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ANALYSIS OF THE ENVIRONMENTAL PERFORMANCE INDICATORS FOR THE EMAS REGULATION

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Abstract. *This paper presents the main environmental performance indicators for the Eco-Management and Audit Scheme (EMAS), which are used by the specific international regulations. They should therefore be cost-effective and appropriate to the size and type of organization and its needs and priorities. The paper also deals with the indicators' functions, quality and basic categories of environmental performance indicators. The originality of the paper lies in establishing the correlation: Environment – Environment Performance Indicators (EPI) – Organization.*

Keywords: *Environmental Performance Indicators; Eco-Management Audit Scheme*

1. Introduction

Environment protection consists of: environmental programs, objectives and targets, training, incentive schemes, audit frequency, site inspections, administration and community relations.

The environmental management and performance of organizations is helped by the selection and use of Environmental Performance Indicators (EPI).

The guidance no. 2001/680/EC, included in the EMAS environment project, also contains regulations concerning the selection and use of Environmental Performance Indicators.

Organizations should make optimum use of the environmental information they collect [1]. To this end the indicators should fulfill the dual purpose of assisting the management of the organization and providing information to stakeholders.

Getting environmental information can be expensive and time consuming. Environmental Performance Indicators (EPI) should therefore be cost-effective and appropriate to the size and type of organization and its needs and priorities. They should address primarily those environmental impacts that are most significant and which the company can influence by its operations, management, activities, products and services. They should also be sensitive enough to reflect significant changes in environmental impacts [2].

Depending on an *organization's capabilities and resources*, the use of environmental performance indicators may initially be limited to those aspects considered most relevant, with the initial scope being gradually widened over time.

Organizations should make the *optimum use of the environmental information they collect*. To this end the indicators should fulfill the dual purpose of assisting the management of the organization and providing information to stakeholders [3, 4].

2. Materials and methods

Categories of environmental performance indicators

The *environmental indicator systems* are:

- ***Comparability***: indicators should enable a comparison and show changes in the *environmental performance*.
- ***Balance between problematic (bad) and prospective (good) areas***.
- ***Continuity***: indicators should be based on the same criteria and should be taken over comparable time sections or units.
- ***Timeliness***: indicators should be *updated frequently* enough to allow action to be taken.
- ***Clarity***: indicators should be *clear and understandable* [5].

Usually, *three categories of environmental indicators* are defined for evaluating and reporting the environmental performance of an organization.

A. Operational Performance Indicators (OPIs). This focus on the aspects associated with an organization's operations including activities, products or services and can cover such topics as emissions, product and raw material recycling, fuel consumption of vehicle fleet, or energy usage.

Operational performance indicators can be subdivided into:

- ***Input indicators.***
- ***Physical facilities and equipment indicators.***
- ***Output indicators***.

They focus on planning, controlling and *monitoring the environmental impacts* of the organization's operations. Operational performance indicators are also *a tool for communicating environmental* data through environmental reports or environmental statements, in accordance with the *Eco-Management and Audit Scheme (EMAS)* regulation. By integrating cost aspects into them, they furthermore represent *a basis for environmental cost management*.

B. Management Performance Indicators (MPIs). These focus on the efforts of management to *provide the infrastructure for environmental management* to succeed and can, among others, cover environmental programs, objectives and targets, training, incentive schemes, audit frequency, site inspections, administration and community relations.

These indicators *serve primarily as internal control and information measurements*, but do not by themselves provide sufficient information to give an *accurate picture of the organization's environmental performance*.

C. Environmental Condition Indicators (ECIs). These give information on the *quality of the environment surrounding the organization* or the local, regional or global state of the environment. Examples include the *water quality of a nearby lake*, the *regional air quality*, *concentrations of greenhouse gases* or the *concentration of certain pollutants in the soil*.

While they may be quite wide-ranging they can be used to focus the attention of the organization on the *management of the environmental aspects associated with significant environmental impacts*.

The condition of environmental media (air, water, land) and the environmental problems that arise from it often depend on a variety of influences. Examples are *emissions from different organizations, private households or transport*.

Data about the *condition of environmental media* are usually measured and recorded by governmental institutions. These data are used to derive *specific environmental*

indicator systems for the main environmental problems [6-9].
Figure 1 presents the basic principles of environmental indicator systems, also the categories of environmental indicators and the correlation levels.

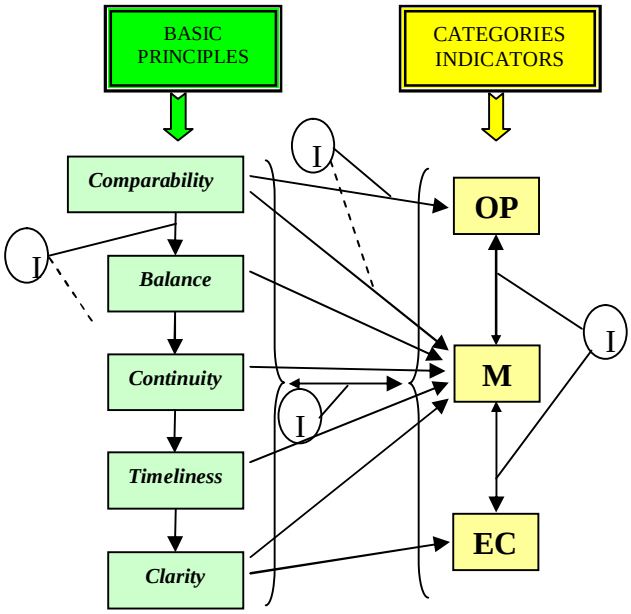

Figure 1. The basic principles of environmental indicator systems, the categories of environmental indicators and correlation levels

OPIs – Operational Performance Indicators; MPIs – Management Performance Indicators; ECIs – Environmental Condition Indicators; I) – Correlations between the basic principles; II) – Correlations between the categories indicators; III) – General correlation between the basic principles and categories indicators; IV) Punctual correlation between the basic principles and categories indicators.

In connection with *environmental policy goals*, public environmental indicators can be used by organizations as an *orientation for setting priorities in determining their own indicators and objectives*. This is especially the case when the organization is one of the *main sources of an environmental problem*, for example the impact of an airport on its surroundings with respect to noise or the impact of a direct effluent discharge on local water quality. For these cases in particular, ECIs enable the measurement of environmental impacts of the organization.
These three categories of environmental indicators have become widely accepted and organizations should consider a *combination of these indicators in order to be able to demonstrate*, that:

- They understand the *environmental impacts associated with their activities, products and services* (ECIs).
- They are taking appropriate measures to ensure the *management of environmental aspects associated with the environmental impacts* (MPIs) and
- The result of the management of environmental aspects is *improved environmental performance of their operations* (OPIs).

The main functions of the environmental performance indicators are:

- Converting raw data into information that can be easily understood by the intended audience ;
- Summarizing extensive environmental data to a limited number of significant key information sets;
- Quantifying and reporting environmental performance;
- Assisting organisations in the management of their environmental aspects and impacts.

The quality of environmental performance indicators consists of:

- Being cost – effective;
- Being appropriate to the size and type of organization and its needs and priorities;
- Being sensitive enough to reflect significant changes in environmental impacts.

Environmental performance indicators should fulfil a dual purpose:

- Assisting the management of the organization;
- Providing information to stakeholders.

It is recognized however that for organizations with less significant

environmental impacts and a less *complex environmental management system* the most important indicators will be those relating to operational performance.

3. Results and discussion

The correlation environment – environmental performance indicators (epi) – organisation

The main correlations between the organization and environment are ensured, in order, by: Offers Data (OD); EPI and Organization Management (OM). The OM must be correlated with the following three parameters: type; measure and priorities of the organization.
In figure 2 are presented the main correlations concerning these indicators.

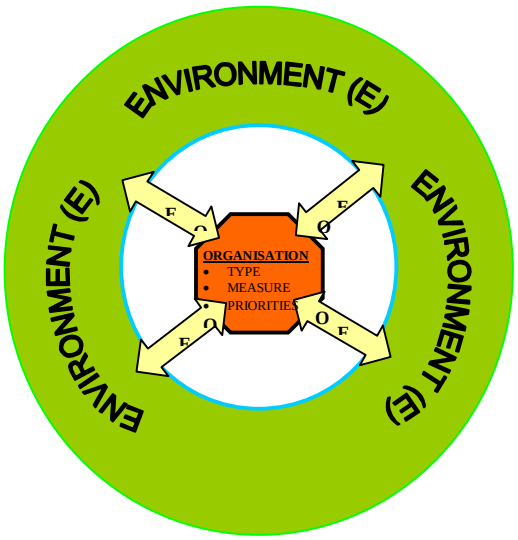

Figure 2. The correlation Environment – Environmental Performance Indicators (EPI) – Organization
EPI – Environment Performance Indicators;
OM – Organization Management
OD – Offers Data

4. Conclusions

In selecting *environmental performance indicators* for a particular environmental aspect an organization should ask itself the following questions:

- What are the *organization's main environmental aspects and impacts*?
- *Where can most improvements be achieved*?
- Where can *environmental improvements also lead to cost reduction*?

The selected environmental indicators should comply with *environmental policy priorities*:

- How does the organization affect the *local or regional environmental situation* in relation to important local or regional environmental policy issues?
- What *environmental problems dominate the current political discussions*?
- What *external requirements,* for example from interested parties, affect the organization?

Organizations should select *indicators which enhance their management.* Indicators which do not contribute to the management of the organization will ultimately not be incorporated in *day-to-day management* and hence will have little effect in improving performance. In short, only those indicators which enable the employees and management to perform their tasks better are the ones which are most appropriate to the organization.
The three categories of environmental indicators have become widely accepted and organizations should consider a combination of these indicators in order to be able to demonstrate, that:

- They understand the environmental impacts associated with their activities, products and services (ECI);
- They are taking appropriate measures to ensure the management of environmental aspects associated with the environmental impacts (MPI);
- The results of the management of environmental aspects are improved environmental performance of their operations (OPI).

It is recognized however that for organizations with less significant environmental impacts and a less complex environmental management system the most important indicators will be those relating to operational performance.

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