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# The Environmental Management Tools and Instruments of Application

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**Abstract:** Environmental Management has made considerable progress in Latin America and the Caribbean in the last two decades, particularly after the Rio de Janeiro Summit on Environment and Development. There is greater public awareness of the various environmental problems and there is greater understanding of the complex relationships existing between environment and development, which is reflected in expanding environmental agenda has gradually permeating towards different sectors of the activity is economic, social is political and of the different countries of the region. Almost all countries have extensive Environmental Legislation and have established citizen rights and obligations, and in turn have defined the functions of the state and public bodies responsible for Environmental Matters, and Venezuela is no exception. With the creation of the Ministry of the Environment in 1976, they complement and comply with everything related to Environmental Legislation, which in the Bolivarian Republic of Venezuela is very broad and of great importance for the conservation of natural resources. For the development of this article, it was first developed what is related to the conception of the environment and then with the development of the theme of Environmental management, its scope of application, environmental policy and a brief description of the tools and instruments of Environmental Management.

**Keywords:** Environment, Environmental Management, Environmental Policy, Environmental Management System

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## 1. Introduction

Through the notions of Management and Environment and Environmental Management and Sustainable Development, it can be affirmed that Environmental Management is an adequate strategy to achieve sustainable development. From the notion of environment arises that of environmental problems, a consequence of the environment relationship (nature society, and considered one of the greatest obstacles to sustainable development and, therefore, it is necessary to address it, for this there are instruments, such as the environmental planning of the territory, which, because it is dynamized, requires timely and effective management.

In principle, management can be understood as that process that includes organizational functions and activities, which must be carried out in order to achieve the desired objectives and goals. This management process is integrated, at the same time, by the functions of

diagnosing, planning, executing, controlling and evaluating.

The objective of this article to make known what its tools and application instruments are understood by Environmental Management, methodologically consisted of a documentary review of books, articles in digital magazines, where issues related to the Environmental management, later the following article was written: Notion of the conception of the environment, the environment under the systemic approach, its etymological origin, historical development, the environment and its dynamics, concept of environmental quality, What is Environmental Management, scope of application, environmental policy principles, Environmental Management Tools and instruments and Environmental Management Systems.

## 2. Before Developing the Theme, It Is Necessary to Define What Is Understood by Environment

The environment is conceptualized, as the complex system in which two basic subsystems are articulated: the natural and the artificial, the latter, in a problematic way given the form of adaptation of the human being to the environment through culture.

The first is composed of physical and biological aspects, highlighting abiotic factors such as climate, soil, geography and biotic factors such as flora, fauna and microorganisms. The second, that is, the artificial one, is composed of social aspects created by the human being and represented by culture, economy, politics, history. Taking into account these components, it can be said that the environment is a complex global system, a product of the dynamic interaction of all the elements and living beings present in a place.

The natural environment is characterized by being an environment without interventions.

This is what could be observed in ecosystems, which are the grouping of several organisms in a common environment, which interact with their physical environment in a dynamic and autonomous way. It must be said that there is a diversity of ecosystems, from microscopic to jungles and forests.

The artificial environment is in turn composed of a perceived or psychological environment and a built environment. The first is characterized because the human being through his mind performs a permanent psychological process of interaction with the environment, through perception, cognition and behavior. For this reason, it is valid to say that the environment is not a neutral system, but on the contrary it is full of values and meanings, biased by people's life experiences, by the level of training and by the culture within which it is inscribed. The second, the built environment, a product of human culture in imitation of nature, has its greatest expression in the city, the habitat of the human being that seeks to protect it from the adversities of nature.

Carrizosa, J [1]

*"He feeds this discussion by saying that the social and the environmental represent two consensual ways of seeing reality in which they try to separate and group their components with cognitive and political objectives, corresponding to extensions of the human vision of what is around; they are attempts to perceive and appropriate "the other", symbols of the different from the individual".*

The genesis of the social and the environmental corresponds, then, to extensions of the human vision, to a ceasing to self-absorbed, to a weakening of selfish tendencies and a strengthening of altruism Carrizosa, J 1999 [1]. Another important aspect that Carrizosa introduces is that the social perception of the environment has always been present from everyday life, without being necessarily linked to the natural, but to specific situations in the development of human action. For example, when saying "the environment

of the place is very pleasant", the environment is related to the material and spiritual that surrounds a place and to some people, since the human being is part of nature.

### 2.1. Environment Under a Systemic Approach

It can be expressed as a system made up of a dynamic set of natural and social elements interrelated in a given time and space: Atmosphere, Lithosphere, Hydrosphere and Biosphere. FIPETROL LATINOAMERICANA 1993. [2].

Natural Elements are those of nature, comprising all the physical-chemical and biological elements present in the atmosphere, hydrosphere, lithosphere and biosphere.

The social elements include all the psychological and social manifestations of man: These include culture and forms of organization.

Environment or environment is understood to be the environment that affects and especially conditions the circumstances of people's lives or society as a whole. It comprises the set of natural, social and cultural values existing in a given place and time, which influence human life and future generations.

### 2.2. Etymological Origin

The word environment comes from the Latin Amiens, ambientis, to surround, to be on both sides.

In general systems theory, an environment is a complex of external factors that act on a system and determine its course and form of existence. An environment could be considered as a superset, in which the given system is a subset.

### 2.3. Historical Development

- a. Hippocrates (460-375 BC, in his Work Air, Water and Places, highlights the importance of the environment as a cause of disease.
- b. In the 19th century John Snow (1813-1858) consolidated the importance of the environment in epidemiology by studying the means of transmission of cholera.



Figure 1. Environment dynamic.

**2.4. The Environment and Its Dynamics**

The environment is a system made up of a dynamic set of interrelated physical, natural and social elements, in turn made up of interrelated subsystems. MARNR 1998. [3].

*Social Subsystem:* made up of cultural elements (habits, behaviors, values, ideas, customs and beliefs, forms of organization (economic, political, religious, cultural), and technological resources. MARNR 1998. [3].

**2.4.1. Abiotic Factors**

Of a non-living or inert nature, and include the environment where living beings live (gaseous, such as air, liquid, such as the aquatic environment, terrestrial such as soil, *the climate* that includes factors such as temperature, solar radiation, winds, rainfall and humidity.

**2.4.2. Biotic Factors**

**Consumers:** This group is made up of all the animals that depend directly and indirectly on the producers for their food. For this reason they are also called heterotrophs (that feed on others). Within this group several categories can be considered: primary or herbivore consumers, secondary or carnivore consumers and tertiary consumers.

**Producing organisms:** Plants that have chlorophyll belong to this group; They are able to synthesize food from solar energy, CO<sub>2</sub> and water. They constitute the first link in the food chain and are the basis of life in nature.

**Decomposing organisms:** Bacteria and fungi belong to this group. These organisms decompose the corpses and cause the disintegration of the organic particles.

**2.4.3. Interrelation Between Living Beings and Physical-Chemical Elements**

Interdependence between living beings and organic matter. Under natural conditions, the different species of plants and animals develop in a habitat, following an adaptation process according to the climate and soil conditions.

*Interrealition of Natural and Social Elements*

Natural and social elements are related and interdependent. Relationships depend on the value and appreciation that the individual and society have of the rest of the elements of the environment, and these respond negatively or positively to human action.

**2.4.4. Interrelation Between Social Elements**

The whole set of man's activities that have a negative impact on himself, and that constitute the so-called social risks: malnutrition, marginalization, illiteracy, social insecurity, etc.

**2.4.5. Quality of Life and Environmental Quality (Figures 2, 3, 4 Annexed)**

- a. In some contexts: Excellence.
- b. Associated with health, environment, food refers to “a certain level”, on a certain scale, without expressly indicating it.
- c. Necessarily implies a comparison.
- d. Concept that is still under discussion.
- e. Synonyms: Happiness, Well-being, Standard of Living.



Figure 2. Quality of life.



Figure 3. Quality of life.



Figure 4. Quality of Life.

**3. Environmental Quality Concept**

**3.1. Traditionally**

- a. It refers to levels of contamination of a certain resource or a geographic area.
- b. Associated with exceeding certain concentrations or volumes of elements considered pollutants.

- c. (Deterioration) Refers to the quantitative loss in the availability of natural resources.

### 3.2. Human Environment

The value judgments assigned to the state or condition of the environment, where the state refers to the values, not necessarily numerical, adopted in a situation and moment given by the variables or components of the environment, which exert a greater influence on quality present and future life of the members of a human system. MARNR. Systems Environmental Venezuelans. 1982. [4].

### 3.3. Nowadays

Physical, biological and ecological state of an area or determined zone of the biosphere, in terms relative to its unity and the present and future health of man and other animal and plant species (Luis Ángel Arango Virtual Library. Banco de la República de Colombia).

## 4. What Is Environmental Management

It comprises the organizational structure, responsibilities, practices, procedures, processes and resources to determine and carry out the company's environmental policy. Conesa 1997. [5]. These activities are proper to the direction or management of the company or state institution, be it of a productive nature and vocation of economic profitability, or simply of a conservative nature of the elements of the ecosystems or natural environment.

We understand environmental management as the set of actions undertaken by society, or part of it, in order to protect the environment. Its purposes are aimed at modifying a current situation to another desired one, in accordance with the perception that the actors involved have about it.

The management and administration, in its broadest sense, of the environment comprises the set of actions and provisions necessary to achieve the maintenance of sufficient environmental capital so that the quality of life of people and natural heritage are as high as possible, all within the complex system of economic and social relations that conditions this objective.

The management of the environment translates into a set of activities, means and techniques aimed at conserving the elements of ecosystems and the ecological relationships between them, especially when there are alterations due to human action.

In its broadest conception, environmental management is a permanent process of successive approaches in which various public and private actors and civil society develop a set of specific efforts with the purpose of preserving, restoring, conserving and using it in a sustainable way. environment.

Environmental management is based on the need for society to conserve and improve the "environmental supply and quality", that is, of the resources that serve to satisfy the needs of human beings, and that are fundamental to support life in the Earth. This entails the challenge of stopping and

reversing the deterioration of the environment in order to preserve and improve its quality for future generations. Based on environmental and socio-economic and political conditions, and based on the information available and the signs of the environment, the different public-private actors and civil society implement policies, plans, programs and projects to comply with the planted objectives. In this process, the actors operate within a specific legal framework, and mobilize economic, technical and human resources for the application of various instruments.

### 4.1. Areas of Application

For example, it can focus on rural or urban areas, on a specific policy (eg air pollution from an urban center, etc.), on a global environmental threat (eg impact of emissions on global warming, etc.), in the environmental impact of a specific economic activity (eg mining, energy, agriculture, etc.), or in the conservation and sustainable use of a strategic resource (eg forests, water, etc.). Environmental management, therefore, can be approached at different levels of government (Regional, subregional, state, municipal and local), etc.), or by private sector groups in its broad conception, or in various territorial areas (global, regional, subregional, metropolitan level, cities, neighborhoods, towns, hydrographic basins, etc.).

### 4.2. Principles of Environmental Policy

When developing an Environmental Management plan, we must take into account some fundamental principles of environmental policy, among which it can be mentioned.

- a. Prioritize prevention over remediation or correction.
- b. When there is danger of serious and irreversible damage, the lack of scientific certainty is no excuse to avoid preventive policies.
- c. Gradual and dynamic development of environmental policies, activities and needs of society and available natural resources, considering scientific and technological advances to provide us with these resources in a sustainable way.
- d. Rights sovereign s to use own natural resources without harming other states or nations.

### 4.3. Environmental Management Tools and Instruments

Among the different Tools and instruments of Environmental Policy and Management, the following can be mentioned:

- i. Environmental legislation.
- ii. Environmental education.
- iii. Territorial Planning.
- iv. Environmental impact studies.
- v. Environmental Audits.
- vi. Life cycle analysis.
- vii. Ecological Labeling.
- viii. Eco design.
- ix. Certifications.
- x. Environmental management systems.

*Environmental Legislation:* Environmental legislation or environmental law is a complete set of treaties, conventions, statutes, laws, regulations, which in a very broad way, function to regulate the interaction of humanity and the rest of the biophysical components or the natural environment., in order to reduce the impacts of nature.

*Environmental Education:* It is a learning process aimed at the entire population, in order to motivate and sensitize it to achieve a favorable behavior towards caring for the environment, promoting the participation of all in the solution of environmental problems that arise. The objective of environmental education is to achieve an environmentally informed population prepared to develop activities and practical skills that improve the quality of life.

*Territorial Planning:* Regulation and promotion of the location of human settlements, economic and social activities, economic and social activities of the population, as well as physical and spatial development in order to achieve harmony between the greater well-being of the population, the optimization of the exploitation and use of natural resources, and the protection and valuation of the environment, as fundamental objectives of integral development. Organic Law of the Territory of Venezuela, article 2 year 1983. [6].

*Environmental Impact Studies:* An environmental impact study is the analysis of the possible environmental consequences of a human activity. Its specific purpose is to take into account environmental aspects when planning and implementing Development Projects.

The function of environmental impact studies is to avoid or minimize negative impacts while increasing positive ones.

*Environmental Audits:* Environmental audits or environmental auditing is the instrument by which an organization can assess compliance with the company's environmental management system, in addition to evaluating compliance with environmental legislation of its processes and procedures.

It is an orderly procedure whose basic objectives are the periodic or occasional examination and evaluation of the legal, technical and administrative aspects related to the environmental activities of a company, as an instrument of analysis of its environmental performance and of the actions related to those aspects.

#### *Objectives of the Environmental Audit*

If there is an environmental management system in place, the same management materializes the designed action program. The audit provides information, performs a review of the operation of the entire system, allows discovering where and how resources can be used more efficiently, how to minimize waste, detect errors and limitations and above all, reports on compliance with the environmental policy of the company, where it is deficient and how it can be improved.

In the event that the company does not have an environmental management system, the audit is more of an "environmental assessment or diagnosis ", which is imposed from outside. Thus we see how the Audit is a flexible tool that allows to evaluate and design an environmental

management system.

*Life Cycle Analysis: Life Cycle Analysis (LCA)* is a tool used to assess the potential impact on the environment of a product, process or activity throughout its entire life cycle by quantifying its use. of resources ("inputs" such as energy, raw materials, water, and environmental emissions ("outputs" to air, water and soil) associated with the system being evaluated.

*Eco - efficiency:* Es a management philosophy, which encourages businesses more competitive, more innovative and more environmentally responsible.

*The bases of eco-efficiency are to produce more with less.*

The philosophy of eco-efficiency proposes not to use solutions at the end of the processes, which are remedial, but to carry out adjustments in the systems, which seek proactive solutions, that is, they seek to prevent damage from occurring.

*Ecolabelling:* It is a system that changes the incentive structure in the industry, promotes the obtaining of benefits so that producers, intermediaries, retailers and consumers adopt a more responsible way in our consumption habits.

Benefits achieved through eco-labeling. Translate scientific terms into a message that can be understood by the consumer.

Ensure that consumers can make their choice with the appropriate information and with the conviction that their choice has had the minimum impact on Natural Resources.

*Eco design or environmental design:* It is understood by eco design or environmental design, to the form of design that can improve the environmental impact of a company. Although reference is generally made to the design of the product, it can also include the design of certain aspects of the production process to manufacture the product. It is about incorporating environmental aspects in the design or redesign stage of a product in such a way as to reduce the environmental load associated with the cycle of that product by reducing the amount of components and materials, selecting less impactful materials, eliminating the most toxic materials associated with the product, choice of easy to disassemble and recyclable components, application of alternative processes, improved transportation, choice of end products that are easy to clean, repair and improve.

## **5. Environmental Management Systems**

*Environmental* management systems or EMS are implemented by companies that want to ensure the improvement of their environmental performance over time.

The systems cover responsibilities and tasks of all the people in the organization. Through a fully integrated system, which is comprehensive, understandable and open, environmental degradation can be avoided.

An environmental management system is the framework or work method that an organization follows in order to achieve, in a first phase, and later to maintain a certain behavior in accordance with the goals that it had set and as responses to certain standards, environmental risks and

social, economic and competitive pressures, in permanent change.

In the EMS, the necessary mechanisms must be clearly defined so that the objectives that have been set in accordance with the company's policy can be achieved.

The company will develop an environmental management system, based on the principles and philosophy of the company itself, which will lead to reaching environmental objectives, previously established, when setting the corporate environmental policy.

The organization shall implement an effective environmental management system in order to help protect human health and the environment from the potential impacts of its activities, products or services and to contribute to the maintenance and improvement of the quality of the environment. COVENIN-ISO 14004-1996. [7].

An organization whose management system incorporates an EMS has a frame of reference to balance and integrate economic and environmental interests. An organization that has implemented an EMS can achieve significant financial benefits.

### **5.1. Potential Benefits Associated with an Effective EMS**

- a. Assure clients of the commitment to demonstrable environmental management.
- b. Maintain good public relations with the community.
- c. Improve industry-government relations.
- d. Improve the image of the company and its participation in the market.
- e. Improved cost control.
- f. Conservation of inputs and energy.
- g. Facilitate obtaining permits and authorizations.
- h. Reduction of incidents that would give rise to legal risks.
- i. Encourage development and share environmental solutions.

### **5.2. Principles and Elements of the Environmental Management System**

- a. Principle 1. Commitment and Policy: An organization should define its environmental policy and ensure commitment to its EMS.
- b. Principle 2. Planning: An organization should formulate a plan and fully comply with its environmental policy.
- c. Principle 3. Implementation: In order to achieve effective implementation, an organization should develop the capacities and support mechanisms necessary to achieve compliance with its environmental policy, objectives and environmental goals.
- d. Principle 4. Measurement and evaluation: An organization should measure and monitor and evaluate its environmental performance.
- e. Principle 5. An organization should review and continually improve its environmental management system with the aim of improving their overall environmental performance.

The objective of management systems is to integrate and organize the structure of a company. For this, the system must cover both the responsibilities of the direction or the management as those of any other person integrated in the company.

A good management system will also allow to see the interrelationships between the different departments or directions of an activity.

The organizational structure of any system is basic for its operation, considering the following aspects:

- a. Identify and consider all the activities of the organization and also document them.
- b. Define the responsibilities of each person involved.
- c. Appoint a representative of the direction or management to be in charge of solving problems that may arise with respect to the organizational system.
- d. Define the interrelationship of the different activities of the company, subsequently proceeding with their coordination.
- e. Identification of current or potential problems and risks posed by the implementation of preventive-corrective measures.

The environmental management systems, in addition to foreseeing the necessary measures to comply with the regulations in the existing environmental legislation, must define the objectives and commitments destined to the continuous improvement of their operation from the environmental point of view. Arana. 2008. [8].

### **5.3. In Accordance with the Fundamental Principles, the EMS Present Four Objectives**

1. Guarantee compliance with environmental legislation both locally and autonomously, as well as nationally and internationally.
2. Establish and enact policies and internal operating procedures necessary to achieve the environmental objectives of the business organization.
3. Identify, interpret, assess and prevent the effects that socio-economic activities produce on the environment, analyzing and managing the risks that the business organization incurs.
4. Deduce and specify the volume of resources and the qualification of the appropriate personnel based on the level of existing risk and the environmental objectives assumed by the business organization, while ensuring their availability when and where necessary.

### **5.4. Functions of the EMS**

The Environmental Management system must be designed, applied and maintained in such a way as to guarantee, through appropriate organizational measures and procedures, the performance of the functions defined below: Canter. 1992 [9].

- a. Environmental policy, objectives and programs, setting, periodic review and, if applicable, modification of the company's environmental policy, objectives and programs at the managerial level.

- b. Organization and staff, responsibility and authority; definition and documentation of the responsibility, authority and interrelationships of the key personnel who manage, carry out and control the works that affect the environment.
- c. Management Representative, appointment of an environmental management representative with authority and responsibility to ensure the application and maintenance of the management system.
- d. Communication and staff training; determine training needs and provide adequate training for all staff members whose work may have an appreciable effect on the environment.
- e. Environmental Impacts; Environmental impact assessment, Study, Systematic Evaluation of the Environmental impact produced by the activities of the company.
- f. Operational control; Responsibilities must be defined at all levels in order to confirm that the control, verification, mediation and tests carried out in the organizational structure are carried out properly and with due coordination.

## 6. Certifications

Certifications are instruments to guarantee that the Environmental Management system implemented by an efficient and quality company, are given by external institutions and outside the company and guarantee that its Environmental Management system is correct and adequate because it meets a set of standards, and instructions.

Certification is not the last phase of the implementation of an EMS, as work must continue on its continuity and continuous improvement.

## 7. Conclusions

It can be affirmed as an important conclusion that Environmental Management consists of conducting and managing the environment related to the elements and processes that form it and with the activities that affect it.

Environmental Management operates in two non-mutually exclusive directions: preventive and corrective, for which

there are technical instruments of both kinds to respond to the problems posed by good management. The preventive tools are implemented when new plans, projects or activities are addressed. Corrective systems are applied to activities in operation.

Environmental Management systems begin with a company commitment to wanting to carry out its activities respecting the environment. Obviously, this commitment has its origin in some or all of the following causes: Greater environmental awareness, more demanding legislation, Improvement of the image of your company, improvement of productive efficiency, reduction of pollution costs. Massolo. 2015. [10].

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