

Algerian company in the test of environmental management- Environmental impact study by HELIOS, a subsidiary of Sonatrach

المؤسسة الجزائرية في اختبار للإدارة البيئية – دراسة الأثر البيئي من قبل هيليوس التابعة لسوناتراك

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Abstract:

This article proposes a dissemination of an environmental management approach to assess the impact on the environment and analysis of the ecological footprint. By embarking on Environmental Management System (EMS) initiatives, the company most often hopes to have a global vision of its performance level.

The drivers of a collective environmental approach in this study confirm the results in two axes, the first representing the theoretical framework of the study's problem, the second representing the empirical study carried out at the Helios Unit and encouraging further study of other paths that suggest an argument in favor of using current regulatory pressures relating to environmental protection, in other words, technical and economic performance no longer has any meaning without the notion of environmental performance.

Keywords: Environment; environmental impact; EMS; environmental performance.

JEL Classification Codes: Q26, Q5, Q51, Q53, Q59

ملخص:

يقترح هذا المقال اطلاع منهج الادارة البيئية لتقييم التأثير على البيئة وتحليل البصمة البيئية، من خلال الشروع في نظام الادارة البيئية (EMS)، حيث تأمل هذه الاخيرة في اغلب الاحيان ان تكون لديها رؤية عالمية لمستوى أدائها.

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تؤكد دوافع المنهج البيئي المشار اليه في هذه الدراسة ان النتائج تكمن في محورين، الاول يمثل الإطار النظري لمشكلة الدراسة، والثاني يمثل الدراسة التجريبية التي اجريت لوحدة Hélios وتشجع على اكتشاف دراسات اخرى تقترح وسيلة لاستخدام الضغوط التنظيمية الحالية لحماية البيئة، أي ان الاداء التقني والاقتصادي لم يعد منطقيا دون فكرة الأداء البيئي.

كلمات مفتاحية: البيئة، التأثير البيئي، نظام الادارة البيئية، الاداء البيئي.

تصنيفات JEL: Q59، Q53، Q51، Q5، Q26

1. INTRODUCTION

Today, environmental issues have become, to a large extent, economic issues. Discussions on climate change affect all aspects of energy production, consumption and transport methods. They will certainly affect the global competitiveness of companies.

To improve their performance effectively and sustainably, companies are focusing their efforts on controlling environmental quality. These efforts must be planned and organized through the adoption of an environmental certification approach by the ISO 14001 standard. The commitment to an environmental management policy makes it possible to achieve an Integration of the Environment into Production (IEP).

Today, there is a growing interest in environmental protection. Environmental movements have become more organized, powerful and widespread and by and therefore more threatening to companies. They have begun to introduce a new dimension into their management process, namely the environmental dimension, in order to reduce damage to the natural environment. This objective is most often achieved through the installation of environmental technologies and the implementation of an environmental management system (EMS). (McLaughlin, 1996, p. 28)

In the transition, the role of industry is analysed on a branch-by-sector basis in three dimensions: the need to reduce its environmental impact (constraint of "greening" activities); the opportunity to manufacture innovative products; and the development of integrated service solutions allowing environmental optimization (economy of functionality).

Algeria considers that environmental management is a means of achieving sustainable development objectives, creating jobs, supporting economic growth (diversification of production and increase in value added), strengthening innovation and reducing poverty. The new five-year growth plan (2015/2019) identifies the green economy as a key driver of development and technological progress. It encourages investment in key sectors of the green economy (agriculture, water, waste recycling and recovery, industry and tourism) and the development of small and medium-sized enterprises. (CEPAN, 2014, p. 04)

The country has undertaken a number of reforms and initiatives aimed at diversifying the economy, improving the business climate, strengthening energy security, protecting the environment, developing green industries and promoting the territories. However, these initiatives need to be consolidated and better articulated within the framework of a national strategy to promote the green economy that promotes sustainable production and consumption patterns while contributing to wealth and employment creation. Such a strategy should be underpinned by an approach based on local issues that can meet the challenges of environmental sustainability.

The new five-year growth plan (2015-2019) encourages investment in key sectors of the green economy. (CEPAN, 2014, p. 02)

1.1 The problem: In this regard, the question related to this study is as follows: What environmental commitment has the Algerian company taken into account for a topical strategic reflection on the ground?

Very little research is being done on this issue, with a few exceptions that argue for the need to take the environmental factor into account in companies' strategies to ensure their survival.

1.2 The hypotheses of the study: A step which consists in carrying out an inventory of the company's premises, allowing it to identify the consequences of its activity on the environment, in order to take a first step towards the integration of the environment. We have endeavoured to keep up with the rapid evolution of these tools. Two key assumptions should be noted:

- Environmental responsibility and the need for communication form the very basis of the implementation of a certified EMS and meets both a need for

environmental responsibility on the impacts of the site and economic constraints;

- Finally, the environmental impact at HELIOS in the fields of energy, waste and discharges can be assessed, if not quantified.

1.3 Objectives of the study: This study will focus on providing evidence to establish a true dashboard of the environmental impact of a site in Arzew, which will include the approach of halving, by 2030, the percentage of pollution that does not have sustainable access to basic services.

1.4 Study methodology: In order to ensure that this concrete approach does not remain ad hoc, and to make the link with the implementation of an EMS, we include the analytical and descriptive approach, and base it on the environmental impact of the Helios Unit located in Betioua.

2. Why integrating the environment?

The objective of an EMS is to improve environmental performance, defined as the measurable results of the EMS, in relation to the organization's control over its environmental aspects based on its environmental management and environmental targets.

There are several reasons that can motivate a company or organization to take a strategic approach to improving its environmental performance.

Users of the standard have indicated that ISO 14001:2015 helps them to:

- Demonstrate compliance with current and future legal and regulatory requirements;
- Strengthen management involvement and employee engagement;
- Improve the company's reputation and stakeholder trust through strategic communication;
- Achieve strategic objectives by taking environmental issues into account in the management of the company;
- Gain competitive and financial advantage through improved efficiency and cost reduction;
- Promote better environmental performance of suppliers by integrating them into the organization's business systems. (ISO, 2015, p. 04)

2.1 The environment and the economic pillar

Environmental services and economic goods are partially interchangeable. But it is important to remember that these substitutions have their limits, and that one aspect should not crowd out the other. Environmental services are no less valuable than economic goods.

Breathing healthy air, finding firewood for cooking, drinking clean water, and being protected from floods... all these satisfy the basic needs of man. Thus, although the environment has suffered from unbalanced economic growth, the economic and environmental pillars play a complementary role in meeting human needs. They are also connected to each other. For example, economic development, which can certainly reduce our direct dependence on nature, depends on the environment in several ways:

- The raw materials used in the production of goods come from nature, as well as the energy needed for production and transport;
- The cost of extracting raw materials tends to increase when natural resources become scarce or degraded;
- Environmental services are of crucial importance, but not integrated into national budgets, as they are difficult to measure in financial terms;
- Adverse environmental effects (e. g. pollution, floods, or fires) can damage or destroy economic assets and equipment;
- Labour productivity is linked to the diet and health of workers, two variables that are directly influenced by the environment;
- Appropriate environmental management and integration reduce costs, through greater economic efficiency or prevention, of the great potential for further progress in this area;
- A high quality environment is an important asset for tourism (such as shows, for example, the growth of ecotourism), it is also the basis of indigenous peoples' livelihoods and contributes to significant pharmaceutical production. (CE, 2007, p. 20)

2.2 The three spheres: social life, economy and environment

The three dimensions (Fig.1) of sustainable development (environmental, economic, and social) are generally referred to as the

"pillars" of sustainable development.

The pillars are distinct, but interdependent. This means that the environmental pillar has relationships, which need to be improved, with the economic and social pillars, as explained below.

This representation of the three spheres is used to locate the field of the sustainable development. The field of reflection on this theme, consisting in finding a winning strategy for each of the fields - social, economic, environment - is in fact in the area where the three spheres intersect. (PERSONNE, 1998, p. 20)

2.3 The environmental company

The environmental industry consists of companies whose activities are based on the production of environmental goods, the provision of environmental services and environment-related construction activities. It is in fact the end use of the company's products, not their physical characteristics, that matters. (Ressources entreprises, 2009, p. 22)

On the one hand, greening has become a necessity and is no longer a simple option for managing a company sustainably and successfully. Like all companies, the goal of the green company is to make money. But "green" means that this objective is achieved while exploiting the opportunities offered by nature in a sustainable way and without harming the environment.

A green enterprise can be defined from two points of view: one concerns the result in the form of green products (goods and services), the other concerns the process (or production) of an economic activity. As a result, entrepreneurs can enter the green business sector either by marketing environmentally friendly products or services or through an ecological process or with clean technologies that limit the negative effects of the activity. (Majurin, 2017, p. 07)

3. Environmental management in Algeria: progress to be consolidated

The transition to this management is the real driver of green growth. The long-term objective is easier to conceive than the path to achieve it. As the transition will involve the creation and destruction of activities, the net effect on the activity is particularly complex to assess.

Green public policy will also be crucial for the development of these

new markets in this transition, through various tools that are complementary to the fiscal and regulatory framework: carbon prices, innovation policy, public investment to develop low-carbon and low-carbon activities and the promotion of sustainable consumption in particular. (Crifo, Crassous-Doerfler, & Flam, 2010, p. 07)

The rational management of water and energy resources, the search for solutions to deal with the long-term depletion of hydrocarbon resources, the fight against desertification and deforestation, the reduction of emissions from the combustion of fossil fuels, the adaptation of the water, health and agriculture-forestry sectors to climate change and the reduction of industrial and urban pollution are the country's main environmental challenges.

The Five-Year Public Investment Program (2010-2014), worth \$286 billion, focused on modernizing infrastructure and privatizing the economy. The privatization of the Algerian economy continues to face the challenges of improving the business climate, increasing bank financing for productive investments and acquiring new technologies. The upgrading of companies affects less than 1/10th of companies.

Programmes have been implemented in the areas of environmental protection, water management and stabilization of greenhouse gas emissions. A budget of 2,000 billion DA (27 billion Dollars) is allocated to the water and sanitation sector (dams, water transfer systems to deficit regions, wastewater treatment and desalination plants) and 7 billion Dollars to the land use and environment sector (creation of 4 new cities and about 100 infrastructures for environmental protection).

The National Plan to Combat Desertification (PNLCD) is being implemented. Concrete efforts have been made in the field of forestry, with the restoration of an estimated forest area of more than 530,000 hectares since 2000. (CEPAN, 2014, p. 08)

3.1 Environmental performance in favour of the Algerian economy

Algeria has a National Environment Strategy, an Action Plan for the Environment and Sustainable Development (2002-2012), a Land Use Plan (2010-2030) and a National Climate Plan (2015-2050) in the finalization phase (Table 1). Sectoral policies are being implemented in the areas of

environmental education, energy resources, water economics and adaptation of the water resources sector to climate change, ecosystem conservation, rural development and industrial pollution control. A National Strategy for Integrated Coastal Management is being prepared. Measures to improve energy efficiency and a programme to promote renewable energy have been adopted. A first hybrid power plant has been in operation since 2011, 23 photovoltaic plants and a wind farm should come on stream by 2020. (CEPAN, 2014, p. 11)

The deployment of the industrial sectors of the green economy will also require:

- An improved business climate and the inclusion of the green economy in the new investment code under preparation;
- A financial system that meets the needs of SMEs; Long-term bank financing is generally inaccessible to SMEs due to lack of guarantees;
- An industrial production that is part of a territorial approach. (CEPAN, 2014, p. 15)

We want to remain an example for the Algerian economic sector. This requires adopting model behaviour and integrating social responsibility into all our activities and with our stakeholders. Through this responsible commitment, SONATRACH is committed to preserving the environment and preparing Algeria's future. SONATRACH will continue to promote actions of social significance and national solidarity in accordance with its values in a perspective of sustainable development. (Sonatrach, 2019)

4. Environmental impact assessment at Hélios (2017)

HELIOS has decided to implement an environmental management system in accordance with ISO 14001/2004. In this context, it has approved a procedure to identify its environmental aspects and impacts and to implement the necessary control measures. (Vinçotte, 2017, p. 91)

This zone is favourable to the establishment of energy systems based on these energy sources, particularly winds in the Arzew region, (Fig.2) which are very persistent in winter and the dominant wind direction is southwest. Figure 02 shows the Arzew compass rose.

4.1 Objective of the impact study

The objectives of the environmental impact assessment are to

characterise, analyse, assess, evaluate, prevent and reduce the risks of the proposed installation, as far as technically feasible and economically acceptable. Depending on the results, it makes it possible to define additional impact reduction measures if necessary.

Thus HELIOS must identify the environmental aspects of its activities, products and services, both at headquarters level and at the level of the plant it has the means to control, and those over which it has the means to have an influence, taking into account new or planned developments or new or modified activities, products and services, and identify those of these aspects that have or may have significant environmental impacts significant environmental aspects. (Vinçotte, 2017)

4.2 Working Methodology

The impact analysis consists of three steps:

- Description of the study project;
- Identification of environmental aspects;
- Impact assessment.

Impacts are identified by comparing the components of the receiving environment with the elements of the case study. For each of the interrelationships between the activities and the relevant components of the environment, it is a matter of identifying all the likely impacts and giving, at the end, reductive and preventive measures against the various forms of pollution.

In conclusion, the study covered in this article only concerns points directly related to the environment, particularly those related to the impacts induced by the project.

4.3. Environmental impact analysis

4.3.1 Description of the study project

It is written in such a way as to make accessible, and as widely as possible, the main themes developed by the installations of Hélios - a subsidiary of the SONATRACH Group - in the environmental impact study. As part of the recovery of its by-products, Sonatrach built the helium and nitrogen production plant. This plant is located in the industrial zone of Arzew. The Helios plant is divided into two sectors: the plant and the tank

farm. It is designed to produce at least 600 million standard cubic feet (equivalent to 16.08 million normal cubic metres) of marketable helium over a 330-day continuous period and 33,000 metric tonnes of nitrogen per year.

With a total storage capacity of:

- Two liquid helium tanks (2 x 113,500 litres);
- Two liquid nitrogen tanks (2 x 75,000 litres). (Vinçotte, 2017)

The choice for the realization of this unit is intended to satisfy the needs of domestic and foreign partners. As a result, the development of this project is multiple and beneficial on several levels of the economy and local life:

On the Economic level:

- Ensure commercialization and its economic sustainability;
- Increasing the attractiveness of the territory;
- Generate tax resources;
- Helium is delivered in liquid form to HELAP for the European market.

On the technological level:

- Giving a place to national engineering at the global level;
- Boosting the technological sector in the field of hydrocarbons;
- Enhance the value of hydrocarbon derivatives (petrochemicals);
- Diversify non-hydrocarbon exports.

On the Environmental level:

- The structure will be installed in an existing industrial area;
- Minimize the environmental impact of air emissions by recovering excess gases.

Helios is committed to Health, Safety & Environment by implementing all necessary measures to ensure safety and the prevention of personal injury and damage to the health of workers and the environment.

4.3.2 Identification of environmental aspects

Identification of polluting activities and pollutants (Table 2)

Actual Sources: No actual sources identified or observed.

Potential Sources: Potential sources of pollution that could have been identified during the site visit are as follows:

- Tank farm;
- Process trains.

Pollutants:

The main pollutants potentially in place in this complex are:

- Total petroleum hydrocarbons;
- BTEX (Benzene, toluene, ethylbenzene, xylenes);
- Polycyclic aromatic hydrocarbons;
- Base heavy metals (Cd, Cr, Cu, Cu, Ni, Pb, Zinc).

It should be noted that some potential pollutants may be of origin other than the operations of the Complex Unit.

Pollutant migration:

At the Helios complex, the general direction of flow is assumed to be in a northerly direction, towards the Mediterranean Sea, first crossing the GL2-Z complex. It should be noted that the drains (wastewater, oil circuit, etc.) are connected to the recovery network by the GL2Z complex.

4.3.3 Impact assessment

The assessment of environmental impacts is essentially based on the sources of potential impacts inherent in the different phases qualifying the life of the project. It is determined by estimating the significance and certainty of the impact (Table 3).

On this basis, the following HSE objectives have been assigned:

1. Contribute to recycling
2. Rationalize consumption
3. Preserving the environment
4. Optimize the production process
5. Prevent accidents and incidents
6. Preventing diseases
7. Improve the HSE management system
8. Ensure the availability of information internally
9. Ensure the availability of information externally
10. Developing skills
11. Raise awareness among staff
12. Ensure compliance with legal and other requirements
13. Ensure the availability of PPE. (Vinçotte, 2017, p. 104)

5. Measures envisaged to eliminate, reduce or compensate for the harmful consequences of the project on the environment

The implementation of such an environmental management system has already made it possible to identify all the environmental impacts of the activity and to implement an environmental action plan that is in line with the environmental management plan requested by this study.

Thus, impact mitigation is characterized by the establishment of technical, human, financial and procedural means for the adequate management of the significant environmental aspects of the project, namely:

- Water discharges;
- Solid waste;
- Emissions of gases, dust and odours;
- Noise pollution ;
- Industrial risk, etc.

The approach to environmental protection at the international level has changed; the traditional management of responding to a pollution problem has become obsolete and no longer meets the current needs of companies. The adoption of the principle of sustainable development and the ISO 14000 series of standards for environmental management systems has strengthened the role of pollution prediction and prevention. It is an important and essential tool of an EMS. (SARMOUK, 2019, p. 110)

The current concept is to prevent pollution problems rather than to cure them. By investing huge sums in increasingly heavy and complicated treatment processes, manufacturers have realized that it would be better to rethink production processes in order to reduce the generation of waste (concept of minimum waste). Protecting the environment now requires a change in attitude and a different way of planning and doing things.

Some of the benefits of pollution prevention include:

- Minimize or stop the production of pollutants;
- Accelerate the reduction or elimination of pollutants;
- Minimize health risks;
- Promote the development of pollution prevention technology;
- Use energy, materials and resources more efficiently;
- Avoid costly remediation operations in the future;

- Making the economy more competitive.

Reading these advantages, it will be clear that pollution prevention will be based on a number of actions. This principle stems from the fact that any transformation process produces a residue or by-product that must be treated; it is this treatment that must be rethought in terms of:

Source reduction: This involves reducing the consumption of materials, energy and water to produce as little waste as possible.

Recovery/reuse: make a new use of a recovered product or material for a use similar to its first use.

Recycling: reintroduce a recovered material or product into the production cycle from which it is derived.

Valuation: to subject the product or material to a treatment that allows it to be used in a way that has a positive economic value.

Disposal: represents all operations to store, sort, collect, transport and treat waste resulting in substances that can be safely disposed of.

These are the practices that must now be given priority in any pollution control program; to do so, it is necessary to review all the unit's activities in order to identify opportunities that can constitute a prevention practice. (SARMOUK, 2019, p. 112)

5.1 Main environmental mitigation measures:

Helios must seek to constantly improve its operational processes through:

- The provision of the management structure, staff resources and guidelines necessary to minimize the negative impacts of its activities on the environment, human health and safety;
- Training of all employees and contractors to raise their awareness of this environmental policy, promote pollution prevention, promote health protection and ensure safety;
- Communication of the environmental policy to employees, contractors, suppliers, visitors and the public as necessary;
- Regular audits to monitor and evaluate progress in achieving the objectives of this policy;
- Pollution prevention and continuous improvement of its facilities through

the implementation of proven and economically viable technologies. The company also strives to promote safe working practices and maintain its goods and equipment under conditions that meet predetermined standards;

- Waste reduction and the promotion of the conservation of environmental resources;
- The development and maintenance of emergency response systems and equipment necessary to control and mitigate the impact of any incident that may occur;
- The carrying out of continuous maintenance of installations and equipment. (SARMOUK, 2019, p. 114)

Table 1. The five-year public investment plan

Objectives of the national climate plan (2015-2050)
-Reduce carbon emissions, in particular through CO2 sequestration; -Promote clean energy; -Reduce the carbon footprint of industrial and domestic activities; -Adapting infrastructure to climate change: improving the water system, massive reforestation and extension of the green dam to combat desertification; -Adapt agriculture to climate change.
National Renewable Energy Development Programme (PNDER) 2011-2030
Estimated overall cost: \$80-100 billion (Pilot project phase and test of the ongoing courses)
Objectives (Horizon 2030):
-22,000 MW including 12,000 MW for the national market (22% of electricity production);
-Cover 40% of the country's electricity needs: solar thermal and photovoltaic energy (37%) and wind energy (3%). The share of renewable energies in consumption emissions would thus increase from 2% (2011) to 5% in 2015, 14% in 2020 and 40% in 2030.
-Create nearly 200,000 direct and indirect jobs;
-Saving of nearly 600 billion m ³ of gas;
-Increase the integration rate of local industry: 50% by 2020 and 80% by 2030.
-First 150MW solar-gas power plant, including 25MW in solar thermal (Hassi R'mel)
-Implementation of a national research program in renewable energies.
-2015-2020: equipment deployment and manufacturing phase

-2020-20-2030: large-scale development phase

Source: (CEPAN, 2014, p. 13)

Table 2. Rating scales for the magnitude and importance of an impact

Ranking the magnitude of an impact	
Magnitude of an impact	Rankings
Major impact: Impact causing changes in the ecosystem causing irreversible damage in the medium term over a period of about ten years.	3
Moderate impact: Impact causing changes in the ecosystem that cause irreversible damage in the short term over a short period of time.	2
Minor impact: Impact causing changes within a normal range of variations but which are detectable as direct consequences of the impact.	1
Negligible impact: An impact whose effects is unlikely to be observed but is known to occur.	0
Impact significance ranking	
Importance of an impact	Rankings
Overall: Consequences that have an impact on the global environment or an impact on rare species of global importance.	3
Regional: Consequences that can affect some limited areas of the Algerian territory providing resources of regional importance or that are not ecologically sensitive.	2
Local: Consequences limited to the area surrounding that of the Unit.	1
	0

Localized: Consequences limited to the area directly surrounding the Unit.	
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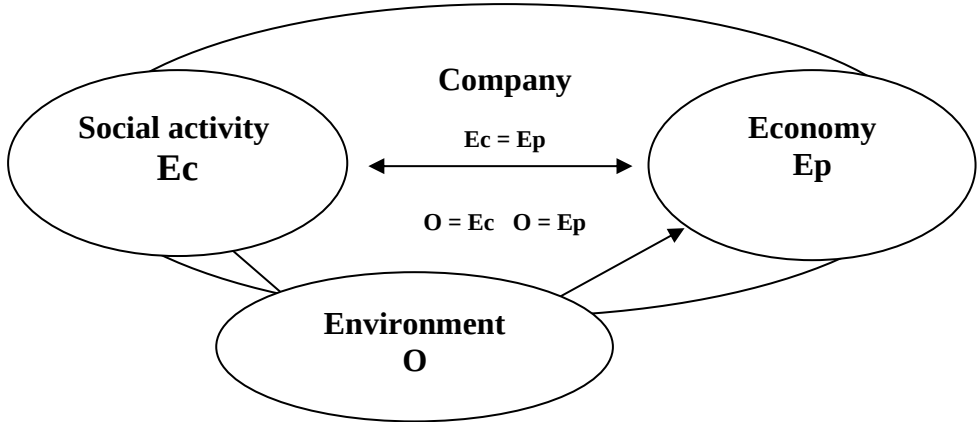
Source: (Vinçotte, 2017, p. 88)

Table 3. Impact assessment

Environmental aspects and impacts identification sheet n°1				
Work unit		Factory		
Activities	Helium and nitrogen production			
Aspects	Impacts	Risk	Priority level	Preventive measures
Gas consumption of charge	Waste of natural resources	4	2	Program of maintenance preventive. Writing of procedures of operation.
Electricity	Waste of resources	IV	1	Special Instruction on the electricity consumption
Consumption of chemical and of petrochemicals	Waste of resources	IV	1	General Instruction on the Consumption
Nitrogen emission gaseous	Product wastage	4	2	Evacuation at height. Installation of silencers.
Helium emission gaseous	Product wastage	4	2	Recovery project

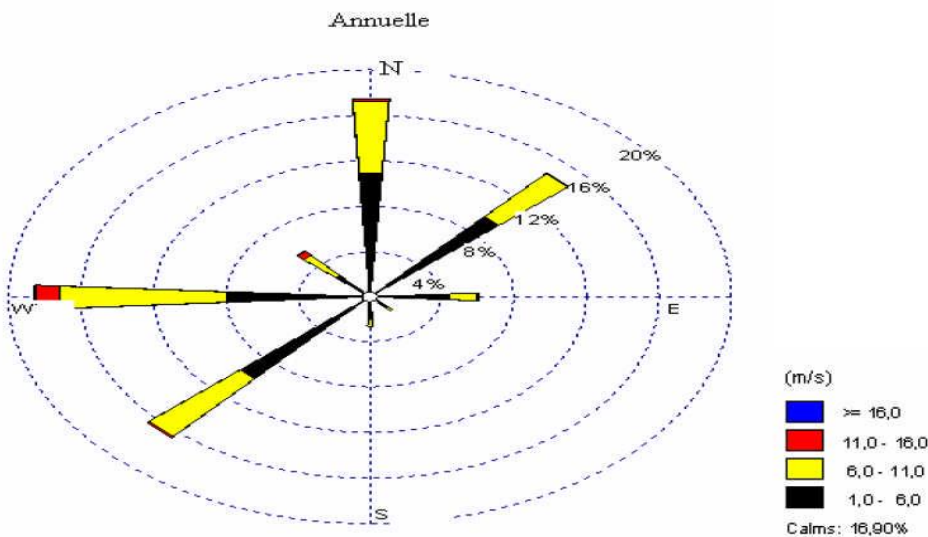
Source: HSE Department in Helios. (Vinçotte, 2017, p. 98)

Fig.1. Social activity, economy and environment



Source: (PERSONNE, 1998, p. 22)

Fig.2. Protection distance from the source



Source: (Meteoblue, 2019)

6. Conclusion:

In Algeria, environmental management is perceived as a development axis that can contribute to the diversification of the economy and job creation, two major challenges for the country. Indeed, in a context of a weak contribution of industry to economic growth, increased investment in the sectors / sectors of the green economy.

Stakeholders, both internal and external, tend to consider the environmental performance of an organization as a priority. Good environmental performance requires the entire organization to commit to a systematic approach coupled with a commitment to continuous improvement of the environmental management system.

This study will provide them with solutions to mitigate at least these negative, environmentally friendly impacts and will encourage them to choose less costly and clean processes, which will allow them to save money.

We can conclude: However, it is recommended to use with positive reflection the guidelines that will serve as a preventive instrument as a consequence:

- ✓ Self-monitoring;
- ✓ Compliance with standards and regulations;
- ✓ An awareness of the danger that can be generated in the event of an incident;
- ✓ Acting as a preventive measure
- ✓ Act in a curative aspect;
- ✓ Avoid serious consequences of damage.

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