in growth and development of the property at an individual and human community scale although, sometimes, this growth was achieved due to the reduction and even exhaustion of some natural resource deposits, or by damaging them, more or less. The state of the natural environment was not always interesting.

Reality has shown that society should pay special attention to the environment not only to economic growth and development.

2. History of sustainable development

The term "ecosystem" was first used in 1935 and it belongs to A. Tansley, expressing an "open information system, with a capacity for self-preservation, self-healing and development from simple forms to complex forms of organisms and stability in relation to other systems" (*Enescu Valer, Dorel Cherecheș, Constantin Bândiu, 1997*).

The United Nations Conference held in Stockholm in 1972, where the 113 nations present, raised the issue of pollution, destruction of resources, environmental deterioration, extinction of plant and animal species, the need to raise the human living standards and raised the concern about how human activities have influenced the man and the environment, emphasizing the indissoluble link between quality of life and the environmental quality for future and current generations.

The year 1986 is marked by the establishment of the UN, the World Commission on Environment and Development, acting to study the dynamics of environmental deterioration and to provide solutions for the long-term sustainability of human society. We must become conscious that development is not just about high profits and high standards of living for a small category of the population, but rising living standards for all, as well as the fact that development does not involve the unconscious use of natural resources nor the environmental pollution. The key issue of sustainable development is the opposition between the needs of population growth and the limits imposed by the planet's resources, on the one hand, and the continuous degradation of the environment, on the other hand.

In 1987, in the paper of the Brundtland Commission "Our Common Future", committee which was convened by the U.S.A to examine global environmental degradation, sustainability is defined as "meeting the needs of today without sacrificing the ability of future generations to sacrifice their own needs" (http://en.wikipedia.org/wiki/Our_Common_Future).

At the summit in Rio de Janeiro in 1992 important issues of environment and development were discussed, namely: the systematic control of production types, particularly the production of toxic components, alternative energy sources to

replace fossil fuels, which are linked to global climate change, finding new solutions to reduce vehicle emissions having very harmful effects on the human body, efficient use of water given the growing water scarcity etc. (http://en.wikipedia.org/wiki/Earth_Summit)

The United Nations Summit on Sustainable Development in Johannesburg in 2002 gave an impulse to the implementation of global measures to fight poverty and protect the environment. The links between poverty, environment and how resources are used and managed, how the economic and social development is regarded as well as the environmental protection at a local, regional, national and international level were emphasized. This conference was the start in developing in Romania a National Sustainable Development Strategy (NSDS) in which one of the objectives is aimed at protecting the environment, namely:

- "protecting the Earth's capacity to support life in all its diversity by improving the environment's quality;
- pollution prevention and reduction and production and consumption promotion for the purpose of sustainable development to ensure the detaching of economic growth from the environmental degradation " (<http://www.mmediu.ro/>).

Sustainable development is "a new way of development that supports human progress for the planet and for a long-term future" (<http://www.un.org/geninfo/bp/anviro.html>)

3. The big challenges of sustainable development

In the course of time, it has been determined that the human domination over nature is an essential part of the technical, economical and social progress, but at the same time it was ignored that often the power of man over nature and the fundamental interest of entrepreneurs to maximize their profit is consumptive and destructive, in other words on the long-term, one can notice the deterioration, degradation and destruction of the natural environment.

The new environmental conditions are less favourable for human life as its continuous deterioration is not only destroying the ecological balance, but it also indicates the emergence of reverse reactions on humans coming from the environment.

In order to carry out a real and effective environmental protection activity, the continuous monitoring of its quality and the level of pollutants discharged or already present in the environment is an objective necessity.

The ecological/integrated monitoring requires obtaining the big picture of the environment's state at a certain moment in time, as well as the evolution trend of the two basic components – the biotic and the abiotic environment - in their interaction. More and more projects are aimed at achieving environmental performance, by controlling the impact of their activities, products or services on the environment and taking into consideration the environmental policy and objectives. To ensure the society's sustainable development, the need to integrate the economic objectives with the ecological and environmental protection ones, is fundamental. (*Minea, Elena-Maria, 2012*)

By environment, in accordance with the Government Emergency Ordinance 195/2005 on environmental protection, we understand all conditions and natural elements of the Earth:

- water;
- air;
- earth;
- underground;
- characteristics of the landscape;
- atmospheric layers ;
- organic and inorganic materials;
- living beings;
- some material and spiritual values;
- quality of life;
- conditions that can affect human health and welfare.

The main way of ensuring the existence as the population grows and even increasing its quality is the economical and social improvement and development. (*Negucioiu, Aurel; Petrescu, Dacin, Crina, 2006*).

The major causes of the crisis are: pollution – consequence of population growth, prosperity, abundance, human aggression, human tendency to maximize profit, capitalism, etc.

The environment includes:

- the natural environment - nature in its original form, with its visible and invisible parts, representing the existence condition for all living things (land of any kind, underground waters, soil, terrestrial flora and fauna etc);
- as well as the artificial environment, the one created by the hand and mind of humans, namely those goods that exist due to human activity and that are the material conditions of life.

The exhaustible resources are divided by specialists into two groups (*Aurel Negucioiu, 1998: 492*):

- renewable resources, which are resources that can be exhausted, but after some time they can recover naturally, as soil fertility is;
- resources that do not recover naturally, like useful minerals.

The finite and non-generable nature of these resources requires managing and saving them.

Ecology studies the relationships between the Earth and all its inhabitants and the economy manages these relationships.

The forms of ambient crisis manifestation are water degradation, the flow of garbage, damaging of the air, noise pollution, chemical pollution, radioactive pollution.

The eco-development is the development process based on taking into account the requirements of the ecological balance.

An ecological balance represents an ensemble of conditions and interrelationships between the components of an ecological system, which ensures that its structure, functioning and dynamics remain ideal.

The ecosystem is a dynamic complex of plant, animal and microorganism communities and the abiotic environment, interacting in a functional unit.

Currently people talk more and more about ecotourism. Ecotourism is a form of tourism in which the main objective is observing and being aware of the value of nature and local traditions and it must meet the following conditions:

- a) contribute into the conservation and protection of nature;
- b) use local human resources;

- c) have an educational character, respect for nature - awareness of tourists and local communities;
- d) have an insignificant negative impact on the natural, the social and cultural environment.

The main priorities of the present moment are protecting endangered species and habitats and the most efficient possible use of natural resources. Reaching these goals we can contribute to economic growth by encouraging innovation and entrepreneurship.

The European Union practices the most advanced environmental standards in the world. Thus, it devised a strategy by which it wants to stop the decline of endangered species and habitats, by 2020. At the heart of this strategy we find the Natura 2000 network, covering 26,000 protected areas representing almost 20% of the land area in the European Union.

The LIFE program is the primary instrument used by the European Union to support environmental and conservation projects. Funds are allocated within the European Union as well as beyond, in acceding countries and other neighbouring countries.

Natura 2000 is a European network of protected natural areas established in 1992 from the need to protect nature and maintain on the long term the natural resources necessary for the socio-economic development. Natura 2000 is a vital tool for saving the natural environment, if we consider that about 800 plant species are endangered and some European fish stocks are below the safe limit.

Declaring the Natura 2000 protected sites is based on two European Union directives governing the selection, designation and protection system: the Birds Directive (1979) and the Habitats Directive (1992) so that the sites were demarcated based on the scientific identification of habitats and species on their territory. It is about sites where human activities can be performed, without endangering rare and vulnerable species or habitats and not about nature reserves.

In Romania, the total surface of protected areas is approx. 7.83% of the land area (1,866,705 ha): "Danube Delta" Biosphere Reserve 576,216 ha; - 13 National Parks 318,116 ha; - 13 Natural Parks - 772,128 ha; - 981 Natural Reserves - 179,193 ha; 28 Special Areas of Bird Protection - 21,052 ha. (*Constantin Munteanu (coordinator), 2011: 27*).

Natura 2000 through analyzes is aimed at identifying economic activities and resources that can help developing the area as well as the socio-economic benefits derived from the area's protected. Another objective would be to identify other fields that can contribute to the economic development of the area, while respecting the conditions derived from its status of protected area.

<http://www.natura2000transilvania.ro/despre-proiect/studii-si-publicatii/beneficiile-socio-economice-ale-includerii-zonei-in-aria-natura-2000>

For example, the result of the socio-economic study in the area of the Hârtibaciului-Târnava Mare-Olt Highland, completed in early 2013, stresses the importance of protected areas for the development of local communities. Ecological farming and tourism are real solutions to revive the area. The main economic activities (agriculture, forestry, animal husbandry, trade) fail to provide sufficient revenue to ensure a decent living style for the citizens. Problems identified in this area are: unemployment, education, inadequate infrastructure, population migration. The study was conducted within the project SOP Environment, co-financed by the European Regional Development Fund - "For Nature and Local Communities -

Fundamentals of an integrated management of Natura 2000 in the area Hârțibaciu - Tarnava Mare - Olt". Natura 2000 protected areas add value to the area and makes it more attractive for tourists, but also for investors and consumers, responsible for healthy products and who want to live in harmony with nature. (<http://www.natura2000.ro/news/>)

Romania faces a serious shortage of resources, because in 2008 it imported 50% of its gas and 60% of its oil. Nuclear power is a solution, but not on a very long-term, due to limited resources. It was found that production is unsustainable, which means that industrial production growth is exceeded by the growth of resource consumption. Two thirds of the power plants are obsolete, so that their modernization would be very expensive. Regarding human resources it was found that in the first decade of the 21st century there are 2.6 researchers per 1,000 persons, which is three times less than in other EU countries. The continental climate in Romania allows the use of renewable energy resources. Romania has untapped mineral resources such as salt, non-ferrous ore, iron ore, non-metallic minerals, sand, gravel, decorative rocks, etc. (<http://www.insse.ro>)

In the paper of the Brundtland Commission "Our Common Future" several issues were raised, including the need for a new approach to resources, especially non-renewable ones, proposing a "national green product" that replaces the gross domestic product, which will exclude non-renewable resources and will provide a more realistic value to others, so that less developed countries will be able to use their own resources, without incurring debt.

If we want to avoid a crisis in the use of natural resources, we need not only tough legislation but also public education and the stimulation of mass collaboration in order to achieve goals by providing funding for projects in the field.

In the long run, one of the measures to reduce energy consumption would be the use of energy labels for household appliances. The energy label expresses the energy's efficiency using an energy efficiency-based index, calculated by comparing the energy consumption of the household electrical appliance that needs to be labelled with the average consumption of the European model.

In the last 10 years, no less than 8 major energy directives were discussed and adopted by the member states of the European Community, influencing on one hand the energy supply and, on the other hand, the management of the energy demand. Since water is the source of life, water is considered the most important disposable consumer commodity. Water policy aims to:

- provide all European citizens with access to sufficient quality water;
- ensure that all water bodies in Europe meet the minimum quality standards;
- protect vulnerable aquatic environments.

By joining the European Union, Romania has access to structural and cohesion funds, financial instruments designed to help reduce economic and social disparities between the Member States of the European Union. To develop and expand the environmental infrastructure, Romania benefits from the European Regional Development Fund and Cohesion Fund where:

- The European Regional Development Fund helps eliminate regional imbalances in the European Community, it reduces the gap between the development levels of different regions and it closes the gap between less favoured regions;

- The Cohesion Fund supports Member States in order to reduce the economic and social development differences and to stabilize the national economy.

Accessing EU funds is conditioned by the Member States developing Operational Programs, indicating areas that require financial support from the European Union.

The water and wastewater sector are receiving the largest share of European Union funds allocated to the SOP Environment (60%). (<http://www.posmediu.ro>)

The Sectoral Operational Programme Environment (SOP ENV) is the document that sets the strategy for allocating the European Union funds for the environmental sector in Romania, in 2007-2013, but its objectives also keep track of Romania's development needs beyond 2013, through investments that lay the foundations for the sustainable development in the environmental infrastructure.

The investments consider the expansion or modernization of water systems and drainage, the construction or modernization of water and wastewater treatment plants as well as the increase in the quality of public water services and sanitation, in terms of acceptable prices for the population. For this sector large infrastructure projects are financed, covering several areas at a regional or county level, which will bring an important contribution to the alignment with the European environmental standards with a significant impact on the development of those communities.

Another issue that must be addressed in investment projects is aimed at protecting people and property from the devastating effects of flooding. Intervention areas will be selected in accordance with the national strategy in the field as well as based on some risk analysis.

Another area of action is the protection and rehabilitation of the Black Sea southern seashore, in order to reduce coastal erosion. Such investments will increase public safety and protection of the natural environment, as well as the economic value of the Romanian seaside.

Air deterioration is another form of the environmental crisis. Air quality is a carefully analysed area, so that ambitious economic standards were set for a range of pollutants, including sulphur dioxide, nitrogen dioxide and oxides, especially particulate matter and lead.

Air quality can be improved by the green certificate, which is a title that certifies the production of a quantity of electricity from renewable sources. The green certificate is traded between producers and suppliers of electricity and it is charged to the electricity consumers. The certificate can be traded, separately from the amount of electricity it represents, on an organized market, in accordance with the law. (*Law no.134/2012 on establishing the promotion system of energy production from renewable energy sources*).

Renewable energy sources are non-fossil energy sources: wind, solar, aerothermal, geothermal, hydrothermal, hydraulic (in power plants of up to 10MW), biomass, landfill and sludge gas from wastewater treatment plants and biogas.

In order to expand the use of renewable energy, a system of promotion through green certificates is applied, which aims, among other objectives:

- to reduce imports of primary energy resources;
- to stimulate local and regional sustainable development and create new jobs;

- to reduce environmental pollution by reducing the production of pollutant and greenhouse gas emissions.

Investments intended to prevent air pollution are also considering the reducing of emissions from municipal heating plants.

Investment projects will be carried out in areas where municipal plants are the largest source of environmental pollution.

Regarding waste, special attention is given to:

- new waste prevention initiatives
- more efficient use of resources
- encouraging the transition to a more sustainable consumption.

Sustainable development requires development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

The sustainable development aims to find optimum of the overall interaction between the economic, technological, environmental and human system in a dynamic and flexible operational process. (Minea, Elena-Maria, 2012)

Investments in the waste management sector are aimed at creating integrated waste management at a regional level, while closing non-compliant landfills. Waste collection, sorting, transportation, treatment and storage measures combined with measures to reduce the amount of waste in accordance with European Union principles and practices in the field, will be financed.

Other investments are intended for pilot projects for the rehabilitation of land affected over time by various pollutants that adversely affect the environment and the human health.

If waste generation cannot be avoided, the materials need to be recovered, preferably by recycling.

By waste we understand any substance, preparation or object in the categories established in the specific legislation on waste, which the holder throws away, he intends or he is obliged to throw away. (*Law nr.211/15.11.2011 on waste*)

By recyclable waste we understand waste that can be raw material in a production process in order to obtain the initial product or for other purposes. (*Government Emergency Ordinance 195/2005 on the Environment Fund, as amended and updated*)

Prevention of waste generation:

- awareness campaigns or financial aid in decision making or other support to businesses;
- use of voluntary agreements, consumer groups and manufacturers to encourage companies or operators in the industrial sectors to set their own plans or objectives regarding waste generation prevention or to correct wasteful products or packaging;
- organizing awareness and information campaigns directed at the general public or at a specific set of consumers;
- promoting recognized and trusted eco-labels;
- agreements with the industry, such as, for example, the use of product panels like those included in the integrated product policies or agreements with retailers to provide information on waste prevention and related products with reduced environmental impact;
- in the context of public and private contracts, including some environmental and waste prevention criteria in tenders and contracts;

- encouraging reuse or repair of spoilt products or components, particularly through the use of educational, economic, logistic or other measures, such as supporting or establishing accredited centres for repairing and reusing, especially in regions with high population density;
- funding project monitoring, evaluation and control activities in order to achieve an increased capacity to absorb European Union funds involved in protecting human health and the environment.

4. Conclusions

The adoption of some preventive and then reactive environmental policies is imposed, characterized by internalising the environmental rational behaviour and attracting actions of all social actors involved in those environmental issues. (Marinescu, D, 2008).

The sustainable development requires respecting at least a few requirements:

- controlled population growth;
- continuously monitoring the economic activity's influence on the environment;
- ecological responsibility;
- conservation and rational use of natural resources;
- emphasizing the qualitative side of production;
- close international cooperation in environmental decision-making and environmental protection;
- elimination of poverty in terms of meeting basic needs related to work, food, water, energy;
- resizing of economic growth and a new attitude regarding technology;
- developing a mentality for conservation and nature's protection;
- respect for nature;
- expanding the use of renewable energy sources;
- stimulating local and regional sustainable development and creating new jobs;
- encouraging the transition to a more sustainable consumption;
- reducing environmental pollution by reducing the production of pollutant emissions and greenhouse gas emissions.

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