

ENVIRONMENTAL ACCOUNTING - A TOOL USED BY THE ENTITY FOR DETERMINING ENVIRONMENTAL COSTS

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ABSTRACT: This paper wants to make a fundamental contribution to current and recently started a debate in the accounting profession and beyond. Internationally, the accounting profession, influenced by a variety of views and broader contextual forces, began to really take into account how environmental regulation of accounting. Historically speaking, the accounting was limited, most often in his reflections on the resources represented by property and financial entities. This has become less appropriate, being left out of accounting reflecting the "costs" important, such as environmental, social, etc. Which were not present in the financial statements of entities, it is because entities do not "pay" anything for the environment, and rather less on social issues. This does not mean that society as a whole; do not support these "costs". The emergence of environmental accounting dating back to 1970, interest in this area increased considerably, from managers to give greater importance to environmental issues.

Key words: Environmental Protection, Environmental accounting, Environmental costs, Protection

JEL codes: M41, O13

Introduction

Accounting is required to submit various types of user information on the financial position and performance of entities in the management of resources at their disposal. In recent decades a growing number of entities give great importance to environmental issues and their reflection by accounting, either under the influence of administrative regulations or because of their information needs. In certain circumstances, for certain fields, they can have a significant impact on the financial statements, and that of their users. Green accounting has been around for two decades. As in all cases, environmental management accounting is a tool to inform managers about the environmental costs, to quantify the environmental effects of the entity.

Research Methodology

The methodology is a complex word (concept), etymologically composed of *method's* and *logos* which mean "method" and "science", in Greek, and free translation "science method", the science of conception, choice and use of method in the investigation process of economic phenomena. The research methodology is the theory and practice methods, an activity that is studying the essence, nature, status, definition, classification, etc. the construction of explanatory models.

The need for scientific research in accounting is particularly important today, more than that pluridisciplinarity in accounting research is necessary and sometimes profitable. Scientific research is

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necessary to seek and find solutions or answers to immediate problems and to achieve reasonable theorizing issues to the environmental accounting, the expenditure of the environment, reporting. The main objectives considered in preparing this article consisted of a stage presentation of knowledge in the field of environmental accounting, presentation of concepts related to the concept of environmental expenses and costs, identification of different criteria for the classification of environmental costs, presentation of specific accounting treatment of environmental expenditure, presentation of environmental costs in Romania for the years 2007 and 2008.

The scientific approach is based on information from literature and specialized national European and international practice regarding environmental accounting and environmental specific treatment costs. In this article we used methods of research like documentation, comparison, analysis, synthesis, in order to achieve the proposed objectives.

The current state of knowledge in the field of environmental accounting

Environmental issues have found a reflection in the accounts only in the last part of the twentieth century. The chronology of important developments in environmental accounting and environmental issues reflected in the accounts we find at Ienciu (2009) which presents the following rhythms:

→ **Period 1971-1987**: represents the beginning of the first environmental accounting research due to the importance that begins to gain this area. The first period takes into account the literature in this field through studies treating social and environmental accounting in the same way. Since the early 80s, surveys suggest that the separation of environmental accounting and social accounting is starting, due to increased interest in environmental reporting compared to the social. Also in this period begin to appear accounting books dealing with aspects of social and environmental accounting. According to research from this period, environmental auditing and environmental management accounting were not treated separately. As a first step in the development of environmental accounting the articles published on this subject have been in a small number, just like the regulations regarding environmental accounting.

→ **Period 1988-1994**: the problem of environmental accounting is becoming an area of interest. In this period of increased interest of researchers for this area, managers and even accountants begin to pay attention to the problem of environmental accounting. It also increases research in environmental accounting terms at the expense of research on social accounting. In this period, the concepts of sustainability and environmental audit begin to interest the users. There were a number of books and articles that dealt with the environmental accounting, environmental accounting showing the state of knowledge both within universities and in the accounting. The progress in environmental accounting regulations is slow, but much faster in comparison with that of social accounting.

→ **Period 1995-2001**: environmental accounting at both theoretical and practical level starts to address on a large scale especially in developed countries. The number of studies in this period begins to grow; this period can be called "the cornerstone" of accounting environment. Sub domains of environmental accounting begin to develop, such as environmental costs, environmental management accounting and environmental auditing. The concept of environmental audit occurred in the USA at the beginning of the '80 for evaluating ecological performances of some units in the oil field and chemical industry. So as to avoid the payments incurred by environmental pollution, buyers systematically proceeded to acquisitions from the units that implemented environmental protection policies (Bețianu Leontina et al, 2008). Environmental accounting researchers are beginning to give greater importance to this area, begin to increase significantly the number of studies, environmental reports of remain the main sub domain researchers treated. This sub domain begins to interest due to the implementation of standards for environmental management, which contain a part of the audit or verification.

→ **Period 2002-present:** there is a widening of this area of research in numerous developing countries including Romania. At the international level are issued guidelines on reporting environmental information and regulations appearing in the accounting environment. The number and quality of articles on environmental accounting continues to grow. Year 2002 is the year that in Romania the conceptual studies are beginning to appear. Studies in environmental accounting are becoming more numerous, more extensive, outstanding contributions to the development of this field of research have: C. Deegan, O'Donovan, Freedman and Stagliano, Cormier, Möbus, Gray, Chatterge, Aerts and Cornier. Regarding the Romanian researchers, we include here the study by Lungu (Lungu et al., 2008), which proposes "new approach" for corporate reporting and report of social and environmental information. In Romania, there are studies of authors: Caraiani, Dumitrana, Jianu Tăbără, and Nuță, Ienciu, Cenușă, which present the environmental accounting as a system composed of three parts: the reporting, the management and the environmental audit. Environmental management accounting experiences a separate development, both in terms of published studies and the quality and diversity of concepts and theories discussed. In Romania, there are theoretical papers which treat environmental costs (Dumitrana, 2005), analysis of the product life cycle (Crețu, 2004), environmental performance and its implications on the financial performance of the entity (Crețu, 2004; Caraiani, 2007; Bonaci and Ienciu, 2007). The environmental audit is treated increasingly more in this period, with the first work in Romania dealing with this problem (Borza, 2007). Involvement of Romania's accounting in the business of environmental protection is even stronger with the entry into force on January 1, 2010 of the Order 3055/2009 for approving the Accounting Regulations in accordance with European directives, so in the chart of accounts, a new account is inserted, account 652 "Expenditure on environmental protection. With this account are kept environmental protection expenditure recorded in the relevant period, for example, environmental taxes paid, and the certificates of emissions of greenhouse gases effect purchased.

From the presented it results that research into environmental accounting have come to the forefront of accounting research, outpacing other chapters, such as social accounting, given the importance of environmental issues on the community. Environmental reports remain an area of interest for researchers, but other research subfields also have interest from researchers, namely, environmental management accounting and environmental auditing.

Accounting involvement in environmental protection activities

Constant degradation of the environment and the growing number of environmental disasters has caused environmental problems to have a greater importance. Integrating environmental issues in life requires entities to consider them at economic and legal, accounting, financial, and technical level (Lafontaine, JP, 2002). In economic terms taking into account environmental parameters in the cost of services or products, enable entities, on the one hand to rationalize energy consumption of natural resources, achieving substantial savings and, secondly, to meet the requirements of environmental compliance consumer health. Legal consideration of environmental risks is required to undertake the responsibility of the entity. This responsibility rises from failure to comply with environmental legislation and may result in administrative sanctions, civil and / or criminal. From the accounting and financial point of view, recording of environmental costs and determining environmental costs generated by the entity and related financial disclosure is way of evaluating the performance of work (Bețianu L., 2008).

The question is: Which department of the entities would be most suitable for the management of environmental information? A certified public accountant from Bulgaria, Dimiter Jeliakov, in a study called "Accounting can and should be involved in environmental protection", says that "the only subdivision that could meet this challenge, is the accounting department, reflected as financial and

economic condition of the entity and changes of these conditions in the most comprehensive and multilateral way "(D. Jeliakov, 2009, p. 52). He proposes to develop an international standard for environmental accounting, to implement a uniform solution across the globe titled "Reporting on environmental regeneration" aimed at determining the organization and implementation of reporting on environmental regeneration within the entities that pollute, and those who consume natural resources. In Bulgaria there is such a standard which deals with environmental issues and lines of coordination to be put into application, but did not become operational due to lack of interest from both, the entities that pollute, and the competent governmental bodies.

As we have noted, the involvement of Romania in accounting for environmental protection work has found a reflection with the accounting regulations in accordance with European Directives, applicable from 1 January 2010, which included the chart of accounts 652 "Environmental Protection Expenditure. In our opinion only this account is not enough, because you can't separate elements that reflect the cost of materials, wages, etc.

Environmental accounting treatment applicable to environmental costs

No matter what their activity is, entities must be within the general rules of an open democratic society; one of the most important rules of democracy is transparency. Transparency requires activity "in daylight" or "sight". From this point of view, the entities cannot hide behind secrecy, at least some of their aspects. They are forced to provide information about aspects of their activities in order to allow control of the company on these issues (Todea N., 2009). From the aspects of the entities activities are detaching the aspects related to the economical and financial activity. Such aspects concern how to obtain funding necessary to conduct normal business conditions, the use of these funds, their efficiency, entities providing such information to various categories of users, including public, the result of the existence and operation of an economically information system. The idea is drawn from the international accounting standards, namely IFRS which show that "the objective of financial statements is to provide information about the financial position, financial performance and changes of the financial position of an entity; this information is useful to a broader sphere of users in making economic decisions "(IFRS, 2007).

An important aspect of environmental accounting refers to the recognition of the environmental costs. Obviously this requires defining environmental costs. Such a definition is found in international and European accounting rules. According to the IASB and the FASB, environmental costs are determined environmental costs, which resulted in a benefit that has expired and which is detailed along with income in the income statement.

Recommendation of CE, 453/2001, defines environmental costs as "those costs to prevent, reduce or recover damages that the entity has caused or is likely to cause on the environment as a result of its activities. These include prevention, elimination or reduction of waste and wastewater, air emissions, treatment of contaminated soil, groundwater, noise and vibration levels, the landscape changes, research and innovation of products and cleaner production processes, control of environmental quality".

Canadian Institute of Chartered Accountants (CICA, 1998) present environmental costs as environmental costs which generate, directly or indirectly benefits of the current period, the period in which they occur, providing a series of details in this regard. Thus we have:

- *Costs generating direct benefits of the current period*: expenditure on waste treatment and monitoring, recovery or cleanup costs associated with current business of the entity;
- *Indirect costs which generates the current period's benefits*: the costs of administrative activities, compliance, evaluation and environmental audit, courses and seminars related to staff training on environmental protection;

→ *Costs regarded as losses for the period*: costs that do not generate future economic benefits that cannot be capitalized (costs related to research performed to design cleaner products and processes, costs of participation in recycling programs), costs related to activities undertaken but that generated a benefit that expired (cost recovery and cleaning of polluted land), costs that have not generated any benefit (fines, penalties, failure to comply with environmental regulations and legislation).

As shown in the list above, we can see that the costs of penalties and fines for failure to comply with environmental legislation are not included in the environmental category. In our opinion they should be part of the environmental costs, at least in terms of the sanctioned entity.

The National Institute of Statistics, at the macroeconomic level, reflect environmental costs of financing environmental flows and include payments for economic activities aimed at production of specific services to prevent, reduce or control environmental damage. They are grouped into: investment and running costs which in turn include internal current expenditure (salaries and social security contributions, consumption of raw materials, fuel, energy, water and other auxiliary materials, expenses for research and development, training, information) and current external costs (costs of environmental protection services purchased from third parties and environmental taxes paid). According to the sources, expenditure in this category in 2007 and 2008 in Romania is as follows:

Table no. 1

**Expenditure for environmental protection sectors and categories expenditure
in 2007 and 2008**

- Thousand lei-

Sectors	Total expenses		Which					
			Investment		Current expenditure			
	2007	2008	2007	2008	internal		external	
	2007	2008	2007	2008	2007	2008	2007	2008
Non-specialist producers	4.516.525	2.743.422	1.550.499	1.329.980	2.153.762	913.847	812.264	499.595
Forestry, logging and related services	143.087	36.976	117.024	12.547	23.799	15.892	2.264	8.537
Mining and quarrying	1.336.006	635.420	292.874	380.742	771.532	120.174	271.600	134.504
Manufacturing	1.873.122	1.478.540	788.268	667.734	750.615	550.167	334.239	260.639
Supply, electricity, gas and hot water	818.851	468.199	312.143	240.773	354.449	153.351	152.259	74.075
Construction	345.459	124.287	40.190	28.184	253.367	74.263	51.902	21.840
Specialized producers	8.328.234	7.039.354	1.716.516	1.048.084	5.637.738	5.487.074	973.980	504.196
Public Administration	3.633.332	2.914.520	1.635.463	1.296.891	939.424	867.226	389.368	224.969

Source: www.insse.ro

In 2008, expenditure on environmental protection at national level was approximately 14.3 billion lei, representing approximately 2.8% of GDP compared to 2.7% in 2007. The share of environmental investment specialist producers represented 35.0% of total investments, followed by public administration (33.4%) and non-specialist producers (31.6%). In manufacturing have achieved

41.5% of the total non-specialist producers, while the mining industry in 2008 absorbed 29.6% vs. 23.2% in 2007, and the production and supply of electricity and heat, 18.1%.

Table no. 2

Environmental protection expenditures in environmental areas and categories of producers in 2007 and 2008

- Thousand lei-

Environmental Domains	Total		Manufacturers non-specialist		Manufacturers specialized		Public Management	
	2007	2008	2007	2008	2007	2008	2007	2008
Air Protection	1.619.272	1.130.353	1.242.606	803.990	55.984	44.614	320.682	281.749
Water Protection	3.508.767	2.697.415	788.120	642.085	1.352.751	1.002.417	1.367.896	1.052.913
Management Waste	8.927.767	6.735.353	1.072.457	479.853	6.778.036	5.843.427	1.077.274	412.073
Soil and Groundwater	760.807	957.022	619.360	179.375	65.817	27.468	75.630	750.179
Fighting noise and Vibration	32.594	92.134	8.900	19.093	3.165	19.728	20.529	53.313
Protection natural resources and conservation biodiversity	212.147	259.676	141.974	117.202	21.900	39.384	48.273	103.090
Other areas Environment	1.416.737	825.343	643.107	501.824	50.582	62.316	723.048	261.203

Source: www.insse.ro

In environmental areas, specialist producers recorded the largest expense for waste management (approximately 76% of total expenditure for this area). For water protection, the largest expenditure was made by the government (39.0%), while for air protection higher costs were recorded in 76.7% non-specialist producers.

Specialist producers recorded in 2007, the largest expenditure in the "waste management" (83.0%), while for non-specialist producers, the costs have been directed primarily to the "air protection" (29.3%). Government has made the biggest expenses on the "water protection" (36.1%).

The accounting treatment of environmental expenditure is influenced by tax legislation in force. Romania Tax Code treats the expenditure for environmental protection and resource conservation as deductible expenses. Thus, entities will increase pollution prevention activities where the costs of these activities are deductible. Some expenses such as fines for violation of environmental regulations and certain remedial costs are not tax deductible. Entities will seek to reduce costs and fines and penalty tax deductible and will increase the number of environmental activities, which makes the tax treatment to be an important tool in changing attitudes towards environmental entity.

The potential of environmental management accounting to reflect environmental costs

The concepts of "General Accounting" and "Analytical Accounting" are recognized by experts for a long time. Today, the practice tends to enshrine the names of "Financial Accounting" and "management accounting" or "managerial accounting".

Financial accounting records flows of an economic entity and its environment, expressed in the published financial statements, is governed by standards and regulations, providing information to external users. Financial accounting includes most environmental costs along with other costs, and thus environmental costs cannot be identified. To reduce pollution, some entities granted significant sums. In some cases they are easily identifiable, but environmental costs are much higher than those relating to pollution prevention and control, and are often included in hidden costs. Management accounting is an "internal accounting" providing information to internal users. As in all cases, environmental management accounting is a tool to inform managers about the environmental costs, to quantify the environmental effects of the entity. It appeared as a result of increasing pressure on the entity's management to reduce costs and minimize environmental impact activities (United Nations for Sustainable Development Division, 2003).

Unlike financial accounts using only monetary standard, management accounting does not resume only to the monetary standard it presents information in natural standard.

There are many definitions of environmental management accounting, but from an accounting perspective is important to see the offer of information on the entity's environmental performance made available to users. IFAC defines environmental management accounting as economic and environmental performance management by developing and implementing appropriate systems and practices on the environment. Although this includes reporting and auditing work in some entities, management accounting environment refers to the lifetime costs to determine total costs and benefits assessment strategic environmental management planning.

Department of Sustainable Development defines environmental management accounting as the accounting where the information given is used for internal organization of the decision making process, and the procedures taken for internal decisions include quantitative information on material and energy consumption, their flows, waste generated and monetary information on costs, savings and revenues on an activity with potential environmental impact.

Australian Environment Agency defines environmental management accounting as the identification, collection, analysis, internal reporting and using information on material and energy flows, environmental costs and other costs necessary for decision making within an entity.

From our point of view, environmental management accounting is a mechanism in which there are both financial and non-financial information, using tools such as calculation of environmental costs or environmental performance evaluation. Basically we are dealing with a blend of environmental management, management accounting, and the result providing information to internal users in order to take decisions regarding the environmental impact of the entity.

In some works, from the fact that this module called environmental management accounting provides financial and non-financial information, it appears the possibility of the division of environmental management accounting for money (Monetary Environmental Management Accounting - MEMA) and accounting environmental management in physical units (Physical Environmental Management Accounting - PEMA).

Environmental management accounting in monetary units (MEMA) is used for internal management decisions and aims to identify and treat costs and benefits arising from the impact it has on the environment entity (Schaltegger and Wagner, 2005). With regard to his methods, MEMA is based on traditional management accounting adapted to be applied to the environmental aspects of

corporate activity. It focuses on environmental impact assessment expressed in monetary terms (cost of fines for violation of the environment rules, investment in pollution prevention projects). Environmental management accounting in physical units (PEMA) serves as a informational tool for internal management decisions, using monetary data, expressed in physical units (kg, t, m, etc.).

There is a very eloquent structuring data provided by environmental management accounting (EMA) and their application in so-called past and future-oriented tools:

Table no.3

Past and future oriented EMA tools

EMA			
MEMA		PEMA	
Past oriented tools	Future oriented tools	Past oriented tools	Future oriented tools
Annual environmental expenditure or costs, transition from bookkeeping and cost accounting	Monetary environmental budgeting and investment appraisal	Material, energy and water flow balances	Physical environmental budgeting and investment appraisal
	Calculating costs, savings and benefits of projects	Environmental performance evaluation and indicators, benchmarking	Setting quantified performance targets
External disclosure of environmental expenditures, investments and liabilities		External environmental reporting and other reporting to agencies and authorities	Design and implementation of environmental management systems, cleaner production, pollution prevention, design for environment, supply chain management, etc.

Source: United Nations Division for Sustainable Development, *Environmental Management Accounting*, New York, 2001, <http://www.un.org/esa/sustdev/publications/proceduresandprinciples.pdf>, p.18

Data provided by environmental management accounting (EMA) and can structure their application in past and future-oriented tools:

Table no. 4

Levels for the implementation of EMA

Accounting in Monetary Units		Accounting in Physical Units	
Conventional Accounting	Environmental Management Accounting		Other Assessment Tools
	MENA	PEMA	
DATA ON THE CORPORATE LEVEL			
Conventional bookkeeping	Transition of environmental part from bookkeeping and cost accounting	Material flow balances on the corporate level for mass, energy and water flows	Production planning systems, stock accounting systems
DATA ON THE PROCESS/COST CENTRE AND PRODUCT/COST CARRIER LEVELS			
Cost accounting	Activity based material flow cost accounting	Material flow balances on the process and product levels	Other environmental assessments, measures and evaluation tools
BUSINESS APPLICATION			
Internal use for statistics, indicators, calculating savings, budgeting and investment appraisal	Internal use for statistics, indicators, calculating savings, budgeting and investment appraisal of environmental costs	Internal use for environmental management systems and performance evaluation, benchmarking	Other internal use for cleaner production projects and condensing
External financial reporting	External disclosure of environmental expenditures, investments and liabilities	External reporting (EMA statement, corporate environmental report, sustainability report)	Other external reporting to statistical agencies, local governments, etc.
NATIONAL APPLICATION			
National income accounting by statistical agency	National accounting on investments and annual environmental costs of industry, externalities costing	National resource accounting (material flow balances for countries, regions and sectors)	

Source: United Nations Division for Sustainable Development, *Environmental Management Accounting*, New York, 2001, <http://www.un.org/esa/sustdev/publications/proceduresandprinciples.pdf>, p.19

It results from the above quite clearly the ability of environmental management accounting to reflect environmental costs that the entity is to prevent, treat or repair the damage it has caused to the environment. This is achieved via accounts available. As for traditional accounting management for each product or service work is necessary to calculate costs of production per unit of measure, and for environmental management accounting should be made to calculate average costs per average sequence performed on each sub domain environment. For example, with account 921 "core business expenses" under traditional management accounting is analytically distinct record for each department and each

product consumption of raw materials and supplies made with the new product, the salary costs of staff involved in production, and in environmental management accounting would be detailed every activity undertaken in order to know at any moment average costs for the work done by the entity.

Conclusions and proposals

Of the presented one can see that accounting development in recent years, were focused on environmental accounting, accounting research in the field of environmental accounting have been and continue to the detriment of social accounting research; environmental financial accounting, environmental reporting continues to represent the principal interest in research in environmental accounting, but we noticed a growing interest to other sub domains such as environmental management accounting, environmental audit; in terms of research in Romania on environmental accounting, these are still early but however it is noted an interest in this area.

Chart of accounts applicable to entities that do not contain separate accounts to reflect environmental issues. Entities whose activities pollute should record separately the expenses incurred for the purchase of machinery and equipment used for environmental protection, their depreciation, with the salaries of staff involved in environmental protection, materials used and other environmental costs.

Basically, as currently reflected, Romanian accounting techniques is not possible to separate coverage of environmental issues in accounting. As opportunities for coverage of environmental issues in accounting such as development plan accounts in the accounts of grade 2 and 3, by introducing new accounts, chart of accounts is not having a limited character. Another possibility is the organization of environmental management accounting, in this situation the development plan accounts are not required but finding the appropriate method of calculation.

Neither the management accounting practice is not too rich in terms of coverage of environmental issues; environmental costs are included along with other expenses. The only area where there seems to be concern for environmental management accounting is the mining, because of its complexities. At least at the legislative level, there is mandatory coverage of environmental costs in accounting.

Given the intense process of normalization and standardization of accounting, it is noted that in regard to environmental management and protection of it, efforts are made to a common representation of such activities, the existence of standards governing environmental issues such as as for Bulgaria, and Romania with the entry into force of the Order 3055/2009, makes itself felt in our accounting involvement in covering environmental issues. Due to the fact that in Bulgaria there is an international standard for environmental accounts entitled "Reporting on environmental regeneration," our proposal is to develop in Romania such a standard that deals with environmental issues and lines of coordination to be made in application.

The conclusion to be drawn is that we have to make the whole activity to be undertaken in full harmony with the environment, ensuring sustainable development.

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