

**ENVIRONMENT COSTS:
STRUCTURE AND ACKNOWLEDGEMENT.
THEIR DYNAMICS IN ROMANIA AFTER THE
INTEGRATION WITHIN THE EUROPEAN UNION**

Mariana MAN

man_mariana2006@yahoo.com

University of Petroșani

Maria MĂCRIȘ

mariamacris2011@yahoo.com

University of Petroșani

Bogdan RĂVAȘ

ravasbogdan@yahoo.com

University of Petroșani

Abstract

Since their beginning, human beings had started to harass environment so that they have turned into a real danger for environment during the last century. On the one hand, man extracted out of environment a large amount of hardly regenerating resources implying its gradual impoverishment; on the other one, man introduced into environment improper products, often toxic and non-recyclable, determining, as a result the decrease of environment's capacity of maintaining the balance required in order to let the species survive and significantly diminishing the surviving capacity of human species. Accordingly, mainly during the last decades of the 20th century people talk more and more about the danger of the bursting out of an ecological crisis and of the stringent need to protect the environment.

The hereby paper starts from the assumption that responsibility regarding environment pollution and its protection should be seen as more important by the large international companies, non-governmental organizations and world's governments. Environment issues together with afferent costs, incomes, and benefits should be an increasing preoccupation of citizens and corporation leaders in most countries worldwide. Accordingly, accounting practice should provide a much wider support in displaying data that are correct and complete enough in order to strengthen the decisional process of administering environment responsibilities.

Jel classification: Q 56, Q 51, P 28, O 44, M 41, C 46

Key words: environment costs, environment accountancy, environment statistics, environment protection

1. Introduction

Beginning with the second half of the 20th century a large part of the population became aware of the fact that we head towards a serious ecological crisis. Scientific studies, made public to a large extent and widely known, have given data about the consequences of the green house effect, of the hole in the ozone stratum, of forests' disappearing, of polluted surface waters, of acid rain, of species' disappearance and of other dangers that we may encounter.

The indices of economic success traditionally employed, such as gross domestic product or the index of consumption prices, encourage consumption, waste, and the irrational use of resources with a view to creating new jobs. The prices of goods and services determine producers' and traders' profit; yet, such a profit does not display social costs, environment or health costs society has to pay. Acknowledging the existence of growth limitation requires the re-orientation of the manner of thinking and acting, at all levels of human activities, starting from a quantitative approach (shown by growth) towards a qualitative one, defined by the term of durable development. Within a durable society people are going to witness a development, a qualitative improvement brought to human factor and added value owing to the use of resources, instead of seeing a quantitative increase of those activities that require important amounts of resources and energy.

On a national and international, people may notice the need of registering all costs of economic activities, of employing certain macroeconomic indices that can adequately reflect the level of social welfare (for instance, the index of durable economic welfare) of implementing a system of taxes able to discourage unwanted actions (resources and energy consumption) and encourage the proper ones (creating new jobs and investments). Nevertheless, the accountancy of natural resources and of the "green" gross domestic product – the national alternative systems of accountancy and performance sizing – are difficultly implemented due to the controversies and methodological difficulties in evaluating under monetary terms pollution and the extraction of the resources out of the natural environment (Boghean F., 2007).

Romania has accepted community acquis regarding chapter 22 – Environment protection on December the 31st, 2000 and became a member of the European Union on January the 1st, 2007. The agreement between Romania and the European Union regarding Romania's participation in the European Agency of Environment and in the European Network of Environment Informing and Observing was ratified owing to law no. 662/2001; accordingly, Romania takes part, with full rights, in the Agency's Administration Council and is associated to the activities of the Agency's Scientific Committee.

2. Development stage in the field of environment accountability

As any novelty, the beginnings of environment accountability have witnessed a period of uncertainty. Specialized works, especially those of Mathews (1997) and Matis and Ienciu (2010) show four stages of the evolution of environment accountability.¹

Period 1970-1980: represents the beginning of the first researches in the field of environment accountability and exhibited mainly a descriptive character. This first stage may be characterized by the turning up of the first empirical works that set forth the issue of environment accountability, containing underdeveloped specialized works, yet important, due to the fact that environment would become a priority. Public authorities emit few interesting declarations or normative models, including those that dealt with sizing, evaluating, and displaying externalities and, accordingly, environment protection. The main works of this period belong to authors such as: Beams and Fertig (1971), Churchman (1971), Linowes (1972), Mobley (1970), Dierkes and Preston (1977), Ullirfan (1976), Abbott and Monsen (1979), Belkaoui (1980), Bowman and Haire (1975), Grojer and Stark (1977), Trotman (1979), Anderson (1980).

Period 1981-1994: the second stage of the development of environment accountability is a complex one. In the first part of the decade, the field of social accountability determined a high degree of interest; afterwards, in the second part of the decade, the interest was transferred towards environment accountability. Empirical research was more analytical and less descriptive; normative models that characterized the '70s were absent to a great extent, but they were replaced by a significant development of philosophical debate upon the part played by accountability in revealing data regarding the activities of social and environment accountability, and, later, regarding the character of ecological issues and the type of reporting which may offer help to a wider range of users. One could witness an increase of the number of researches regarding environment accountability in the detriment of the researches regarding social accountability. The most representative authors of this period are: Trotman and Bradley (1981), Mathews (1984), Guthrie and Mathews (1985), Freedman and Jaggi (1988), Guthrie and Parker (1989), Richardson (1987), Cooper (1984), Gray (1990), Harte and Owen (1991), Roberts (1992), Hindle (1993), etc.

¹ Displaying as a starting point the studies done by Mathews (1997) and Matis and Ienciu (2010), we have continued the stage of knowledge in the field of environment accountability and following our research upon the studies up to April 2011.

Period 1995-2001: witnesses the growing up of environment accountancy both at a theoretical level and at a practical level; it began to be approached on a larger scale, especially in developed countries; new sub-fields of environment accountancy began to develop, for instance, administration accountancy of environment and environment audit; the period may be called “the founding framework” of environment accountancy. The period was characterized by the almost complete domination of environment accountancy over social accountancy. The researches in the field of environment accountancy began to pay an increased attention to the field, the number of studies considerably grow, and environment reporting remained the main sub-field analyzed by researchers: Burritt (1995), Owen (1995), Gamble (1995), Medley P. (1997), Mathews M.R. (1997), Deegan (1998), Cairns R.D. (2000), Friedman and Miles (2001), Kitzman (2001), Wilmshurst and Frost (2001).

Period 2002-2011: at an international level they publish guides regarding the reporting of environment data and standards appear and deal with environment accountancy; the number and quality of articles continue to grow. The researches in the field of environment accountancy become more numerous, more ample; important contributions to the development of this field have brought: Gibson and Bruce Martin (2004), Watson and Emery (2004), Parker (2005), O'Dwyera and Owen (2005), Mobus (2005), Patrick de Beer and Francois Friend (2006), Richard Howarth (2006), Martin (2007), Auty (2007), Bartelmus (2007), Ubaldo (2009), Jeliakov (2009), Henri (2010), Gray and Bebbington (2010), Burritt and Schaltegger (2010).

As regards Romanian researchers, one should notice the studies undergone by Cretu (2004), Dumitrana (2005), Lungu (2008), Caraiani (2007), Borza (2007), Boghean F.(2007), Cernuşca (2007), Tabara and Horomnea (2008), Bonaci and Ienciu (2007), Matis, Ienciu and Matis (2010).

3. Short history regarding environment costs

Environment costs were the object of a first analysis made by the national Institute of Statistics and Economic Studies of Romania during the '80s. Beginning with **1996**, the expenditure accounts of environment protection are elaborated according to the methodology of the European System of Centralizing the Economic Data upon the Environment. Starting with the period **1974-1975**, the ministry that deals with environment initiates researches and studies about eco-industries (business results, jobs, export, etc) and about expenditures regarding the protection of environment initiated by organizations, local communities, and private persons. These two types of works are put together in 1981 in a first version of the publication “**Economic data about environment**”. The objective in view is

to better direct decisional factors and the public as regards the main economic targets of environment policies, the level and the evolution of expenditures for environment protection, those who finance them, the level of environment damages, and the economic advantages connected with the decrease of such damages, the implications of widening environment policies, including the issues connected with jobs, export, etc.

Beginning with 1990, the Statistics Office of the European Union (Eurostat) defines a **European System of Centralizing the Economic Data upon Environment**. This system belongs to the directions defined by the System of National Accounts, adopted at an international level. It envisages a common framework of the member states in order to collect, process, and display economic data upon the environment; it is centered on environment protection and the evaluation of the expenditures settled in order to diminish the impact upon the environment. These are the object of a certain account, namely the account of Expenditures for Environment Protection. Complementary accounts are centered on the administration of natural resources: water and forests administration, recycling activities administration.

After reading Cairns R.D.(2000) we think that the **objective of the account of Expenditures for Environment Protection is to answer the following three questions:**

1. How much does the national collectivity spend and what is the form of such expenditures for environment protection?
2. What are the economic activities initiated in order to protect the environment?
3. How and through what means such expenditures are financed?

In France, between 1995 and 1998, they elaborated the expenditures accounts for the environment protection for the following fields: waters administration, wastes administration, air and phonic pollution, landscape biodiversity. A few fields of the European classification of the activities of environment protection are not yet the object of expenditures accounts (soils and underground waters protection, protection against radiations). As a satellite-account for environment protection, the Account for Environment Protection Expenditures of the National Institute of Statistics and Economic Studies matches national accounts. This account represents one of the modules of the Integrated System of Environment Economic Accounts. The Integrated System of Environment Economic Accounts envisages a standardized display of the interaction between economy and environment that is built around flux accounts (pressures upon environment) and patrimony accounts (condition of environment according to physical and monetary terms). Under such circumstances,

expenditures accounts may be perceived as describing the real answer of the companies when facing the pressure and degradation environment is exposed to. Another module of the integrated System of Environment Economic Accounts contains **synthesis indices** that bring synthetic information about the level of pressure and environment's condition. **Their objective** is to provide a most direct monitoring of public policies. A large number of works regarding environment indices has been developed at an international level by the European Agency of Environment and the United Nations. For instance, the European Agency for Environment and the United Nations have defined **the indices based upon the "pressure-condition-response" model**. Pressure results out of human activities, condition is characteristic for physical environments, and responses are the efforts made by public and private actors.

The most important **indices** are the following ones:

- *For climate change*: the intensity of CO₂ emissions;
- *For ozone layer*: the substances that damage the ozone layer;
- *For air quality*: the intensity of Sox and Nox emissions;
- *For wastes production*: the intensity of municipal wastes production;
- *For non-salty water quality*: the rate of coupling of filtering stations;
- *For non-salty water resources*: the intensity of using water resources;
- *For forest resources*: the intensity of using forest resources;
- *For energetic resources*: the intensity of using energy;
- *For biodiversity*: the number of threatened species.

During the present stage of displaying national accounts according to an international, European and French level, a worldwide evaluation of the natural patrimony and of depreciations undergone by environment is still quite difficult. Preference directs towards the elaboration of physical accounts, susceptible to describe the whole natural patrimony of a country in its diverse components, integrating the use of natural resources stocks, on the one hand, and the depreciation of natural environments determined by economic activities, on the other one. These physical data are able, under certain circumstances, to be correlated with national accounts which are expressed in monetary terms.

4. Structure and typology of environment costs

In concordance with Alfsen and Greaker (2007) there are various manners of classifying environment costs. **The classic accounting system classifies costs as follows:**

- Direct materials and salaries;
- Manufacturing indirect costs (for instance, exploitation costs other than direct material and salaries costs);

- Sale costs;
- Administration and general indirect costs;
- Research-development.

In order to make easier the calculation of costs and to allow the implementation of environment management accountancy, UNO's Statistics Division elaborated and published the work entitled "**Integrated Environmental and Economic Accounting: Handbook of National Accounting (SEEA – 2000)**" which appeared in 1993 and which defines accountancy methodology. Yet, it still has an experimental character, a lot of countries checking its implementation to national practice; it mainly has three **objectives**: air and climate protection; administration of used waters; wastes administration; soil and infiltration waters protection; noise and vibrations avoiding; biodiversity and landscape protection; protection against radiations; directing research and development towards ecology. Considering these specifications, one is able to outline the accounting scheme of environment management expenditures the manner Table no. 1 displays it and which can be found along the whole logic of environment management accountancy.

Table no. 1 Scheme of environment protection costs

No	Environment factors Category of environment protection expenditures and costs	Air, climate	Used water	Wastes	Soil and infiltration water	Noise and vibrations	Biodiversity and landscape	Radiation	Other factors	Total
		1.	Wastes and emissions processing							
2.	Prevention and environment management									
3.	Value – shadow of the materials lost as non-products									
4.	Processing costs of non-products materials									
5.	Total environment expenditures									
6.	Incomes out of environment protection									

The management of organizations should focus mainly upon direct costs. Specialized works also employ for this category of costs the term of **usual costs**, while for the other costs they use the following terms: **hidden costs, unpredicted costs or less tangible costs**.

5. Identifying and acknowledging environment costs

In agreement with Caraiani C. (2007) identifying and acknowledging environment costs associated with a product, process or system are important in order to take positive management decisions. Carrying out the objectives of decreasing environment expenditures, extending the processes of bettering and improving environment's performances require an increased attention paid to the present, future, and potential environment costs. Delineating environment costs out of the other costs determined by the economic activity of an organization depends on the manner data are employed. Moreover, it is not always certain whether a cost is an environment cost or not: such costs belong to a gray zone and may be classified as being partial environment costs (figure no. 1).

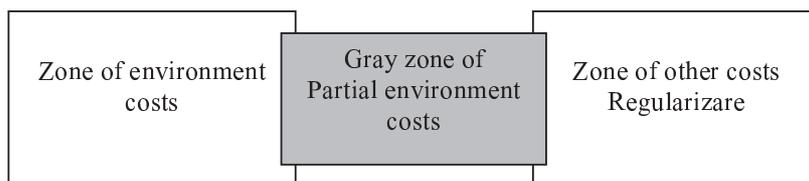


Figure no. 1 Limit between environment costs and other costs

The costs implied by observing environment legislative demands are surely environment costs. The costs required by environment rehabilitation, pollution control equipments, fees of non-conformation are undoubtedly environment costs. Other costs implied by the activity of environment protection are environment costs although they are not explicitly required by legal stipulations. Nevertheless, there are costs that belong to a **gray zone** meaning that they may also be regarded as environment costs. For instance, may one consider the cost of producing a clean technology as an environment cost? May one consider the costs for monitoring the categories of raw materials and suppliers as environment costs? Under such circumstances, it is difficult to make a difference among environment costs, health and safety costs or risk management costs. These costs belong to a gray zone. In order to make clear the gray zone, one may choose one of the following approaches: a certain cost article is treated as an environment cost with a view to a certain objective but not with a view to another one; considering as environment cost only

a certain part of a cost implied by an activity; considering a cost as being an environment cost in case one decides that more than 50% of it is determined by an environment activity.

As also Heal G. (2007) implies there are various options. Organizations may define what an environment cost should contain or certain classification criteria depending on the objective or intentions of the analysis. For instance, in case an organization wants to promote the activities of fighting against pollution, then it can be differently considered: environment costs for pollution prevention investments; environment costs regarding the fixing of contamination that is already present.

A manner owing to which the management of an organization can clear the gray zone consists in resorting to an environment expert who, depending on certain characteristics, is going to classify the various types of costs of the organization by giving marks from 1 to 10 and employing the **discriminatory analysis** methodology. Discriminatory analysis emphasizes the connections existing between the explicative quantitative characteristics and characteristics that are going to be explained. The method allows such a thing owing to displaying a factorial plan of the analyzed characteristics. At the same time, it exhibits the types of the explained characteristic starting from the values of the explicative characteristics. The method of discriminatory analysis is based upon a sample of statistic individuals upon which a qualitative characteristic with "q" types is being watched. Each statistic individual is going to be identified according to a single type of this characteristic so that a part of the sample of individuals has been defined according to "q" disjunctive classes. Along this sample the "q" quantitative characteristics are going to be measured. The issue that requires a solution is the following one: do those "q" classes differ within the whole group of quantitative characteristics? In order to get an answer, one should determine a new characteristic owing to certain lineal combinations of the old characteristics. Discriminatory analysis determines the elaboration of a decision rule owing to which one may settle, depending on the values of the explicative variables, the belonging of the statistic individuals of the sample to a certain class; according to these results, previsions regarding the belonging of other individuals to classes are made.

Briefly, one may state that discriminatory analysis has in view: a descriptive objective consisting in looking for the smallest number of explicative variables capable to better express the separation of statistic individuals into classes; a decisional objective, namely to check to what extent a certain statistic individual, that is not yet part of a group, resembles the statistic individuals of a certain class and, in case such a resemblance exists, to decide its distribution to that class.

The attributes taken into consideration by discriminatory analysis of environment costs derive from the vectors that characterize an activity of environment protection:

- Attribute 1: nature of the impact associated to an environment element (water, air, soil, biodiversity);
- Attribute 2: type of activity (of preventing pollution, of remedying pollution, of measure and control, of research-development, of education, of environment general administration);
- Attribute 3: instruments employed (equipments, machines, installations, procedures, technologies).

Another important aspect of correctly displaying environment costs regards the **evaluation of capital investments**. Accordingly, one may compare environment costs, savings, and the incomes determined by the pollution preventing investment parallel to the chosen alternatives. With this in view, one should identify and include the types of costs and incomes that are going to help showing the financial viability of clean technologies investments. One is going to further analyze those data and characteristics that cannot be easily quantified, such as potential benefits which are less tangible than pollution preventing technologies.

Table no. 2 Specific aspects in settling capital budgets

Aspects of the economic and financial analysis of investments projects	Integrating the statistic environment analysis within the economic and financial analysis of investment projects
Inventoring and quantifying costs Displaying and prefiguring costs and benefits Specifying the proper time period that may attract benefits	Inventoring and quantifying environment costs Displaying and prefiguring environment costs and benefits Specifying the proper time period that may attract environment benefits

After collecting environment data (either belonging to the organization's accounting system, or owing to separate researches), after their change into environment data, the inventory and prefiguring of costs, the savings reported to costs and the potential incomes determined by products, processes, and systems, one is going to take the decision of settling the investments budget (table no. 2). One should start with the costs and savings that are most easily to be estimated and continues with the most difficultly estimable ones (contingents, image costs). The benefits of improving the image and the relations of the company owing to pollution prevention investments (table no. 3) may significantly influence the sensitiveness of the inner reliability rate; that is a reason why their estimation closer to reality is required.

Table no. 3 Potential benefits of pollution preventing investments

Organization's partners	Less tangible potential benefits of pollution prevention investments
Customers	Increase of the financial result after improving the company's and product's image
Financial institutions/investors	Attraction for investors
	Easy access to loans and better terms in order to get them
Employees	Savings reported to health and safety costs
	Increase of labor productivity and employees' motivation, decreasing of recruitment costs

A correct display of environment costs cannot be made in case the opening towards an environment management does not occurs during the planning stage of a product or process. Planning a product or a process significantly influences environment costs and performances. A lot of organizations have adopted "environment planning" programs or "planning according to the life cycle" in order to integrate environment aspects within statistic analyses beginning with an early stage. In order to do this, one needs data regarding the environment costs and benefits of alternative plans about a product/process (table no. 4).

Table no. 4. Integrating environment characteristics in planning the product/process

Stages	Aspects to be noticed
Including environment characteristics within the analysis	Considering environment costs and performance in defining the plan's objective
	Defining the basic elements for environment costs and performance
Adding environment demands to planning criteria	Planning according to the life cycle
	Planning according to the limited resources consumption
Evaluating alternative planning solutions	Cultural, legal, performance, environment costs are taken into consideration

The analysis of environment damages is compulsory in order to explain a part of the constant evolutions in the stocks of natural assets (quantitatively and qualitatively). The United Nations (The Department of Economic and Social Informing and of Policies Analysis) intends to integrate within the accounts the damages connected with the exhausting of natural resources, with the use of the land, with the use of pollution elimination's function. As a result, despite of an important initial effort on a methodological level, environment accounts have been in fact limited to the accounts of environment protection expenditures.

The accounts should allow the observation of policies impact. The improvement of the accounts has also as an objective their contribution to the foundation and strengthening of proper policies and instruments. In order to do this, the accounts should integrate the monitoring instruments of such policies, namely: data about prices observation, data about the networks of various taxes and about the use of allocated funds, information about the evolution of emissions and physical indices (figure no. 2.).

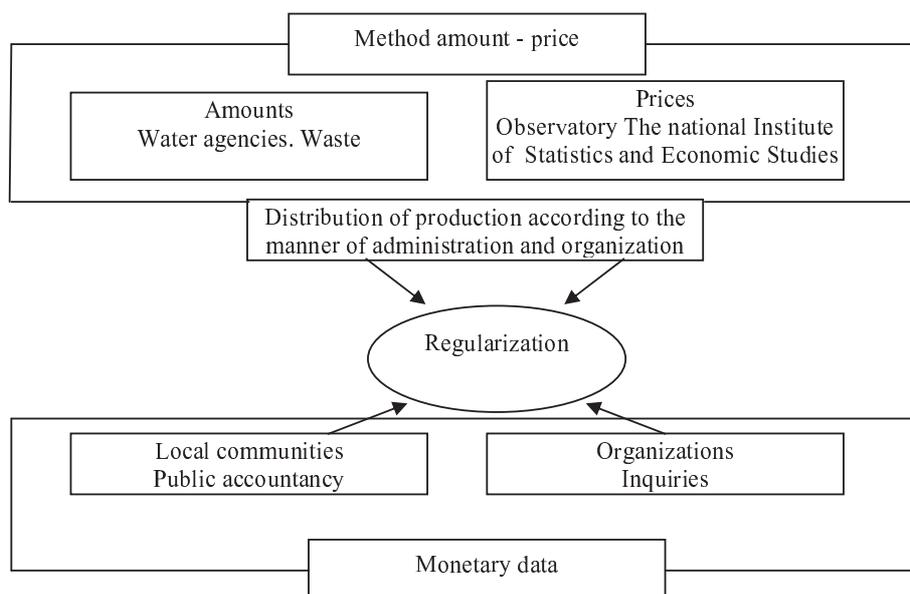


Figure no. 2. Scheme of costs improving

One of the main **objectives** of costs improvement is connected with the issue of costs retrieving, especially emphasized by the Directive of the European framework. It requires checking whether these costs, connected with equipments' depreciation, are really integrated within the price of services. **The detailed results of the inquiries should register a significant improvement of the accounts, namely:**

- An analysis of the evolution of current expenditures depending on the amount of the services brought, the type of treatment, and the quality of the services;
- A more concise description of fields' organizing and of the intervening terms of public administrations.

The statistic system upon the environment develops along three large categories of statistic sources:

- The data resulting out of the administration of environment services, the data received from Water Agencies or from certain departments of the Ministry of Environment, are up-dated each year and represent an important item in elaborating costs;

- The data resulting from the public statistic system, especially those originated in public accountancy. Except for the inquiry regarding anti-pollution investments, these data do not strictly concern the environment. The framework does not match a direct use of the data. Accordingly, within the list of official activities, the administration of municipal wastes is not separated from the administration of industrial wastes. Accordingly, certain estimations are necessary in order to move from sector data to products data. Within the fields (water, wastes) where economic, juridical, and organizational changes are numerous, these estimations should be regularly renewed in order to get an account of real evolutions;

- Statistic inquiries characteristic for environment. These inquiries provide only an image of a certain condition at a certain moment.

The project regarding the improvement of expenditures accounts in the field of water and wastes mainly targets the strengthening of the connection between monetary data and physical data determining substantial changes of the methods envisaged in order to elaborate the accounts.

The practice of countries experienced in the field of the economic environment focusing displays two manners of expressing this connection, namely: the implementation of the “**environment cost**” index or of the “**environment protection expenditures**” index.

Environment cost is an economic category generally accepted and represents that part of uses which compensates the consumption of production means and labor, under technical, organizational, and administrative circumstances, in order to get an environment service. The content of cost is connected with the consumption of factors that determined it which, in order to be observed and emphasized, should be expressed as a value. Consequently, cost is the value expression of all the factors consumed in order to produce environment services and is expressed by the expenditures made by the producer of environment services. In other words, the cost is based upon live and materialized labor consumptions which are expressed as values; these consumptions appear as production and distribution expenditures made by the producers of specific environment services as Ienciu and Matis(2010) also imply.

One should not make confusions between the notions of cost and expenditure. In order to be more specific, one may say that **expenditures** are synonymous with payments, representing a financial flux, and the factor that

decides whether expenditure is a cost element is consumption. Expenditures may be simultaneous, subsequent or previous to consumption.

The difference between the two factors consists in the fact that **at the level of costs only material consumption and labor are included during a certain period (month, year), while expenditures include the whole financial circuit determined by environment activities.**

6. The analysis of environment protection expenditures in Romania after its inclusion into the European Union during the period 2007-2010

Environment protection expenditures represent the economic expression of the answer given by society in order to approach the issues determined by environment's condition during a certain phase. These include the expenditures made by the carrying out of the activities of environment survey and protection as well as those that regard the prevention of environment damages or environment damages repairs.

Further we are going to display the expenditures for environment protection made between 2007 and 2010 which result out of the statistic inquiry carried out by the National Statistics Institute and published on its web site www.insse.ro. The statistic inquiry observes the specific rules of the European Union.

The objectives of the statistic inquiry regarding the expenditures for environment protection attempt to: focus upon financial fluxes that match the carrying out of the specific activities of environment protection which have as a goal the prevention, decrease or fight against environment damages; provide the data required in order to quantify the efforts made during a period of time in order to protect the environment at the level of the economic unit and of the units of local public administration; allow the emphasizing of environment protection expenditures according to environment factors and specific activities of environment protection; offer data in order to thoroughly characterize the producers of environment protection services.

The categories of producers of environment protection services are the following ones:

- **Productive field (or companies)** out of which: *specialized producers* – those companies that have as a main preoccupation the activity of environment protection; *non-specialized producers* – the companies that mainly deal with other activities than those targeting environment protection but which deal, in subsidiary, with activities connected with environment protection.

- **Local public administration field** that includes all the units of public administration whose competences regard only the administrative and territory form for which they have been constituted.

Public expenditures for environment protection show the State's ecologic policy and are made by the State in order to maintain ecologic parameters under the negative circumstances that economic development might have upon natural environment. This conception, appeared at the beginning of the '70s and mentioned by the work "Limits of Development" (Club of Rome, 1972), is known today as durable development and implies the economic development simultaneously with, at least, the preservation of environment parameters. The State's intervention in this issue is determined by the public character of environment and by the fact that its damage affects the whole community. The State intervenes, yet it is not equitable or rational that the efforts of repairing/preserving the characteristics of the natural environment to be made by the whole society. Accordingly, when financing these activities, the principle "polluter pays" comes first. The financial resources for such expenditures are the following ones: funds coming from/spent by companies (penalties for environment damages, investments for environment protection/pollution prevention, and taxes/fixed term payable shares for the consumption of environment factors), funds from the budget, special funds for environment protection/pollution prevention, and credits/aids from international organisms.¹

The dynamics of environment protection expenditures during the period 2007-2010 is displayed by the following figure:

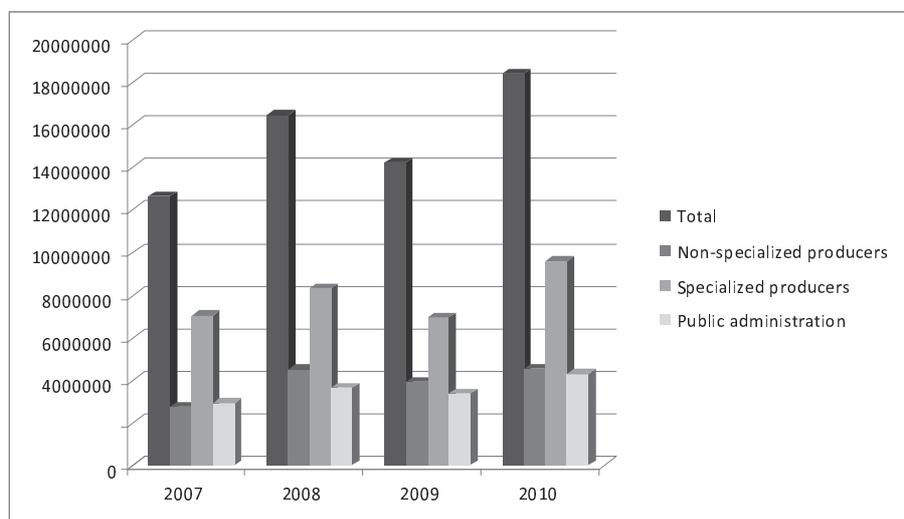


Figure no. 3 Expenditures for environment protection at a national level

¹ The statistics provided by the National Statistics institute was corobotated with the data supplied by National Association for Environmental Protection (www.anpm.ro)

In order to emphasize the evolution rhythm of expenditures the indices of relative deviation and evolution rhythm displaying a linked up foundation are going to be used.

The relative deviation employed is calculated as a difference between the expenditures registered during the current period and the expenditures of the previous period compared with the expenditures registered during the previous period, multiplied by 100 according to the following formula:

$$\Delta C\% = \frac{C_1 - C_0}{C_0} * 100$$

Where: $C_{1,0}$ - represents the expenditures registered during the current period, namely the basic period;

The evolution rhythm displaying a linked up foundation displays the evolution of the analyzed phenomenon. In case the evolution rhythm is positive then the phenomenon has a growing tendency. In case the evolution rhythm is negative then the phenomenon has a decreasing tendency. The evolution rhythm displaying a linked up foundation is calculated as a ratio between the expenditure registered during the current period and the expenditure registered during the previous period; out of the result, number 1 is extracted.

$$R_{t/t-1} = \frac{y_t}{y_{t-1}} - 1$$

Where: $y_{t,t-1}$ - represents the value of the characteristic noticed at moment t, namely during the current period, that is the value of the characteristic noticed at moment t+1, namely during the previous period.

The environment protection expenditures in Romania have increased owing to funds' growing as a result of a more active economic growth; implicitly the incomes entering the State budget have increased; yet, these have also grown owing to the allocation of a higher percent of the GDP in order to cover such expenditures.

The emphasizing of these categories of expenditures can be done along three coordinates:

1. Environment protection expenditures according to categories of producers of services made in Romania during the period 2007-2010;
2. Environment protection expenditures of non-specialized producers made in Romania during the period 2007-2010;
3. Environment protection expenditures according to environment fields made in Romania during the period 2007-2010.

1. The expenditures for environment protection according to categories of producers of services during the period 2007-2010 are further displayed by appendix A.

The analysis of environment protection expenditures according to categories of producers includes, as appendix A shows: specialized producers, non-specialized producers, and public administrations.

According to the analysis, we have reached the conclusion that the share of environment protection investments of specialized producers within the total amount of environment expenditures has registered a descendent trend from 35% in 2008 to 22.5 % in 2010 although, according to the total share in the GDP, environment expenditures have had an ascendant trend. Contrary to specialized producers, the non-specialized ones have had a climax of the increase of the share of environment expenditures in 2009 when they reached 40.9% out of the total amount of environment expenditures; nevertheless, this growth ceased in 2010 when it reached 38.8% out of the total amount of environment expenditures. Environment protection expenditures afferent to local public administration expenditures have registered the most accelerated rhythm of evolution among the three categories of producers of services, from 33.4% to 38.7% and they are supposed to grow in the future too. As regards investments, one may notice that most expenditures were made in 2008; yet, one may notice that the level of these expenditures is also quite similar in 2010, a fact that confirms again the interest of authorities and companies in this field of environment protection. As regards internal, external, and other environment protection expenditures, one may notice a positive dynamics represented by values in a continual growth which attain their maximum in 2010.

As a whole, the analysis of the indices shows that governmental organizations and the private field are conscious of the need and importance of preserving environment factors through providing proper sums meant to support environment policies according to the present tendency exhibited by all the countries members of the EU and not only by them.

2. The environment protection expenditures of non-specialized producers made in Romania during the period 2007 – 2010 are displayed by table no. 5:

Table no. 5 Environment protection expenditures of non-specialized producers made in Romania during the period 2007-2010¹

Environment protection expenditures of non-specialized producers	2007 (lei)	2008 (lei)	2009 (lei)	2010 (lei)
Forest culture, forest exploitation and annex services	36.976	143.087	48.686	37.195
Extractive industry	635.420	1.336.006	652.947	600.726
Processing industry	1.478.540	1.873.122	1.752.331	2.245.561
Production and supply of electric and thermal energy, gases and warm water	468.199	818.851	1.059.509	1.422.260
Constructions	124.287	345.459	264.061	77.004

The analysis of environment expenditures according to categories of non-specialized producers refers to: forest culture, forest exploitation and annex services, production and supply of electrical and thermal energy, gases and warm water, constructions.

The analysis made us conclude that the share of environment protection investments in case of processing industry has registered an ascendant trend from 41.5% in 2008 to 49.6% in 2010. The same results are specific for the evolution of the productive field and of the energy supply field which have attained a share of environment expenditures of 31.4% in 2010 while in 2008 they represented 18.1%. Extractive industry which has also witnessed the tendency of reducing its activities at a national level showed a constant diminishing of its environment expenditures from 29.6% in 2008 to 13.3% in 2010. Environment protection expenditures afferent to the expenditures regarding forest culture, forest exploitation, and annex services have registered the most alert rhythm of evolution of all environment protection expenditures afferent to non-specialized producers.

3. Environment protection expenditures according to environment fields made in Romania during the period 2007-2010 are displayed by table no. 6:

¹ www.anpm.ro

Table no. 6 Environment protection expenditures according to environment fields made in Romania during the period 2007-2010¹

Environment protection expenditures according to environment fields	2007 (lei)	2008 (lei)	2009 (lei)	2010 (lei)
Air protection	1.130.353	1.619.272	1.951.690	1.158.581
Water protection	2.697.415	3.508.767	2.654.651	2.402.682
Wastes and used water elimination	6.735.353	8.927.767	6.948.742	7.900.210
Soil and underground water protection	957.022	760.807	468.737	425.261
Noise and vibrations diminishing	92.134	32.594	69.564	1.359.635
Natural resources protection and preservation of bio-diversity	259.676	212.147	223.657	212.147
Other environment fields	825.343	1.416.737	1.921.419	2.288.265

The analysis of environment expenditures according to environment fields, targets the following: air protection, water protection, wastes and used water elimination, soil and underground water protection, noise and vibrations diminishing, natural resources protection and bio-diversity preservation, and other environment fields.

The analysis made us conclude that the share of environment protection investments in case of wastes management within the total amount of environment protection of specialized producers has registered a descendent trend from 76% in 2008 to 50.9% in 2010. As regards water protection, although in 2009 the share of environment protection expenditures attained 49.6%, in 2010 they decreased to 15.5%. In case of air protection, the most significant expenditures were made by non-specialized producers in 2008, namely 76.7% while the lowest level was registered in 2010 representing 15.5%.

Romania has become more and more aware of the importance of environment protection showing an increasing interest in air, water, soil, and natural resources protection (Bălan M., 2010). Due to this reason expenditures significantly increased during the period 2007-2010.

The expenditures afferent to other environment fields have witnessed the most important rhythm of evolution of all environment protection expenditures according to environment fields.

¹ www.anpm.ro

7. Conclusions

About until 20 years ago economic growth was given priority while environment protection issues were excluded. Such an approach does not allow the countries to strenuously develop, on a long term. The serious forms of the deterioration of the environment's components have determined the change of such an attitude; accordingly, the concept of **durable development** has come out; it has as major **objectives** environment protection, life quality improvement, the development and maintaining of a viable and efficient economy, and is based upon the following concepts: precaution, pollution prevention and removal, natural resources preservation, standards matching, and the support of the idea that the polluter pays.

The traditional national accounts system ignores the value of natural resources as well as the extent to which environment depreciates. As a result, it offers a false image of incomes and wealth. The incorporation of the real value of natural resources, of their consumption, and depreciation offers a better allocation of priorities; consequently, the causes of the serious environment issues, including the excessive exploitation of natural resources – for instance, the forests – would be eliminated. **Environment accountancy** repairs the drawbacks of **traditional national accountancy**. Environment accountancy consists in identifying and sizing material costs and environment activities as well as in using such data in order to take environment decisions. Its objective is the acknowledgment and search for these costs in order to attenuate the negative effects upon the environment, activities, and systems. **The Integrated System of Environment Accountancy** has been developed by **UNO** in **1993**. It contains the satellite accounts that are directly connected with the structure of the National Accountancy System and relies upon certain indices that define monetary fluxes and wealth stock taking into consideration the effects on the environment. The Integrated System of Environment Accountancy completes the traditional System of National Accountancy.

Environment cost represents, in our opinion, that part of the uses that compensate the consumption of production means and labor, under technical, organizational, and administrative terms, in order to get an environment service. **Environment protection expenditures** approach the issues determined by environment's condition during a certain stage. They include the expenditures made in order to deploy environment surveying and protection activities as well as the expenditures that regard the prevention or repair of its damages.

Environment costs and performance should be considered by management out of, at least, the following reasons:

- a lot of environment costs may be significantly diminished or eliminated owing to changes at an operational level, investments in clean technologies, remodeling of manufacturing processes and products;
- environment costs (and, accordingly, potential costs savings) may seem insignificant at a first glance;
- owing to the use of wastes retrieving schemes a lot of organizations have brought to light environment costs and benefits;
- a better environment costs management may determine the improvement of environment performances and significant benefits for human beings' health and for the success of the business;
- the correct understanding of environment costs and benefits place associated to the manufacturing processes and to products determines costs and prices which are more correctly settled and may help the organization in planning the processes, products, and services in the future so that they be environment friendly;
- competition advantages may result owing to displaying environment directed processes, products, and services.

Romania has started to allocate more and more money for environment protection being aware of the importance of environment protection through diminishing and preventing pollution and protecting the environment. The results of the countries that made investments in order to protect the environment grow from year to year as a result of the better image they promote on an international level. Accordingly, Romania, through allocating increased sums of money each year in order to prevent pollution, to decrease the impact upon atmosphere, water, and soil, to preserve bio-diversity, to administer protected natural areas, to decrease gases' emissions having a green-house effect, is going to forge a solid international image and will attract investors.

After analyzing the **environment protection expenditures made in Romania during the period 2007-2010**, one may notice that these expenditures registered an ascendant trend. Romania's observing the standards of the European Union in the field of environment implies huge costs that increased from year to year in order to consider all the commitments before the European Commission. These growths are directly connected with inflation too, with economic development, and with the political national milieu.

The analysis of the **environment protection expenditures according to categories of services producers made in Romania during the period 2007-2010** has shown that they registered an ascendant trend being dependent on the

economic, political, and social conditions in our country. These expenditures have also been influenced by the terms and conditions of the integration within the European Union. The most important expenditures have been made by *specialized producers*, and within this category, internal expenditures registered the most significant value. *Non-specialized producers* have registered smaller expenditures than specialized producers, and within this group, investment expenditures have witnessed the smallest value. *Local public administration expenditures* have registered the smallest value among the environment protection expenditures according to categories of services producers.

After analyzing **the environment protection expenditures of non-specialized producers made in Romania during the period 2007-2010**, one may state the following conclusions: these expenditures have evolved maintaining an ascendant trend. These expenditures have been influenced by Romania's economic conditions and by the increase of inflation. They have also increased in order to attain the standards of the European Union regarding environment protection. A lot of expenditures have been made with a view of buying non-polluting equipments and technologies and of modernizing the existing ones.

After analyzing **the environment protection expenditures according to environment fields made in Romania during the period 2007-2010**, one may notice that these expenditures have been influenced by Romania's economic and political conditions and also by the demands of the European Union. Expensive EU directives connected with the control of industrial pollution, the control and decrease of air, water, and soil pollution, the protection of natural resources, the protection and preservation of bio-diversity, wastes management have been implemented. The most important expenditures in this field have been made in order to *eliminate wastes, used water and water protection*. Water quality is one of the most difficult environment issues in Romania and requires high costs. Romania has benefited from various transition periods regarding the quality of air, water, wastes, and large burning equipments. The demands of the European Union regarding air quality have been gradually implemented.

The conclusion that results out of all the exhibited data is that the researches in the field of environment accountancy in Romania and not only here have considerably increased due to the important effects environment issues have upon entities and society.

Appendix A

The environmental protection expenditures realised by the service producers categories in Romania in the period 2007-2010¹

Type of producers	Total expenditures (lei)	Investment (lei)	Curent expenditures		Other expenditures (lei)
			Internal expenditures (lei)	External expenditures (lei)	
2007					
Total	12.644.668	3.674.950	7.268.145	1.228.759	45.776
Non-specialized producers	2.743.420	1.329.978	913.847	499.595	-
Specialized producers	7.039.351	1.048.083	5.487.072	504.195	-
Public administration	2.934.368	1.296.888	867.226	224.968	45.776
2008					
Total	16.478.091	4.902.478	8.730.924	2.175.612	669.077
Non-specialized producers	4.516.525	1.550.499	2.153.762	812.264	-
Specialized producers	8.328.234	1.716.516	5.637.738	973.980	-
Public administration	3.633.332	1.635.463	939.424	389.368	669.077
2009					
Total	14.238.460	4.338.024	7.455.961	2.050.791	45.776
Non-specialized producers	3.929.598	1.773.140	1.324.524	831.934	-
Specialized producers	6.951.154	1.046.720	5.070.253	834.181	-
Public administration	3.357.708	1.518.164	1.061.184	384.676	45.776
2010					
Total	18.404.817	4.753.593	9.286.892	2.870.183	1.494.149
Non-specialized producers	4.530.101	1.843.471	1.780.594	906.036	-
Specialized producers	9.581.683	1.069.905	7.104.690	1.407.088	-
Public administration	4.293.033	1.840.217	401.608	557.059	1.494.149

¹ Appendix realised with the help of the data supplied by the National Institute of Statistics and The National Association for Environmental Protection

References:

1. **Alfsen K. H, Greaker M.**, From natural resources and environmental accounting to construction of indicators for sustainable development, *Ecological economics*, no.61, 2007, p. 600-610;
2. **Bălan M., Negoescu B., Nedelea St., Grigoriu M, Bran M.**, „Some Models Used to Analyze the Impact of Greenhouse Effect Gases on Climatic Changes”, în volumul „Recent Advances in Risk Management, Assessment and Mitigation”, Published by WSEAS press, 2010, pp.407-413;
3. **Beer P., Friend F.**, Environmental accounting: a management tool for enhancing corporate environmental and economic performance, *Ecological Economics*, no. 58, 2007, p. 548-560;
4. **Boghean F.** “Contabilitatea mediului pentru o dezvoltare durabilă”, Integrarea României în Uniunea europeană, oportunități și provocări, AGER Symposium, April, 27th, 2007, ISSN 1841-8678, pag. 257-264, Supplement of the magazine „Economie teoretică și aplicată”, Vol II;
5. **Cairns R.D.**, Sustainability accounting and green accounting, *Environmental and Development Economics*, 2000, no. 5, p. 49-54;
6. **Caraiani C., Șendroi C., Jianu I.** “Green Accounting in Romania - a Vision to European Integration” site: <http://www.sre.wu-wien.ac.at/ersa/ersaconfs/ersa06/papers/476.pdf>;
7. **Grădinaru G.** “Bazele statisticii mediului” site: <http://www.biblioteca-digitala.ase.ro/biblioteca/carte2.asp?id=353&idb=>;
8. **Heal G.**, Environmental accounting for ecosystems, *Ecological economics*, no. 61, 2007, p. 693-694;
9. **Ienciu L.A., Mățiș D.**, Status of research in the field of environmental accounting, *Review of Business Research*, 2010, vol. 10, issue 2, p. 37-44
10. **Mathews M.R.**, Twenty-five years of social and environmental accounting research. Is there a silver jubilee to celebration?, *Accounting, Auditing and Accountability Journal*. 1997. vol. 10, issue 4, p. 481-531
11. **Medley P.**, Environmental accounting – what does it mean to professional accountants? *Accounting, auditing, accountability journal*, vol. 10, 1997, no. 4, p. 594-600
12. **UNO’s Statistics Division** "Integrated Environmental and Economic Accounting: Handbook of National Accounting (SEEA – 2000)", 1993; http://www.anpm.ro/Mediu/instrumente_ale_performantei_de_mediu-151; <http://www.insse.ro/cms/rw/pages/index.ro.do>.