



Awareness manual of the Environment of ANF AC

Presentation

The environmental concept

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Presentation

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1. Introduction

We must therefore understand Environmental Education as an international current of thought and

In recent decades, human intervention action; Its goal is to seek individual changes on the environment has increased and social that cause environmental improvement and in an exorbitant way, causing damage that a sustainable development.

impact on health and, if urgent measures are not taken, the very future of humanity is at risk. **3. Education as a response to the crisis**

environmental

The greenhouse effect, the hole in the layer of. Already in the sixties the ozone model, desertification, the depletion of growth were questioned with no other objective than to achieve increased resources ... These are some examples of the serious constants without considering real needs, problems generated by the action of man. nor question the effects of consumerism

excessive. Some denounced the impact

The reality is unquestionable. The environmental crisis that the environment produced, and they were, has a social dimension that is already recognized by numerous analyzes that predicted them in a general way. And this supposes a new vision negative effects on the environment of the world in which we live. Is essential

provide a basic education that trains women **4. Objectives of environmental education**

people to address conflict, imagine or

recognize outputs and put them into practice, both of Eight are the fundamental objectives of the individually and collectively.

Environmental education:

1. Promote knowledge of environmental problems, both local and global.
2. Train people to critically analyze environmental information.
3. Facilitate the understanding of environmental processes in connection with social, economic and cultural ones.
4. Encourage the acquisition of new pro-environmental values, fostering critical and constructive attitudes.
5. Support the development of an ethic that promotes the protection of the environment from a perspective of equity and solidarity.
6. Train people in the analysis of socio-environmental conflicts, in the debate of alternatives and in making decisions for their resolution.
7. Encourage the active participation of society in collective affairs, promoting the

2. Purpose

This section has the objective of providing a better knowledge about Environmental Education, contemplates aims and strategies, and determines its basic principles and instruments. Environmental Education has the objective of promoting a pro-environmental action between individuals and social groups; an informed and determined action in favor of the environment and towards a sustainable society, carried out in the vital context of citizens: home, work, school, leisure and community.

The relationships between education and the environment are not new, however, the novelty that Environmental Education brings is that the environment, in addition to being an educational medium, appears with sufficient entity to become the purpose and object of education.

- shared responsibility towards the environment.
8. Be an instrument that favors sustainable behavior models in all areas of life.

5. Basic principles

Environmental Education, as a tool to transform reality, must attend to some basic principles:

- Involve the whole of society.
- Wide and open approach.
- Promote critical and innovative thinking.
- Be consistent and also credible.
- Promote participatory channels.
- Involved in all environmental initiatives.
- Facilitate coordination and collaboration between people and agents.
- Provide human, material and financial resources.

6. Instruments of environmental education

To build Environmental Education it is counted many working tools, instruments. It is important to take into account the role that they allow to reach many recipients in which we all play, each one from their very different situations: situation, to get the world to

- Information and environmental communication. now we enjoy being a place where we can Environmental information tries to give to live a dignified life and the desirable inheritance for know the facts in an understandable way. leave our children.

It must be truthful, rigorous, up-to-date and proven. Communication goes further; it is a process of social interaction, which should help to understand key environmental problems, also enabling a constructive citizen response.

- Education and training. Training is key to achieving social changes since all activities have direct or indirect environmental consequences. Training should be understood as a continuous training process, adaptable to the present and future socio-environmental situation, which presents different degrees of complexity.
- Participation, through which profound personal and social changes are made possible and responsibility towards the environment is reinforced.
- Research and evaluation. With these tools the environmental situation will be better known, what are the knowledge, attitudes and behaviors towards the environment and the results of educational actions.

The concept of environment

1. Introduction, purpose and concept of environment

2. The earth, the atmosphere and main ecosystems

2.1. Water

2.2. The atmosphere

2.3. Soil

3. Evolution and development of protection and the right to the environment

1. Introduction, object and concept of medium ambient

A current definition of Environment could be the following:

"Global system made up of natural and artificial elements of a physical, chemical or biological, socio-cultural nature and their interactions, in permanent modification by human or natural action and that governs and conditions the existence and development of life in its multiple manifestations".

We can also understand by Environment:

"Set of all the external conditions that influence the life, development and, ultimately, the survival of an organism."

For thousands of years man was a hunter and gatherer and his impact on nature was slight. With the beginning of agriculture began the clearing of forests, not only to obtain farmland, but as fuel and construction material. In this way, gradually the human being has been modifying large areas and therefore increasing the impact on the environment.

Today a large part of humanity lives in an industrialized society. In little more than a century our civilization has gone from the horse-drawn cart to the automobile, and from the sailing ship to the airplane.

Advances in medicine, agriculture, electronics, computing, chemistry, etc. They have been so great that there has been a real revolution in human life.

But in the second half of the 20th century we have found ourselves, somewhat unexpectedly, with a new situation. Great scientific and technical advances have brought with them:

- An increase in amenities and comfort.
- Important environmental problems arising from the overexploitation of resources and pollution derived from human and industrial activities.

The increase / severity of problems

Environmental issues has caused public opinion to have an increasing concern for the common goods of humanity, obtaining a global vision of the earth. Living beings, ecosystems, the water environment, the atmosphere, the soil ... are complex systems in which an infinity of relationships between their components are established. When a modification is introduced in one of them, it is not easy to predict what the consequences will be.

The concept of Environment has evolved in such a way that it has gone from fundamentally considering its physical and biological elements to a broader conception in which the interactions between its different aspects are highlighted, emphasizing the economic and sociocultural aspect.

2. The earth, the atmosphere and main ecosystems

Knowing the soil, grasslands, forests, oceans or wetlands, among other various ecosystems, is essential to understand how our planet works. There are several types of ecosystems, widespread throughout the world, whose study allows us to have a global vision of the progress that life has had on Earth. In this section there will be a brief

description of the most important:

- Water.
- Atmosphere.
- I usually.

2.1. Water

On our planet, the water surface far exceeds that of the emerged lands, presenting itself in different ways:

- Seas and oceans.

Oceans and seas occupy 70% of the earth's surface and contain a great variety of organisms. Representatives of practically all forms of life can be found in its waters.

The beings that live in the sea have adapted to very varied physical conditions (waves, tides, currents, salinity, temperature, pressure, illumination, dissolved gases, etc.) and have developed physiological systems, of restraint, of flotation, etc. very varied. high primary productivity and essential for the survival of many species.

Water fluctuations due to tides or heavy rains and seasonal fires make them more fertile, because they release soluble nutrients. If there are not these fluctuations, sediments and peat accumulate that facilitate invasion by terrestrial vegetation and the wetland disappears.

They also have a special interest because they maintain the aquifers that are nearby and fill them with water.

2.2. The atmosphere

The atmosphere is the gaseous envelope that surrounds the Earth. It began to form about 4.6 billion years ago with the birth of the Earth.

The atmosphere of the first epochs of the history of the Earth would be made up of water vapor, carbon dioxide (CO₂) and nitrogen, together with very small amounts of hydrogen (H₂) and carbon monoxide (CO) but with the absence of oxygen. (O₂). It was a slightly

reducing until the photosynthetic activity of living beings introduced oxygen and ozone (from about 2,500 or 2,000 million years ago) and about 1,000 million years ago the atmosphere came to have a composition similar to the current one.

Also now living beings continue playing a fundamental role in the functioning of the atmosphere. Plants and other photosynthetic organisms take CO₂ from the air and return O₂, while the respiration of animals and the burning of forests or fuels have the opposite effect: they remove O₂ and return CO₂ to the atmosphere.

2.3. Soil

The soil, essential substrate of life in the terrestrial environment. The plants, on whose production depend the other levels of the ecosystem, are supported and nourished by it; A fundamental part of the soil are the large amounts of fungi, algae, bacteria and tiny animals that perform basic tasks in the ecosystem such as closing the cycles of the elements or decomposing the remains

3. Evolution and development of protection and the right to the environment

The concept of Environment, in the most remote times, was already configured in Roman Law as Res Communis Omnium, susceptible by nature to unlimited use by all individuals.

That conception passed to Spanish Medieval Law in Las Partidas (around 1290) in which we read "things that commonly belong to all the creatures that live in this world are these, the air, the rainwater, the sea, and its shore . Any creature that lives can use each of these things, according to its need "

(Item III, Title XXVIII, Law III)

Nature was thus conceived as an inexhaustible element of exploitation.

It will be in the twentieth century, when the current conception of the Environment appears as a

integrating concept of the different assets and after this the United Nations Program resources that make up the human ecosystem United for the Environment (UNEP) are created, in which there is no mention of partial aspects or international institution whose purpose is aimed at sectoral (fight against noise, elimination or promoting, orienting and implementing waste treatment programs, protection of flora of international cooperation in matters and fauna, etc.) but of a general environmental policy developed within the framework of multiple facets. United Nations.

Already in the Spanish Constitution of 1978, we also see Highlights in the protection of the Environment as the fundamental impulse to the Environment is given by the World Charter for Nature (1982) in which Environment as a collective or supra-individual good established various principles and rules that reflect the concern for the world quality of life for the conservation of nature and defense of the environment (Art. 45 CE). with a decidedly ecological character.

At the international level, the first major milestone in the A fourth phase of the development of the right to protect the Environment is the International Conference on the Environment is the Stockholm Conference in 1972. This first "Rio de Janeiro Summit Conference on the Earth's Environment" (114 States, a large number of Environment and Development (1992) with the appearance of international institutions and Organizations of a new concept: Sustainable Development; non-governmental) focuses its attention on the concept that manages to combine development in the Environment as an economic concept with the preservation of the environment, with the comprehensive defense of a global and systematic aim of guaranteeing the quality of life of both nature on a world scale. The current and future generations agreements. adopted at this Conference would not contain binding obligations for the parties, as they would only be of a purely declarative and advisory nature.

The environmental problem

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1. Introduction

The human species has always interacted with the environment. We will talk about them to what has been long of activated with the medium and has modified it; This chapter. We will also talk of others environmental problems are not new. environmental problems of character However, what makes the current situation particularly worrisome that affects our planet is the acceleration is the deterioration of the ozone layer, the effect of these modifications, its massive nature and the greenhouse and acid rain. universality of its consequences.

Later, in future chapters, we will discuss Environmental problems no longer appear to give a much closer approach to how independent of each other but the problems posed, that is, it faces - constitute elements that are related to each other from a territorial perspective which are configuring a reality different from that of the simple the environmental aspects that affect the accumulation of all of them. Therefore, today as a citizen within their living space, (day space we can talk about something more than simple urban, rural and coastal), with the aim of making environmental problems, we face an awakening in each of the people to the that authentic environmental crisis and the seriousness of the crisis is addressed in this manual, a growing awareness is manifested in its global nature. environmental This is ultimately intended

instance, achieve effective involvement of the Overpopulation, together with the consumption of citizens in the improvement of the environmental environment resources, are one of the main causes that surrounds them, through the knowledge of the environmental problems that currently are problems that affect their lives directly. hover over the planet.

3. Overpopulation

2. Purpose

For thousands of years, the world's population has Throughout this chapter it is intended to grow slowly, since births are affecting the accelerated to know what are the main causes that barely surpassed deaths that our planet suffers today and degradation that is massive due to epidemic problems, the main consequences of such degradation. what are natural causes and wars.

Bear in mind that when the Globally, the causes that today are agriculture, it is estimated that there would be about 5 million consider more pollutants due to the effects of inhabitants, the industrial revolution, the improvement

hygienic conditions and other advances explain the accelerated growth of the world population since the end of the 18th century and the demographic explosion especially evident in the 20th century. XX. In the year 2,000, we have already reached 6,000 million inhabitants. The world population has doubled in the last 50 years and, according to the UN (United Nations), in the 2,050 the world will be home to about 10 billion people. These figures make us ask a logical question: "If this exponential population growth continues, will the Earth be able to accommodate so many people?"

Of these current 6 billion inhabitants, about a sixth live in the so-called rich countries, where growth is beginning to stagnate, while in the poor the growth rate continues to skyrocket.

China is the most populous country in the world with about 1.3 billion inhabitants, of which 26% are under 15 years old, so its growth will continue despite efforts to control it. India has also recently exceeded 1 billion inhabitants.

Concern for the effects on the environment of a population of such magnitude and for the availability of resources to serve it, are understandable in light of these figures and are aggravated by the coexistence of the demographic explosion with a socioeconomic model that propitiates another less worrying explosion, that of consumption. , already massive in industrialized societies, and which favors situations of serious inequality, in which the wealthy 20% of the world's population distributes 80% of the resources.

Both questions, explosion demographic and the explosion of consumption cannot, therefore, be considered separately or isolated from the development models that arise; For this reason, it is necessary to face the issue from both aspects, population and resources, and look for fairer development models.

Today there is a broad consensus in considering that persistent and generalized poverty and serious social and economic inequalities between rich and poor countries, between women and men, have a great influence on demographic behavior and that, in turn, this affects

importantly in the pace and quality of economic and social development and, ultimately, in the state of the environment.

The wasteful wealth of a small part of the world population in contrast to the extreme poverty of a large part are important elements of the environmental problem; The predatory attitude puts pressure on the resources of the western world but also on the developing countries, which have become raw materials supply areas, a source of labor and a toxic waste dump, while, in these, poverty contributes to a explosive population growth and great pressure on resources. Thus, the root causes of these phenomena must be understood, at the base of which is an economic model, that of the consumer society of the industrialized countries, the generalization of which would produce its own collapse. If all countries behaved like developed countries, With its high consumption and waste production, surely none could continue to be so; the carrying capacity of the earth would not withstand it.

Therefore, it is necessary to move towards a new development model that goes beyond simple economic growth and that brings closer, and does not distance, the developed world and the developing countries; a development that does not exceed the possibilities of renewing resources and that is in solidarity with present and future generations. It is a development that has been called "Sustainable Development".

4. Environmental impacts of the consumption of natural resources.

Natural resources are those elements and forces of nature that man can use and take advantage of for his benefit, either to obtain goods and services or for their use and enjoyment.

The use of these natural resources represents mainly a source of economic wealth for the human beings who exploit them.

In this way the fuels, the wind and water can be used as resources

natural for energy production. In the same way, animals and plants constitute natural resources that man can use directly as a source of food.

But we must realize that natural resources are not there only to obtain an economic benefit from them, but it is precisely the existence of these resources, which will ensure the survival of man on earth.

It is essential to use them rationally or to look for new alternatives to avoid their disappearance. Not surprisingly, these are essential elements made available to us in nature, which constitute the basis of life, elements such as water, air, forests, animal species, soil ... that must be preserved and protected.

The natural resources that we find in nature can be of two types: renewable and non-renewable.

The difference between one and the other lies in the possibility that renewables have of being regenerated in a short period of time and thus being able to be used over and over again, by man.

Plants, animals, water, soil, among others, constitute renewable resources, as long as there is a real concern to exploit them in a rational way, allowing their natural or human-induced regeneration.

However, resources such as oil or minerals are considered non-renewable since their regeneration would require complex formation processes that would last thousands of years, this implies the possibility of depleting the existing deposits on the planet, if they are not used rationally. .

In this chapter we will try to identify the environmental problems associated with each type of natural resource.

Specifically, the natural resources that we are going to analyze will be:

- Renewable resources:

- . Water
- . Soil and landscape

- . Marine resources
- . Flora and fauna

- Nonrenewable resources:

- . Oil and mineral resources

In this last section, an epigraph will be included dedicated to the problem of the use of natural resources in obtaining energy, making special mention of the use of renewable energies.

4.1. Water

Water, while constituting the most abundant liquid on Earth, represents the most important natural resource, since it is essential for the development of physical and biological processes that occur in nature and is the basis of all Lifestyle.

Of all the water on Earth, only 2.5% is fresh water and of it, only 0.3% is available in rivers and lakes.

To this must be added that in Mediterranean regions, characterized by having a strong dry season of three or more months in the year, the scarcity and irregularity of the resource has traditionally been an integral factor of the productive structure and of the culture of the society itself. .

If we add to this the problem of water pollution associated with the use of pesticides in agriculture, the discharge of untreated sewage into rivers, toxic discharges from industries, acid rains ..., the problem is still possible. More serious. We must therefore consider water as a scarce good, a fact that forces us to manage this resource in a rational way.

Agriculture is the main user of water in Mediterranean countries, especially for irrigation. In some regions, even illegal extraction of groundwater is exceeding the rate of renewal of aquifers, causing decreases in the level of the water table and thus leading to the loss of wetlands, problems of desertification, loss of soil and soil. vegetation, as well as intrusion problems.

In Spain, about 80% of water resources are used in agriculture as a consequence

of the scarcity of natural precipitation in relation to the demand of the crops. Urban use accounts for between 8 and 10 percent of total water consumption, a percentage that is increasing due to the development of tourism and leisure and free time activities (green areas, swimming pools, golf courses ...), precisely in coastal areas where water is scarcer and of lower quality. In the industrial sector, water consumption remains at 12-15% thanks to saving measures aimed at reducing costs.

Ultimately, it is a matter of assuming that unsustainable consumption of the water resource will lead to the progressive degradation of ecosystems and consequently will affect the survival of the species (including humans) that inhabit them.

Measures aimed at limiting the irrational consumption of water include: improvements in the efficiency of use, price control, policy agrarian and saving.

4.2. Soil

The soil constitutes a dynamic structure formed by organic and inorganic materials that is found covering the earth's crust. It supports the plants and provides them with the nutritional elements necessary for their development.

The formation of soils depends on a long and complex process of rock decomposition, in which physical, chemical and biological factors intervene. Soils deteriorated by improper or excessive use of them can take thousands of years to fully recover.

However, the deterioration and even the total loss of the soils has been a pressing problem for some time now, due to factors such as:

- ***The lack of adequacy of the reception capacity of a soil*** to the uses to which it has finally been destined in territorial planning.
- ***The urbanizing desire of man***, many of the times without showing any respect for the conservation of nature.
- ***The indiscriminate felling of forests*** that have

given way to the development of an agriculture oriented to monocultures.

- ***Soil salinization*** mainly in the Mediterranean countries due to causes such as the overexploitation of water resources, the increase in population, industrial and urban development and the expansion of beach tourism.

- ***Erosive processes***, intensified by the abandonment of farmland and forest fires; as well as the direct extraction of soil derived from mining activities, among others, lead to the impoverishment and contamination of our soils.

Erosive processes are responsible for the environmental modeling that characterizes most of its landscapes. Human activities such as logging, land abandonment, forest fires, etc., exacerbate this problem. If the climatic characteristics of our region are added to these factors (alternating dry years with especially rainy years, torrential rains and long, hot summers), the risk of desertification (loss of biological potential) is extremely high.

4.3. Marine resources

The marine environment occupies an area of about 71% of the total surface of the Earth and plays an enormous role in the lives of human beings.

It is an essential source of food resources worldwide, it stores a huge reserve of biomass and water (which, if necessary, could be transformed into drinking water through purifying desalination processes), it contributes to regulating the amount of oxygen present in the atmosphere and is a potential source of renewable energy generation obtained from the force of waves and tides, among other aspects.

The oceans, which contain 90% of the world's living biomass and are the primary source of food for more than three and a half billion people, are currently suffering serious degradation due, among other reasons, to the depletion of fishery resources in the main world fishing grounds.

We are currently in the midst of a global marine crisis. Coastal marine resources, and the ecosystems on which they depend, are showing signs of collapse.

The decline in fishing is mainly due to the spectacular growth between 1970 and 1990 of the global fleet, the frequent use of illegal practices, non-compliance with management regulations and, especially, the modernization of the sector, a fact that has allowed an increase spectacular catch rates in recent decades.

The Food Agriculture Organization (FAO) already reported in 1995 that more than 80% of commercially exploitable fish stocks in the Southwest Atlantic and 40% in the Southeast Pacific are exploited to the maximum, excessively or are depleted.

The application of new fishing policies adapted to the global crisis affecting marine reserves has triggered numerous international conflicts to take over the exploitation of the main fishing grounds. Countries like Spain where the fishing tradition has special significance have been seriously affected.

4.4. Flora and fauna

The flora and fauna represent renewable resources, of great importance for the human being, insofar as they constitute the fundamental basis of their diet.

But currently there are many threats that threaten the natural and plant species that populate the planet.

Among the main impacts derived from human activities that affect the sometimes uncontrolled consumption of natural and plant resources, hunting, the excessive application of pesticides on crops, fires and deforestation stand out.

In Spain, aspects such as illegal hunting and fishing, as well as the use of traps and poisons as common poaching practices, have caused serious problems in the Iberian fauna. In the same way, the practice so deeply rooted in our country such as sport hunting, or with

collectors purposes, if possible increase the problem even more.

On the other hand, alterations in the trophic chain of an ecosystem, due to the suppression or introduction of a new species, could eventually cause serious alterations in the set of interacting species and processes. This is what is happening with the massive elimination of species from the application, sometimes irrational, of pesticides in agriculture.

Similarly, today many natural landscapes are marked by the presence of exotic living beings that were brought to this place by conscious or unconscious acts of human transport and because of having a better adaptation to the environment they have ended up displacing the species. indigenous to the place.

Regarding the destruction of forests and the disappearance of many plant species from the Iberian Peninsula, it has been and continues to be the uncontrolled felling of forests for the use of wood and for the creation of agricultural land as well as the increase in the number of arson, the main causes of regression

4.5. Energy resources.

The demand for energy has skyrocketed in recent years and with it the energy use of primary resources, its transformation and subsequent consumption, a fact that makes the energy sector the number one environmental impact factor worldwide. Today, energy from fossil fuels, nuclear energy, energy from biomass combustion (mainly wood), and hydraulic energy, satisfy the world's energy demand in a percentage higher than 98%, with oil and coal being the most used. .

As we indicated in the development of this chapter, there are renewable and non-renewable energies.

The main aspects that characterize renewable energies are:

- The renewable energies have a much lower performance than non-renewable ones, but the advantage is that the resources are very high.

- The energies renewable require large areas of land to collect significant amounts of energy, this fact generates disturbances

of the environment.

- The energies renewable offer the opportunity to obtain useful energy and exploitation has lower environmental impacts than that generated by conventional sources.

The main renewable energies worldwide are: hydroelectric, oceanic, geothermal energy, energy from biomass, solar energy and wind energy. At the end of this manual, and as an annex, a more detailed development of each of them is included.

5. Other global environmental problems

Earth's atmosphere is made up of many gases. The most abundant are nitrogen and oxygen (the latter is what we need to breathe). The rest, less than one hundredth, are other gases, including carbon dioxide (CO₂), methane and nitrogen dioxide (NO₂).

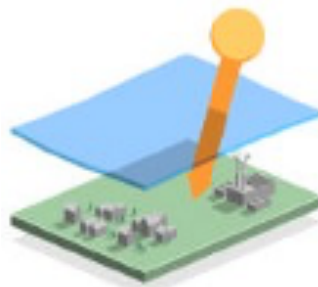
5.1. Deterioration

The greenhouse effect is a natural atmospheric phenomenon that allows maintaining the planet's temperature, by retaining part of the energy from the sun. The increase in the concentration of some of these gases mainly coming from human activity, have caused the intensification of the phenomenon and the consequent increase in the global temperature of the planet.

In the following diagrams we can visualize how the greenhouse effect occurs.



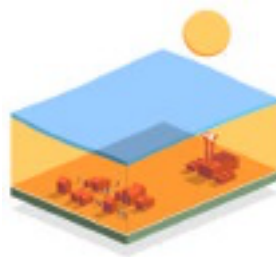
Water vapor, CO₂ and methane gas form a natural layer in the Earth's atmosphere that retains part of the energy from the Sun. Human activity has caused increased concentrations of CO₂ and methane, as well as other gases, such as nitrous oxide, which increase the greenhouse effect.



The surface of the Earth is heated by the Sun. But it does not absorb all the energy but reflects some of it back to the atmosphere.



About 70% of the solar energy that reaches the Earth's surface is returned to space. But part of the infrared radiation is retained by the gases that produce the greenhouse effect and returns to the earth's surface



As a result of the greenhouse effect, the Earth stays warm enough to make life on the planet possible. In the absence of the phenomenon, climatic fluctuations would be intolerable. However, a small variation in the delicate balance of global temperature can wreak serious havoc. In the last 100 years the Earth has recorded a

increase of between 0.4 and 0.8°C in its temperature average.

Causes and consequences of the greenhouse effect

CAUSES

- Carbon dioxide (CO₂): increased consumption of fossil fuels (oil, diesel, etc.), deforestation, obtaining large amounts of cement, lead to an increase in emissions of this gas.
- Methane (CH₄): they come from fuel treatment processes, leaks in mining operations, natural gas distribution, livestock farming and intensive crops.
- Chlorofluorocarbons (CFCs and HFCs): these gases are used in numerous activities (aerosols, air conditioners, refrigerators, etc.) although their activity is decreasing.
- Nitrogen monoxide (N₂O): these Emissions increase due to the increase in the use of nitrogen fertilizers in agriculture, which, when decomposed, generate gas.

CONSEQUENCES

Fundamentally an increase in the average temperature of the planet. It is expected that, if the rate of increase continues, towards the end of the year 2,100 the increase will oscillate between 3.5- 4.2 ° C. This temperature variation it will induce climate change, among whose main consequences we could cite the following phenomena:

- More intense storm regime.
- Uneven distribution of precipitation.
- Severe droughts and desertification of some areas and serious floods in others.
- Displacement of forests to higher latitudes.
- Sea level rise and melting of the polar caps.

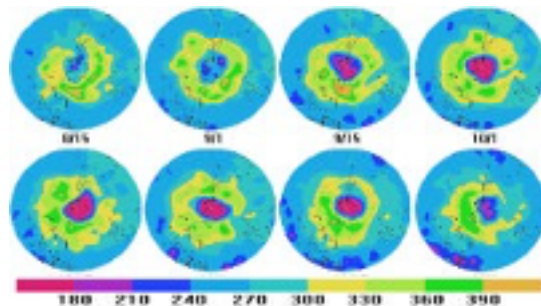
5.2. The deterioration of the ozone layer

Between 19 and 23 kilometers above the Earth's surface, a thin shield of gas, the ozone layer, surrounds the Earth and protects it from the sun's rays.

Ozone is produced by the effect of sunlight on oxygen and is the only substance in the atmosphere that can absorb ultraviolet radiation from the sun. This thin shield makes life on earth possible.

So scientists were concerned to discover in the 1970s that certain chemicals posed a potential threat to the ozone layer.

When released into the atmosphere, these chlorine-containing chemicals rise and are broken down by the action of sunlight, after which the chlorine reacts with ozone molecules and destroys them.



Images of the Antarctic ozone hole in 1995

Causes and consequences of the depletion of the ozone layer

CAUSES

- Artificial sources of **Chlorine and Bromine**: present in the circuits of industrial and domestic refrigerators, aerosols, etc.
- **Nitrogen oxides (NOx)**: These gases are derived from the use of some fertilizers in agriculture.

CONSEQUENCES

Effects on human health:

- Skin cancer.
- Alterations in the immune system.

Effects on aquatic ecosystems

- Loss of phytoplankton (base of the marine food chain).

Effects on animals

- Skin cancer.

Effects on plants

- Alteration in shape, growth, flowering times, etc.

5.3. Acid rain

Since the industrial revolution, the acidity of rainfall has increased dramatically in many parts of the world. Currently it represents one of the most worrying aspects of air pollution.

The formation of acid rain starts with emissions of sulfur dioxide and nitrogen oxide to the atmosphere.

These gases, through chemical reactions, combine with the water vapor in the clouds to form sulfuric and nitric acids.

When the precipitation from these clouds falls it is highly acidic, with the pH value of 5.6 or lower. This phenomenon also sometimes takes the form of snow or fog, or precipitating in solid form.

Causes and consequences of acid rain

CAUSES

The main gases that cause acid rain are two:

- **Sulfur dioxide (SO₂):** contribute 60-70%.
- **Nitrogen oxides (NO_x):** contribute 30%.

Both are a consequence of combustion processes. SO₂ is emitted when burning low-quality fuels, which contain sulfur, in general they are coals or heavy fractions of oil.

NO_x is produced in all combustion reactions by the reaction of oxygen and nitrogen in the air at elevated temperatures.

CONSEQUENCES

Effects on human health:

- Reduction of the effectiveness of the pulmonary defenses.
- Irritation of the respiratory mucosa.

Effects on aquatic ecosystems:

- Damage to aquatic life due to increased acidity in river and lake waters.
- Soil demineralization and groundwater degradation.

Effects on structures and buildings:

- Corrosion of metallic structures.
- Crumbling of surfaces of limestone.

Urban spaces

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7. Noise and noise pollution
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1. Introduction

urban. They are cold and concrete figures that serve to understand the dimension of a phenomenon

The cities are there and almost all of us live complex and of transcendental importance for him in some. No matter how many problems they cause, there is a future for the planet.

to count on them. A decade ago, cities

they had little to offer the generations plus Spain, like most restless nations. Today, in a world where the developed world prevails, the cities described above have also participated in the search for stimuli and sensations: in 1950 there were 28 million who are winning the game over nature. There are inhabitants, and in 1990 it was close to 39 million. a whole movement to reclaim space Likewise, in 1950 only 37% of the urban population that starts from this reality and tries to get Spanish out of it resided in cities (considering cities as the maximum ecological party. 10,000 inhabitants), in

It deserves it, because let us not forget that in 1991 this percentage already rises to 74%.

species that are most related to us of all: the beings

humans. This human concentration is

translate

necessarily in increased demands

Cities have become the typical habitat of energy and natural resources and the problems of humanity today. At the beginning of the century, only associated with the conservation and protection of the environment, 15% of the world population lived in cities, the environment (pollutants, waste, noise, etc.). today the percentage is close to 50%, that is, about 2,500 million people, and it is predicted that, in the year 2025, some 5,000 million people throughout the planet will live in areas

2. Purpose

Throughout this chapter, the main causes of the deterioration of the urban environment will be presented, among which are:

- Urban waste and industrial waste.
- Discharge of wastewater.
- Atmospheric pollution.
- Noise and noise pollution.

Likewise, the main policies and actions that have been developed in recent years in relation to each of these environmental aspects will be indicated.

Among the main actions is the implementation of Local Agendas 21 in the municipalities. Due to the great importance they represent, we have dedicated an exclusive chapter to deal with this topic.

3. Explanatory keys

Before starting with each of the main environmental problems that urban centers face, we are going to define the main keys that generate this deterioration.

- Trends in industrial location: industrial development tends towards the spatial concentration of productive units. This makes the impacts of the industry agglutinate in certain points and are reinforced by other polluting activities.

- **An erroneous urban practice:** Over the last decades, poor urban management has been developing in many of the Spanish cities, characterized mainly by the disorderly growth of cities, the disappearance of popular architecture spaces and the execution of large construction projects in urban areas. high natural value. Consequently, this generates:

- **Low quality of the urban fabric** (poor construction, high building density, lack of facilities and services, etc).
- **Increase in displacements** (towards offices, shopping centers, industrial estates, etc.) that has led to a dependence on transport in general and on private cars in particular.

- **Internal structure of cities**

based on planning and zoning molds of a functionalist nature, which generates a very radical separation of land uses (residential, commercial, etc.), promoting the existence of peripheral areas that become recipients of uses that are not considered desirable for the city (landfills, industrial facilities, social housing, etc.).

- **Specialization of a large number of cities**

such as commercial and administrative service centers, etc., which has led to considerable real estate speculation on urban centers with intense office construction, increased traffic, etc.

- **The increase in motorized transport:**

this fact is presented as the main aggressor of the urban environment. Apart from the atmospheric pollution it generates, there are other negative aspects: congestion problems, increased noise, growth of roads and parking lots, flight of the more favored classes to less congested areas, etc.

- **Degradation of urban areas**

historical: generated mainly by motor vehicle traffic, air pollution, noise, garbage accumulation in abandoned areas, the increase in the area occupied by shopping complexes and excessive tourist activity.

- **Displacement of impacts**

environmental outside the urban perimeter: the growth of cities is done at the expense of livestock or farm lands, well-preserved natural spaces or rural recreational areas. On them it is urbanized, built, roads, highways, railways, etc. are built. In addition, food, energy, etc. resources are extracted. Finally, it is to these peripheries where a large part of the waste generated in the city, contaminated water and air, etc., is transferred.

- **Ignorance and unsupportive attitude of the citizen:**

This attitude, largely generated by the lack of environmental training, prevents citizens from interpreting the environment as a fragile and highly interrelated system, in which acting positively on one part is equivalent to improving the rest and vice versa.

4. The growth of urban and industrial waste

One of the most serious environmental problems in today's society is undoubtedly that of waste.

The treatment of waste constitutes one of the key points of environmental solutions, since its production has increased in the last 20 years in an alarming way and has made it one of the main causes of soil contamination.

Taking into account the environmental legislation that currently regulates the production and management of this aspect, we can differentiate two types of waste:

- Urban or Municipal Waste.
- Dangerous residues.

The amounts generated in recent years give us an idea of the magnitude of the problem and its consequences, year after year with exponential increases.

This vertiginous increase in waste is caused in large part by the demographic increase, the strong concentration in urban centers, the increase in the standard of living and consumption per capita, the aggressive industrial processes with the environment, the scarce environmental training, etc.

to. Municipal or Urban Waste

They are those generated in private homes, shops, offices and services, as well as all those that do not have the classification of dangerous and that by their nature or composition can be assimilated to those produced in the previous places or activities.

The following will also be considered urban waste:

- Waste from the cleaning of public roads, green areas, recreational areas and beaches.
- Dead domestic animals, as well as abandoned furniture, belongings and vehicles.
- Waste and debris from minor construction and home repair works.

We can affirm that today, the problem of urban waste manifests itself in at least three ways:

- The production of waste has grown dramatically in recent years and a change in sign is not expected in this trend, as a consequence of the evolution of the standard of living and consumption patterns
- The diversity of the subjects that compose it makes its management difficult and requires administrations to design very varied strategies for its control and collection.

According to information collected in municipalities in Spain, a large part of urban waste (48%) is made up of organic matter. On the other hand, packaging waste (paper, plastic, glass, etc.) also represents a considerable volume of all waste generated.

- There are different disposal and treatment systems, but their efficiency and relevance have been questioned, at least partially.

The different treatments given to urban waste in the Spanish state. It is worrying that more than 14% of this waste is destined for one of the thousands of uncontrolled landfills in Spain.

i. Effect of urban waste on the environment

City streets need special care when it comes to cleaning and disposing of waste. All this aims to improve the quality of life of man. The volume of waste generated in cities has grown a lot in recent years and this has generated problems regarding its collection and disposal. This problem worsens year after year due to four main causes:

- Population growth.
- The concentration of the population in urban centers.
- Greater use of rapidly aging goods.
- The most widespread use of non-return packaging made of non-return materials biodegradable.

Table 4.1.2. Situation of the elimination and treatment of UR in the Autonomous Communities (Tons / year)

Comunidad Autónoma	Vertido controlado	Compostaje	Incineración	Vertido incontrolado	Recogida selectiva de papel, vidrio y otros
Aragón	1.835.375	867.655		45.489	69.296
Asturias	348.331			43.964	23.881
Baleares	408.234			86	28.466
Barcelona	60.880	48.763	352.874	21.807	15.244
Cantabria	693.285	45.000	10.051	247.787	12.459
Castilla-La Mancha	166.166			64.866	19.666
Castilla y León	311.521	57.539		231.560	11.932
Cataluña	644.742			285.202	27.884
Cataluña	2.023.142	99.259	693.363	6.973	176.090
Extremadura	123.864	1.000.846		880.935	43.082
Galicia	386.384			23.297	4.396
Galicia	279.828			326.199	15.340
Madrid	1.691.845	649.895		6.094	175.799
Murcia	34.987	227.873		34.617	11.629
Navarra	193.397	16.800	4.000	15	29.000
País Vasco	713.686			5.725	84.669
La Rioja	96.134			809	4.593
Ceuta				26.366	
Melilla			36.878		
Total	19.014.396	3.013.710	1.893.166	2.562.151	734.746

Source: Environment in Spain, 1996 (Ministry of the Environment, 1997).

b. Dangerous residues

Some of them are listed below:

They are those that appear on the list of hazardous waste approved in Royal Decree 952/1997, as well as the containers and containers that have contained them, those that have been classified as dangerous by community regulations and the

- Used oils.
- Radioactive waste.
- Polychlorinated biphenyls and polychlorinated terphenyls.
- Asbestos.

that may be approved by the Government in accordance with the provisions of European regulations or in international conventions to which Spain is a party. The damage that these substances can cause depends in the first instance on their degree of

There is a great variety of hazardous waste, toxicity and, secondly, if they reach one depending on the process by which they are generated and sufficient concentration to have effects on their composition. harmful, both in biotic systems and in abiotic ones.

The magnitude of the problem posed by these Wastes can be considered of a lesser scope Quantitative substances are especially harmful, due to the lower quantity of chemicals that possess high properties themselves and their less generalized location. toxicity and environmental persistence. Some But from a qualitative point of view (according to organochlorine compounds (heavy metals, the environmental degradation they cause), their polychlorinated biphenyls, etc.) are typical examples; consequences are even greater than in the case of pollutants with high previous persistence. environmental.

- Part of this waste is regulated Among the main effects on the environment by specific regulations, in which the environment we can find the following: establish the guidelines to be followed by the producers and managers of these substances.

Soil contamination.

possibility of **surface and groundwater contamination**.

In high concentrations they can cause **death**.

At low concentrations they cause **sub-lethal effects**: reduction of the life span of certain species, increased susceptibility to diseases, mutagenic and teratogenic effects.

5. Discharge of wastewater

Water is a limited resource, the decrease of which would bring us serious consequences.

Among the most important problems that affect water within urban centers, we find pollution that makes it unsuitable for use by man. The origins or sources of contamination are very varied, but the main ones are:

- Urban discharges.
- Industrial spills.

Waste water can be defined as any water that has changed its composition or characteristics as a result of its use.

5.1. Urban wastewater

They are those that, after being used by an agglomeration of people, have changed their characteristics. Depending on how the water is used, these can be divided into:

- Domestic: those generated in private homes.
- Commercial: those from bars, shops, hotels, etc.
- Institutional: those generated in schools, barracks, administrative centers, etc.

The following shows the physical-chemical characteristics of urban discharges:

Constituyente	Concentración		
	Fuerte	Media	Alta
Sólidos totales	1200	720	350
Disueltos totales	850	500	250
- Fijos	525	300	145
- Volátiles	325	200	105
En suspensión totales	350	220	100
- Fijos	75	55	20
- Volátiles	275	165	80
Sólidos sedimentables, ml/L	20	10	5
Demanda bioquímica de oxígeno (DBO: a 20°C)	400	220	110
Carbono orgánico total	290	160	80
Demanda química de oxígeno (DQO)	1000	500	250
Nitrógeno (total como N)	85	40	20
Orgánico	35	15	8
Amoníaco	50	25	12
Nitritos	0	0	0
Nitratos	0	0	0
Fósforo (total como P)	15	8	4
Orgánico	5	3	1
Inorgánico	10	5	3
Cloruros	100	50	30
Alcalinidad (como CaCO ₃)	200	100	50
Grasas	150	100	50

The urban wastewater situation in Spain is extremely serious. At the beginning of the 90s, 41% of the population did not have any water purification system, that is, almost 16 million inhabitants dumped their sewage into the riverbeds without any treatment. The remaining 59% treated their water using some of the following methods:

- Primary treatment: removes up to 65% of suspended particles and 30% of organic matter from wastewater. Physico-chemical methods are used, such as sedimentation, flocculation, flotation, etc.

- Secondary treatment: it removes up to 90% of solids and organic matter. Biological processes are applied, in which bacteria and other microorganisms present in the wastewater.
- Tertiary treatment: implies that Water is finally subjected to new physical and biological treatments that reduce the concentration of nutrients (phosphorus and nitrogen).

Figure 5.1.1. Urban wastewater treatment in Spain



Source: MOPTMA, 1994

c. Industrial wastewater

Industrial wastewater are those that have changed their composition due to industrial use.

Due to the number of different industries that exist, the characteristics of this water will have enormous variability. In principle there will be as many different wastewater as there will be different industries. For example, in the case of the food industry there is a high content of organic matter. On the other hand, the effluents from the metal finishing industry contain inorganic substances, mainly heavy metals (chromium, zinc, etc.).

As a general nature, it can be stated that the treatment of this water in large facilities it is acceptable, however, the little one industry has deficiencies considerable.

6. Air pollution

The layer of gases that surrounds the Earth is called the atmosphere. The continuous aggressions it suffers are manifested in different ways, and its degradation can affect the rest of the media, thus becoming the natural resource on which environmental problems become more evident.

Spanish urban areas are subject to a wide range of atmospheric pollutants and most of them come from the following sources:

- **The local or nearby industry:** The most important problems of air pollution are generated, either in large industrial estates with pollutants of diverse origin, or in specific industrial areas but with high impact and mainly related to the energy sector (thermal power plants, oil refineries, cement plants, etc.).

- **Motor vehicles:** in metropolitan areas, traffic produces almost 100% of CO and lead emissions, 60% of hydrocarbons and NOx, 50% of particulate emissions and 10% of SO2.

- **The use of fossil fuels for heating or to generate electricity:** domestic heating contributes from 20 to 30% of the total emissions to the atmosphere in urban areas. The pollutants produced depend on the fuel used. Natural gas is the cleanest fuel, and consequently recent energy plans seriously consider this option.

d. Main air pollutants

- **Sulfur dioxide.** It is of great importance in Spain, both for the amount emitted and for its effects on human health, on vegetation and, ultimately, on the ecosystem as a whole. In 1980, the sulfur dioxide emitted into the atmosphere amounted to 3,172,000 tons, 68.2%

of which came from thermal power plants, 22.9% from industrial boilers and 4% from refineries, iron and steel industries and other large combustion facilities.

Recent evolution has been positive and in 1993 SO₂ emissions in Spain fell to a little over two million tons.

- **Carbon monoxide.** Its main producers are, as we said, motor vehicles, with transport becoming the main cause of local air pollution in many Spanish cities. On average, 57% of production comes from vehicles, while various stationary sources emit another 40%.
 - **Nitrogen oxides.** Those with the most dire consequences come from those derived from the combustion of organic nitrogen contained in fuels. In 1980, global emissions amounted to almost two million tons. In 1993, the figure had been reduced to 1.2 million tons, originating in 62% from power plants, and 15% from industry.
 - **Suspended particles.** These are usually metals present in the polluted atmosphere, such as beryllium, cadmium, mercury, lead, nickel, etc. They come from 30% of the power plants, 43% from the cement plants, 18.5% from the steel industry, 4.3% from the sulfuric acid plants and 4.3% from the paper mills.
- In Spanish urban areas, the growing number of diesel-powered vehicles has contributed to the increase in particulate matter.
- **Hydrocarbons.** Basically are the Vehicles are the main source of compounds that only contain carbon and hydrogen, but whose combination with nitrogen oxides in the presence of sunlight produces ozone and other photochemical oxidants, which cause a good part of the irritation episodes in the eyes and respiratory tract and, in certain circumstances, asthmatic processes.

- **Lead.** Its danger is even greater than that of the rest of the atmospheric pollutants described, if we consider the magnitude of its emissions and the ease it has to disperse in the atmosphere; Since its use in gas stations was implemented in the 1920s, most of these have been used with
 - had to a greater or lesser extent; its combination with other additives, such as ethyl dibromide, gives rise to volatile products (lead bromide) in the gases emitted.

- **Carbon dioxide.** The basic sources of origin are energy transformation (35%), motor vehicles (34%), industry (21%) and various other (10%).

- **CFC.** Spain contributes to the alteration of the ozonosphere with the emission of 46,500 tons per year of CFCs or freons (refrigerants, aerosol propellants, foaming agents).

and. Negative effects at the local and regional level

Air pollution over cities are varied and worrying. Its impact depends fundamentally on:

- Nature of the polluting agents.
- Storage capacity of harmful substances in the air.
- Possibility of accumulation of polluting substances at specific points through wet precipitation or dry deposition.

The main harmful effects that air pollution can generate within urban centers are studied below.

i. Incidence in climatic conditions

The climate in urban areas can be affected by the very structure and functioning of the city, giving rise to urban microclimates different from those of the peri-urban or rural environment. This can generate the phenomenon of heat island, whereby cities reach temperatures significantly higher than their surroundings right now.

This phenomenon causes the blockage of the air, which leads to an excessive concentration of gases, causing aggravations in respiratory and cardiovascular ailments.

Likewise, the heat island enhances the country-city breezes, which attract the harmful substances emitted by polluting sources located in the peri-urban environment.

ii. Harmful effects on health

The main negative health effects caused by some of the aforementioned air pollutants are listed below:

- **Carbon monoxide:** dizziness, visual problems, heart and lung ailments and, exceptionally, death. These effects are aggravated in smokers, whose alveoli already have significant levels of this substance.
- **Nitrogen dioxide:** decreased lung function, irritation of the eyes, nose and throat, asthma, bronchitis and other respiratory conditions and death when it exceeds 100 ppm (parts per million).
- **Lead:** it has a direct impact on the nervous system, on the red blood cells of the blood or on the digestive system.

These are some examples, but the consequences of heavy air pollution can be devastating. In 1952, 5,000 people died in London from smog produced by SO₂ emissions.

iii. Corrosive effects on materials and historical and cultural heritage

The degradation of the atmosphere not only affects human health, but also the complex built inside the cities (particularly the historical and artistic heritage) also suffers serious alterations. Atmospheric pollutants act corrosively on historical materials and monuments, causing extremely serious damage.

F. Some corrective measures applied

Among the corrective measures that have been applied in Spain in recent years, the main ones have been aimed at three sectors:

- **Transport:** Among the best examples of concrete actions we point out the sustained increase in the consumption of cleaner fuels (unleaded gasoline), the mandatory technical inspection of vehicles (ITV), the mandatory introduction of the three-way catalytic converter in new vehicles and financial incentives to renovate the old car fleet (Plan Renove).
- **Energetic:** it is about incorporating the improvement of the environment into energy planning. For the first time a National Energy Plan, that of 1991, includes numerous objectives related to the environment and the reduction of emissions.
- **Industrial:** The aim is to implement cleaner production processes and minimize gaseous waste in large industrial complexes.

7. Noise and noise pollution

Environmental noise produced by human activities has increased dramatically in recent decades, especially in urban centers, due to an increase in population density, mechanization of activities and the use of transport vehicles. The increase in environmental noise has led to noise being considered one of the most annoying pollutants and that most directly affect the well-being of the population, being one of the causes that motivate the largest number of complaints by citizens .

Spain is the European country with the highest percentage of inhabitants affected by this problem. Noise pollution in cities with more than 50,000 inhabitants is high in relation to that in OECD countries.

The type of urban area where a higher level of noise pollution is observed coincides with a residential use that is highly exposed to noise from road traffic or transport.

g. Sources of acoustic pollution

In general, four groups of human activities can be established as main sources of noise:

- Road Traffic

Although the cars that are manufactured are increasingly silent, the sustained growth of urban and metropolitan traffic experienced in recent decades has prevented technological advance from having practical effects.

- Industry

The noise produced by industrial activities is very varied, both in intensity and frequency, and depends on multiple factors; reason for which there are no general studies on its impact on the population. Within this group of activity, the noise originated by construction stands out, both in buildings and in infrastructures.

- Railways

The population most exposed to noise from rail traffic is, in general, small. The use of corrective measures, such as burying roads or installing acoustic screens in the most critical areas, notably reduce these impacts.

- Other sources

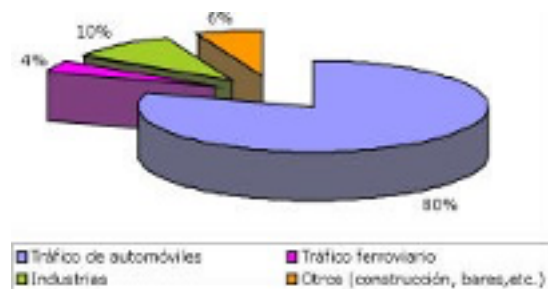
- Domestic noise: The sources of noise emitted within a building are those produced by the occupation and use of the same by people and those caused by the services and facilities of the buildings.

- Noise generated in business activities:

Among the numerous sound sources that attack citizens, the diversity of public nightlife venues such as discotheques, pubs, nightclubs, etc., stand out for their growing diffusion. which have become a true factor of noise pollution with its own characteristics and personality.

- Noise generated by services: Among the different sources that generate noise, the household garbage collection, shops, schools, etc. stand out.

Figure 7.1.1. Main sources of noise



h. The negative effects of noise

The consequences of exposure to high noise levels are varied and serious, yet they are not given the necessary attention. This is largely due to the fact that noise is detected only by the ear (unlike atmospheric or water pollution) and because the most serious damage caused by noise has gone unnoticed since most of it manifests itself in the medium and long term. .

Among the main physiological disorders, hearing loss, cardiac and circulatory disorders (hypertension) and other very varied and worse known respiratory, digestive and neurovegetative disorders are frequently cited.

In the field of mental and behavioral disturbances, sleep and rest disturbances, irritability and conduct disorders (aggressiveness), depressive disorders and a decrease in concentration that lead to poor performance in studying and studying stand out. job.

Environmental footprint

1. Introduction

2. Environmental footprint

2.1. Water footprint

2.2. Ecological footprint

2.3. Greenhouse footprint

2.4. Footprint environmental degradation

2.5. Energy consumption footprint

2.6. Cost savings

1. Introduction

Since 2015, ANF Certification Authority [ANF AC] is a member of the United Nations Global Compact (**Global Compact**).

Global Compact is an international initiative that promotes the implementation of Ten Universally Accepted Principles to promote sustainable development in the areas of rights

humans Y business, rules labor, The Spanish Association of Manufacturers ASPAPEL the environment and the fight against corruption, it is estimated that each Spaniard consumed an average of 136 kg of paper activities and business strategy. The European average is 125 Kg., Companies. and that of Asia about 28 Kg.

In addition, in the area of Responsibility, 115 billion corporate social sheets, ANF AC carries out an assessment on our planet. objective and well-founded derivative savings of the use of our products and services, which have been designed and developed to achieve the objective of the European Union of "0 Papers" (Lisbon Agenda). Achieving this objective presupposes real support in the fight against climate change.

Taking as a frame of reference ISO 14044: 2006 Environmental Management, we determine:

- Life Cycle Analysis (LCA) or Objective.
 - o Inventory analysis.
 - o Environmental impact assessment.
 - o Interpretation.
 - o Environmental impact.

are printed annually

2. Environmental footprint

At ANF AC we have analyzed the benefits we generate based on the savings obtained in the dematerialization of processes in companies and government institutions, establishing different analysis parameters:

- Water footprint.
- Ecological footprint.
- Greenhouse footprint.
- Footprint of environmental degradation.
- Energy consumption footprint.
- Cost savings.

2.1. Water footprint

Life Cycle Analysis (LCA) water footprint

Objective:

Determine the consumption of fresh water necessary to produce paper.

Inventory analysis:

To make a kilo of paper cellulose, 324 liters of water are needed.

In addition, a kraft pulp bleaching factory with a production of 1,000 tons per day consumes more than 150 million liters of water per day, which is discharged into highly polluted water.

Environmental impact evaluation:

Producing a ton of virgin paper requires a minimum of 474,000 kg. of water

Source info: paper industry (Kay Teschke and Paul Demers)

Interpretation: Each sheet of white paper in its usual format 80 grams DIN A4 size weighs 5 grams (not including the associated waste). Therefore, each leaf assumes a minimum consumption of 2.42 liters of water.

Environmental impact

Although the Earth is known as the Blue Planet because 71% of its extension is occupied by water, the truth is that only 3.5% is fresh water, and only 0.007% is accessible to the population. It is a resource that is distributed unevenly, that is poorly managed and increasingly polluted.

The UN has considered access to this natural resource as one of the biggest problems facing those facing the world.

2.2. Ecological footprint

Life Cycle Analysis (LCA) ecological footprint

Objective:

Determine the impact of the use of paper on deforestation.

Inventory analysis:

World paper consumption is 268 million tons per year. Every year 4,000 million trees are cut down in the world to make paper, which represents a third of the world's total.

Environmental impact evaluation:

Producing a ton of virgin paper requires 2 to 3.5 tons of trees, that is, an average of 28 to 49 trees (depending on size)

Info source: paper industry

Interpretation:

Each sheet of white paper in its usual format 80 grams DIN A4 size weighs 5 grams (not including the associated waste). Therefore, each leaf assumes a minimum consumption of 0.000245 parts of a tree.

Environmental impact

- The deforestation of the planet causes the greenhouse effect, climate change, droughts, fires, and erosion.
- In the last fifty years an area of forest equivalent to China and India combined has been lost in the world.
- The Amazon rainforest disappears at the rate of one soccer field per second. If we highlight that this type of forest is home to between 50 and 90% of the planet's biological diversity, then we will get an idea of what its loss entails.
- With regard to Extremadura (Spain), in the years from 1950 to 1980, a quarter of the holm oak forests were lost, which is equivalent to approximately nine million trees. Although cutting holm oaks is now prohibited, recovery is difficult due to pests, drought and overgrazing.

The tree is more than just a wood factory:

- It is the best solar collector: it takes advantage of the sun's energy, which is free and non-polluting energy.
- Fertilizes the soil: inert materials, minerals, etc. are transformed into matter organic.
- He himself is transformed into compost (leaves, fruits, roots and everything when he dies).
- Give food and shelter to forest animals.

2.3. Greenhouse footprint

Life Cycle Analysis (LCA) greenhouse effect footprint

Objective:

Determine the loss of oxygen necessary for human life due to the production of paper.

Inventory analysis:

A tree provides the oxygen that 3 people consume in a day. Every year 4 billion trees are cut down in the world to make paper.

Environmental impact evaluation:

Producing a ton of virgin paper requires a minimum of 474,000 kg of water

Source info: paper industry (Kay Teschke and Paul Demers)

Interpretation:

Each sheet of white paper in its usual format 80 grams DIN A4 size weighs 5 grams (not including the associated waste). Therefore, each leaf assumes the oxygen that consumes 0.000735 parts of 3 people.

Environmental impact

The greenhouse effect is an unquestionable reality, the current felling of trees represents a loss of oxygen generation equivalent to almost four times the world population.

2.4. Footprint environmental degradation

Life Cycle Analysis (LCA) environmental degradation footprint

Objective:

Determine the environmental degradation caused by the production of paper.

Inventory analysis:

To make the paper white, it is necessary to use various additives such as chlorine dioxide, a product that does not exist in the environment naturally, requires other production processes whose effect is not included in this analysis. This product dissolves in water which, once used, is discharged into the environment, causing serious polluting effects.

Environmental impact evaluation:

Producing a ton of white paper requires about 10 liters of chlorine dioxide, and 10 kg of talc per ton of paper cellulose.

Info source: paper industry (Kay Teschke and Paul Demers)

Interpretation:

Each sheet of white paper in its usual format 80 grams DIN A4 size weighs 5 grams (not including the associated waste). Therefore, each leaf requires 0.05 grams of talc and 0.05 grams of chlorine dioxide.

Environmental impact

The so-called organochlorine compounds (more than a thousand different ones) are formed when wood pulp reacts with chlorine. Only about 300 of this chemical cocktail are actually known.

- The persistence over time of organochlorines is enormous. Living beings do not have the means to excrete them and that is why they increase their concentration as they travel the food chain. Any discharge of chlorine into the environment, in liquid or solid form, such as some plastics (PVC) also produces this phenomenon.
- A number of organochlorine compounds are especially dangerous: the so-called dioxins, the most powerful poison ever invented. Its toxicity is 70,000 times greater than that of cyanide. A milk carton without inner aluminum protection can contaminate the contents of the container with dioxins, which is why some countries, such as New Zealand, have forbidden

2.5. Energy consumption footprint

Life Cycle Analysis (LCA) energy consumption footprint

Objective:

Determine the energy required in the production of paper.

Inventory analysis:

The papermaking process is intensive in consumption of electrical energy and steam.

To produce 1 Tm of paper, approximately 4,000 kWh of energy is used (77% from fossil fuel).

The electricity mix for 2010 is 181 g CO₂ / kWh. CO₂ emission factor attributable to the electricity supply known as the electricity mix (g of CO₂ / kWh) -

Info source: Generalitat de Catalunya - Practical guide.

Environmental impact evaluation:

Spain is a paper pulp producing country, and accounts for more than 10% of the total energy consumed by the entire industry in Spain as a whole, which presupposes more than 14,000 ktoe. For energy production in Spain, fossil fuels have covered more than 77%, nuclear more than 12%. And 11% renewable.

- 1 ktoe equals 11,630,000 kW-h

- 1 ktoe is 1000 equivalent tons of oil.

Source: Government of Spain

Interpretation:

Each sheet of white paper in its usual format 80 grams DIN A4 size weighs 5 grams (not including the associated waste). Therefore, each sheet requires:

- 0.0154 kWh of energy, which is equivalent to

- 0.0462 Kg., Of oil, which in turn represents

- 2.7874 g of CO₂.

The steam generation is not included in this analysis when the data of the produced steam generation falls.

Environmental impact

Electricity generation using fossil fuels generates carbon dioxide, which is one of the main causes of the greenhouse effect.

Water vapor (H₂O), carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄), and ozone (O₃) are the main greenhouse gases in the Earth's atmosphere (Protocol of Kyoto).

2.5. Cost savings

In a business environment, as well as by government institutions, the use of economic resources is one of the determining factors in decision-making.

The dematerialization of processes does not presuppose an increase in costs, on the contrary, it entails significant savings and a significant improvement in competitiveness. Sticking with a traditional paper process can only be due to lack of knowledge or clinging to outdated habits.

Administrative paper management.

Cost estimate based on a direct product cost of 4 euros per package of 500 units of 80 gram folio, DIN A-4 size.

Estimated calculation based on: Product cost, transportation, storage, printing, filing, handling, destruction.

Estimate approximately 0.5 euros.

In the case of paper bills, burofax, notary, etc. costs rise exponentially, reaching 10 times the value of administrative management.

For example, all the published studies estimate the savings of an invoice digitization process as a minimum:

- invoice issued is 2.85 euros
- invoice received of 2.86

The cost of an electronic document kept in the long term is less than 0.02 euros.