

The Social and Environmental Responsibility of the Cement Company in Tebessa Province: With a Focus on the Period (2010–2016)

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Abstract

This study aims to examine the reality of the application of social and environmental responsibility at the Cement Company of Tebessa Province. Algerian cement companies are among the most important institutions contributing to the national economy and have a direct relationship with the environment due to the nature of their activities. They are also among the institutions that generate the largest amounts of waste. The study highlights the most important efforts undertaken by the Cement Company of Tebessa to mitigate its industrial pollutants through investments aimed at reducing pollutants as much as possible. The company also sought to use cleaner production techniques whenever possible. Furthermore, the company positively embraced the importance of social responsibility and the need to adhere to it as voluntary practices in its dealings with all relevant stakeholders, within the limits of its available capabilities. The study recommended that the Cement Company of Tebessa increase the number of reports prepared on the environmental status of the company's products and waste and submitted to the Provincial Directorate of the Environment, in a manner that ensures the success of the company's environmental policy and enables it to address pollution risks. It also recommended that the state seek to encourage institutions in both the public and private sectors to compete in conducting their activities in accordance with the principles and foundations of social responsibility and to promote the welfare of members of society in a more developed and advanced manner. Furthermore, institutions should be encouraged

to participate in charitable activities and environmental events and to allocate part of their profits to advancing this field and ensuring its sustainable development.

Keywords: Cement Industry, Environmental Responsibility, Social Responsibility, Cement Company – Tebessa.

Introduction

The cement industry is considered a strategic industry because it is directly linked to construction and urban development activities. Cement plants are usually established near sources of raw materials in order to reduce the cost of transporting these materials. Algeria is among the countries that possess abundant natural resources. Among the most important national institutions that have a direct relationship with the environment are cement manufacturing companies. Given that the activities of these companies cause environmental damage, they have become obliged to develop environmental strategies that enable them to establish a reconciliatory relationship with the environment, allowing them to pursue their ambitions and objectives in the field of cement manufacturing. The Cement Company of Tebessa belongs to the industrial sector, and its activities negatively affect the environment through pollutants generated by cement production. It is considered an environmental polluter because of the dust emissions it generates, which pollute the air both inside and outside the plant. Therefore, the company has undertaken efforts aimed at contributing to the establishment of a preventive and remedial system to address its environmental impacts within the framework of investments designed to reduce pollutants as much as possible. It has also sought to employ cleaner production techniques whenever possible. Within the framework of sustainable development, the company is committed to developing an integrated management system for quality, safety, and environmental management in accordance with international standards. At the same time, however, it has also become responsible for fulfilling its obligations regarding the social problems resulting from its activities, as well as the requirements for environmental protection that must be incorporated into the company's overall strategy in order to make its performance more efficient and effective. Consequently, social responsibility has recently become one of the important priorities of the Cement Company of Tebessa.

1. Research Problem

Based on the foregoing, the following research question can be formulated: What is the reality of social and environmental responsibility at the Cement Company of Tebessa within the framework of sustainable development, particularly during the period (2010–2016)?

2. Significance of the Study

The significance of this study lies in examining the extent to which cement companies, including the Cement Company of Tebessa Province, focus on the serious consequences of the high levels of environmental pollution associated with this industry, which depletes natural resources on the one hand and generates environmental pollutants on the other. Through the case study of the Cement Company of Tebessa, the study also highlights the possibility for an economic enterprise operating in the cement manufacturing sector to generate revenues in accordance with its objectives while simultaneously protecting the environment in a manner consistent with its environmental policy. It also clarifies the importance of the company's exercise of its social role and the most significant positive effects on its working environment.

3. Objectives of the Study

- To clarify the basic concepts related to social responsibility.
- To identify modern mechanisms and techniques for reducing pollutants generated by cement production throughout the production stages.
- To identify the behavior of the Cement Company of Tebessa, through its environmental management, toward its industrial pollutants and the costs resulting from them.

4. Research Methodology

This study adopted the descriptive-analytical approach by providing an overview of the social responsibility of business organizations in general, describing the main stages of cement production and the most important pollutants generated by these stages and the extent of their harmful effects, and describing the reality of cement production at the Cement Plant of Tebessa Province. In addition, the statistical approach was employed to analyze statistical data concerning the company's activities through selected tables and statistical data covering the period (2010–2016).

5. Study Axes

- First Axis: Social Responsibility in Economic Enterprises.
- Second Axis: Hazardous Pollutants of the Cement Industry and an Introduction to the Cement Plant of Tebessa.
- Third Axis: The Cement Company of Tebessa between Commitment to Environmental and Social Responsibility and the Achievement of Sustainability.

First Axis: Social Responsibility in Economic Enterprises

1. Concept of Social Responsibility

The World Bank defines corporate social responsibility as the commitment of business owners to contribute to sustainable development by working with their employees, their families, the local community, and society as a whole to improve people's living standards in a manner that serves both business and development. It has also been defined as all efforts through which an organization voluntarily contributes to development for ethical and social considerations (Al-Asraj, 2010; Al-Sakameh, 2009).

The importance of social responsibility for business organizations can be demonstrated through the following points (Al-Bakri, 2001):

- Social responsibility helps create an atmosphere of trust within the organization, thereby increasing the level of commitment.
- Social responsibility helps prevent and combat corruption within the organization.
- Social responsibility plays a role in promoting development by helping establish dialogue between the organization and society.
- Social responsibility enables the organization to protect the environment and support and respect human rights.

2. The Idea of Social Responsibility of Organizations: Supporters and Opponents

Social responsibility as an idea has both supporters and opponents. Among the reasons for opposing it are the following (Al-Ghalibi & Idris, 2007):

- Attention to social responsibility may gradually dilute the organization's economic objectives, leading to weaker economic performance and a decline in social initiatives, while imposing high costs as a result of social activities.
- Business organizations may lack sufficient skills to perform a social role correctly. There may also be difficulty in legal and accounting accountability for social activities, weakening the reasons for commitment to them.

Despite these opposing arguments, some support the need for commitment to social responsibility for the following reasons (Najm, 2006):

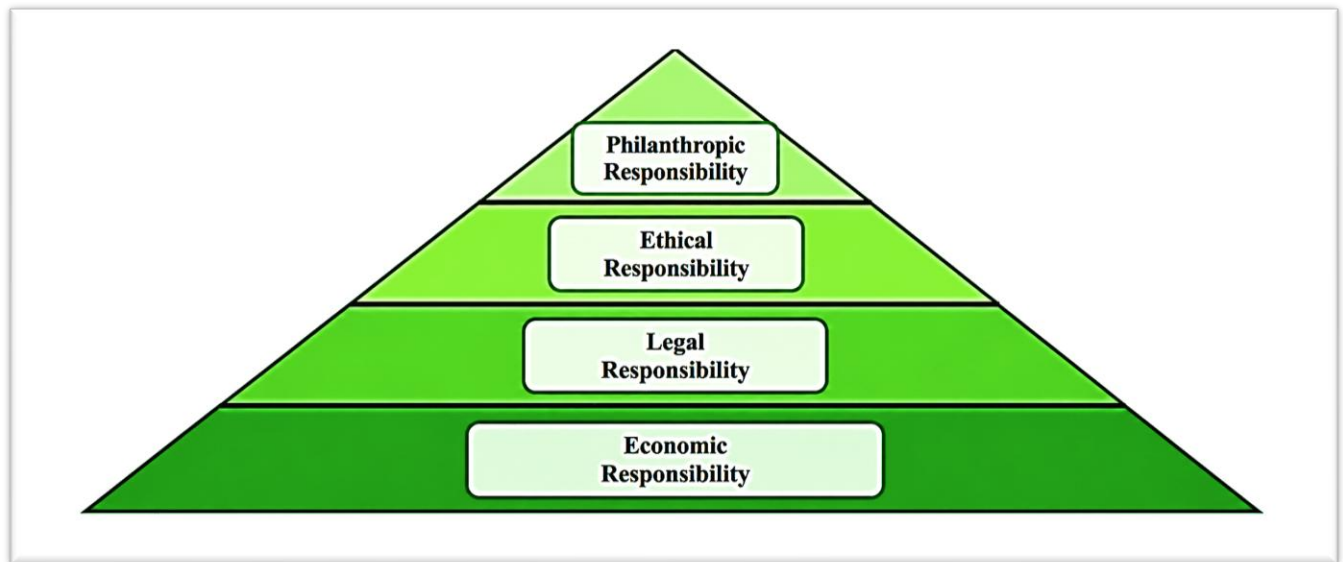
- Corporate profits may increase in the long term through adoption of a greater social role, while criticism directed at companies for focusing only on increasing profits and expanding investment at the expense of employees and society may decrease.
- Organizations' commitment to social responsibility supports their reputation and competitive advantage.

- Organizations' commitment to social responsibility may reduce government intervention in business affairs while ensuring a better environment and a higher quality of life for society.
- Adoption of social responsibility by business organizations with substantial financial and technological resources can contribute to major social achievements, benefiting both society and the environment.

3. Dimensions of Social Responsibility of Business Organizations

The concept of social responsibility in economics and business encompasses multiple dimensions and considerations. This was demonstrated by Archie Carroll in his classification of the dimensions of social responsibility, represented by the pyramid in Figure 1 (Al-Ghalibi & Al-Amri, 2008).

Figure 1. Dimensions of Social Responsibility



Source: Delchet (2007, p. 35).

These dimensions enable business organizations to benefit from the four dimensions as follows:

3.1. Economic dimension: It is based on the principles of competition, respect for the rules of fairness and freedom, and benefiting from technological development in a manner that does not harm society or the environment.

3.2. Legal dimension: It is based on business organizations' respect for the laws, regulations, and instructions of the state in this field.

3.3. Ethical dimension: It is based on the need for business organizations to respect the beliefs and culture of society and to seek to commit to doing what is ethically right, fair, and honest.

3.4. Philanthropic dimension: It is based on business organizations' efforts to respect the principle of improving quality of life in general and the quality of what individuals enjoy in terms of food, clothing, transportation, and other necessities.

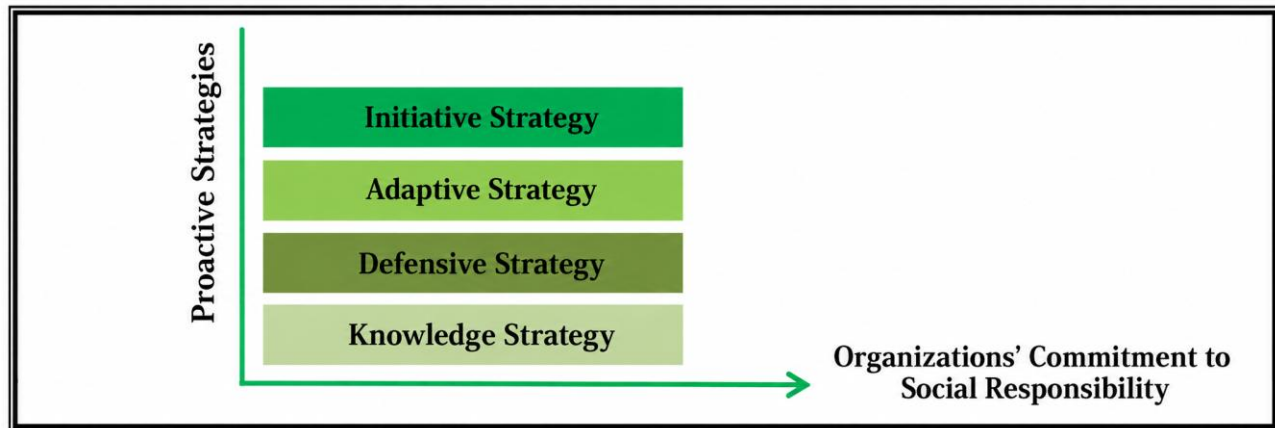
Carroll employed the four dimensions in a hierarchical pyramid to clarify their interrelationship and reach the comprehensive social responsibility that business organizations are expected to undertake. This can be expressed by the following equation:

Comprehensive Social Responsibility = Economic Responsibility + Legal Responsibility + Ethical Responsibility + Philanthropic Responsibility

4. Organizational Strategies for Dealing with Social Responsibility

There are four strategies that may characterize business organizations' positions toward commitment to social responsibility, as illustrated in Figure 2.

Figure 2. Organizational Strategies for Dealing with Social Responsibility



Source: Al-Ghalibi (2009, p. 98), adapted.

5. Principles of Social Responsibility

5.1. Principle of legal compliance: The organization complies with all applicable written and published local and international laws and regulations.

5.2. Principle of respect for international norms: The organization respects international conventions, regulations, and charters in its social practices.

5.3. Principle of respect for stakeholder interests: The organization respects the interests of parties affected by its activities.

5.4. Principle of accountability: The organization discloses to legal authorities and stakeholders everything related to its social responsibility procedures toward society and the environment.

5.5. Principle of transparency: The organization discloses the effects of its activities and decisions on the environment and society, with information made available to all parties.

5.6. Principle of respect for human rights: The organization respects human rights as set out in the Universal Declaration of Human Rights.

5.7. Principle of ethical conduct: The organization commits to ethical conduct and strives to perform all activities correctly and honestly.

6. Stakeholders Supporting Organizational Commitment to Social Responsibility

Social responsibility does not target a single party in the relationship between organizations and their internal and external environments; rather, it concerns multiple parties in the course of organizational activities. Table 1 presents the main points that help an organization commit to social responsibility through its different stakeholders.

Table 1. Stakeholders Affected by Organizational Commitment to Social Responsibility

Stakeholder	Elements Supporting Organizational Commitment to Social Responsibility
Owners	Maximizing profits; maximizing share value; increasing enterprise value; building a respectable image in society; maintaining legal and ethical standing.

Employees	Attractive wages and salaries; good promotion opportunities; continuous training and development; appropriate healthy working conditions; employment equity; participation in decisions; other services and benefits.
Customers	Products at appropriate prices and of good quality; truthful advertising; safe products; product/service availability; commitment to remedying harm when it occurs; allocating part of profits to customer groups; ethical commitment not to violate business or market rules.
Environment	Linking environmental performance to the organization's mission; reducing environmental risks; environmental codes of ethics; participation of environmental representatives on the board; rewards and incentives for employees distinguished in environmental activities; reducing energy consumption; clear policies on material use; rational water use; waste treatment; protection of biodiversity.
Local community	Supporting infrastructure; respecting customs and traditions; avoiding violations of public rules and conduct; combating administrative corruption and bribery; supporting civil-society organizations; supporting scientific centers and educational institutions.
Government	Compliance with government legislation and laws; honestly paying taxes and fees; enhancing the reputation of the state and government in external dealings; respecting equal employment opportunities; respecting civil rights without discrimination; strengthening national health efforts.
Suppliers	Continued fair dealings; fair and acceptable prices for finished materials; development of finished materials; payment of obligations and honest dealings; training suppliers in various work-development methods.
Competitors	Fair and honest competition; avoiding harm to others' interests; not recruiting others' employees through unethical methods.
Minorities and persons with special needs	Avoiding intolerance and promoting tolerance among minorities; employment equality and fairness in access to senior positions; facilities for persons with disabilities; supporting associations that help persons with disabilities integrate into society; respecting women's rights and privacy; fair promotion opportunities; encouraging scientific thinking among youth; promoting a culture of tolerance; caring for

	older persons and retirees; protecting children and respecting children's rights.
Other pressure groups	Good dealings with consumer-protection associations and trade unions; honest dealings with the press and media; honesty and transparency in publishing information about the organization.

Source: Al-Ghalibi & Al-Amri (2002, pp. 117–119).

7. Areas of Impact of Social Responsibility for Achieving Sustainable Development

Organizational commitment to social responsibility is reflected in environmental and social performance across several areas, the most important of which are the following:

7.1. General contributions: Supporting scientific organizations; supporting health-care bodies; supporting organizations that conduct cultural activities; providing transportation for employees; contributing to housing programs; building housing for employees; strengthening programs that limit epidemics and diseases; providing health-care facilities, resources, and services; contributing to the care of persons with disabilities; and contributing to the care of children and older persons.

7.2. Human resources: Providing equal employment opportunities to all individuals without discrimination based on gender, color, or belief; preparing training programs for all human resources to increase their skills; seeking employee satisfaction; adopting wage and incentive systems that provide an appropriate standard of living compared with other organizations in the sector and society; establishing clear employment and personnel policies; continuously ensuring employees' physical and psychological safety and protecting them from occupational hazards; providing promotion policies that recognize employees' capabilities and offer equal promotion opportunities; and maintaining workforce stability through continuous equipment maintenance.

7.3. Natural resources and environmental contributions: Commitment to social responsibility in this field seeks to achieve and prevent environmental degradation resulting from organizational activities by economizing on raw materials and energy sources; contributing to the discovery of new sources of raw materials and energy; avoiding causes of soil, air, and water pollution and noise; designing products and operating processes in ways that reduce waste; and disposing of waste in a manner that reduces pollution.

7.4. Goods and services: Social responsibility in this field is demonstrated through marketing research to identify consumer needs consistent with their purchasing capacity; packaging products in ways that reduce the likelihood of injury during use and informing customers about product/service characteristics; placing information on product packaging concerning usage limits, risks, and expiry dates; preparing information programs explaining product characteristics, methods, and areas of use; and providing maintenance and repair service centers.

8. Positive Effects of Social Responsibility on Organizations and Society

Some of these effects, which may spread through increased social awareness of social responsibility, can be summarized as follows:

- Enhancing employee loyalty and improving employee safety and health; positively affecting the organization's ability to recruit, motivate, and retain employees; and improving the organization's image in society, particularly among customers and workers.
- Social stability resulting from justice and equal opportunity, and improvement in the quality of services provided to society.
- Increased awareness of the importance of full integration between organizations and different stakeholder groups.
- Advancing development through increased education and social awareness among individuals, thereby contributing to political stability and a sense of social justice.
- Reducing the burdens borne by the state in performing its health, educational, cultural, and social functions and services.

- Commitment to environmental responsibility increases state revenues because organizations become aware of the importance of making a fair and appropriate contribution to bearing social costs.
- Contributing to technological development, reducing unemployment, and addressing other areas in which the modern state may be unable to carry all burdens without private economic organizations assuming their role in this framework.

9. Reasons for the Failure of Business Organizations to Commit to Social Responsibility

- Some companies do not have a public-relations department and managers show limited interest in social responsibility.
- Insufficient expertise among those managing company departments regarding social and ethical matters.
- Senior management neglects involving other administrative levels in decisions concerning social responsibility, and there is ineffective communication between management and the public.
- Commitment only to activities explicitly required by laws and regulations.
- Failure to establish a social and ethical code in business organizations similar to those applied by major companies worldwide.
- Failure to respect legislation, laws, and regulations in pursuit of gains, with violators sometimes not being held accountable.
- Some companies seek only to maximize profits and believe that attention to social responsibility may reduce profits and weaken their position in international competition.
- Insufficient financial resources to contribute to social-responsibility activities.
- Difficulty combining profitable business operations with socially responsive corporate activity.

Second Axis: Hazardous Pollutants of the Cement Industry and an Introduction to the Cement Plant of Tebessa First: Main Pollutants Released by Cement Plants and Their Effects

Cement production generates several negative environmental effects. The list of pollutants released by cement plants has expanded and includes dust emissions smaller than 10 microns. Dust is one of the main pollutants causing contamination of the surrounding environment and therefore requires treatment and disposal. Other pollutants include nitrogen and sulfur oxides, carbon dioxide, carbon monoxide, and particles carried by combustion gases in the form of fine dust. These gases cause significant pollution of the surrounding environment, in addition to mercury and cadmium. Carbon dioxide, carbon monoxide, sulfur dioxide, and nitrogen oxides are among the major pollutants. Cement production can cause serious diseases, most notably effects on the nervous and respiratory systems, difficulty breathing, effects on mucous membranes, bronchitis, throat irritation, direct effects on the nervous system, chest pain, bronchitis, cancer, and fetal abnormalities. Dust also reduces tree growth and the quantity, weight, and area of leaves, may cause parts of trees to die, and reduces plant and soil productivity. Cement plants also release water pollutants represented by total dissolved solids, suspended solids, and heavy metals, in addition to solid waste such as kiln dust, raw materials, and clinker.

Second: Classification of Cement-Industry Pollutants

These pollutants can be classified as follows:

Emissions from cement-plant stacks appear as dense white clouds. Dust is the main element causing these clouds. The very fine particles contain chlorides, sulfates, alkalis, and quicklime and constitute a health and environmental hazard. These products of cement manufacture are called “BY PASS” and cause serious health and environmental deterioration because of air pollution inside cement plants and in the environment surrounding the plant. When inhaled, they cause respiratory and lung diseases. Cement dust can also contaminate drinking water through the spread and leakage of dust into seas, rivers, and waterways.

Carbon dioxide is considered the primary cause of global warming. CO₂ emissions from cement plants worldwide are estimated at 5% of total emissions of this gas into the atmosphere, and approximately 917 kg of carbon dioxide is released in the production of one ton of cement according to European standards.

The main sulfur oxide produced is SO₂, although sulfur oxides are generally denoted SO_x and may include mono-, di-, and tri-oxides. SO₂ is a colorless gas with a pungent odor and is one of the main causes of acid rain, which gradually destroys ecosystems. It is also responsible for damage to buildings made of steel and natural stone. Released SO₂ remains in the atmosphere for 4 to 255 days, during which it is oxidized into sulfuric acid and then returns to the earth as acid rain. It causes severe damage to mucous membranes and bronchitis, and its effects on children are greater than on adults.

Carbon monoxide is a colorless and odorless toxic gas. It binds to the hemoglobin of red blood cells more strongly than oxygen and causes suffocation at high concentrations in the air. At low concentrations, it causes poor concentration and nervous tension, with resulting heart and chest diseases. An average of 2.2 kg is emitted per ton of cement produced.

NO and NO₂ have an unpleasant odor. At high concentrations (1 part per million) and over long periods, they inhibit plant growth and reduce fruit production. Their effect on humans depends on their concentration in the air: low concentrations cause allergies, while high concentrations have a destructive effect on living cells. For plants using natural gas, an average of 3 kg of nitrogen oxides is produced per ton of cement. Permitted nitrogen-oxide concentrations in Europe are approximately 200–500 mg/m³ of discharged gas.

Third: Classification of Pollutants Generated by the Tebessa Cement Plant

The pollutants generated by the plant are classified into four groups, as shown in Table 2.

Group	Hazard level	Polluting material
First – 01	High-risk pollutants requiring priority treatment in the short term	Discharge of used and unused oils and grease; wastewater discharge; cement leaks; dust emitted into the air; mazout discharge; storage, treatment, and transportation of chemicals; water leaks; non-combustible materials (plastic, strips, bags, etc.); used tires; special waste (used batteries, printer ink cartridges, paint, glue, etc.).
Second – 02	Less hazardous pollutants to be addressed in the corrective program	Solid waste (used spare parts, paper, etc.); bag waste; gas accumulation; storage, treatment, and transportation of chemicals used to strengthen cement.
Third – 03	Moderately hazardous pollutants; treatment is environmentally desirable but not a priority	CO and NO gases released from used machinery; cleaning waste; leakage of cement-forming materials.
Fourth – 04	Low-risk pollutants that do not require urgent treatment	Noise; vibrations; loss in the use of electrical energy.

Source: Prepared by the researchers based on a document from the company's Environment, Safety, and Quality Department.

Third: Establishment of the Cement Company of Tebessa

The cement-company project was included in the Fourth Four-Year Plan for the 1976–1980 development period in Algeria, which entered into implementation in 1985 under the supervision of the National Company for the Distribution of Building Materials. This company was established pursuant to Ordinance No. 67/280 dated December 20, 1967, and was divided into four regional companies: the Regional Cement and Derivatives

Company for the Center, West, East, and Chlef. In 1988, the file of the Cement and Derivatives Company for the East in Constantine Province was transferred because of the geographical proximity between Tebessa and Constantine. Consequently, the Eastern Cement Company initiated the project to establish the Tebessa Cement Company under a notarized contract dated November 29, 1993, with total capital of DZD 800,000,000 divided into 8,000 shares, each valued at DZD 100,000, in addition to loans obtained from the Algerian Development Bank at the beginning of its operations. At the beginning of 1997, the Eastern Cement Company became the sole shareholder in the Tebessa Cement Company by purchasing the remaining shares from the other two companies. In 1998, the company's capital was DZD 1,200,000,000, and it increased in 2003 to DZD 2,700,000,000. In November 2009, following the new restructuring within which the Industrial Group specialized in the production of cement and building materials (Groupe GICA) was established as part of Algeria's industrial strategy to increase national cement production and establish a monitoring, distribution, and regulatory network, GICA became the owner of all cement-plant shares. After completion of the project over approximately four years, the first kiln works began on April 11, 1994. The first clinker (semi-finished product) was obtained on October 14, 1994, while the first cement product was obtained in January 1995, and the product was distributed for the first time on March 12, 1995. The plant is located in the El Ma Labiodh district south of Tebessa Province, approximately 26 km away alongside National Road No. 16. It consists of a production line with a capacity of approximately 1,600 tons of clinker per day and an annual production capacity of approximately 525,500 tons of Portland cement.

Fourth: Objectives of the Cement Company of Tebessa

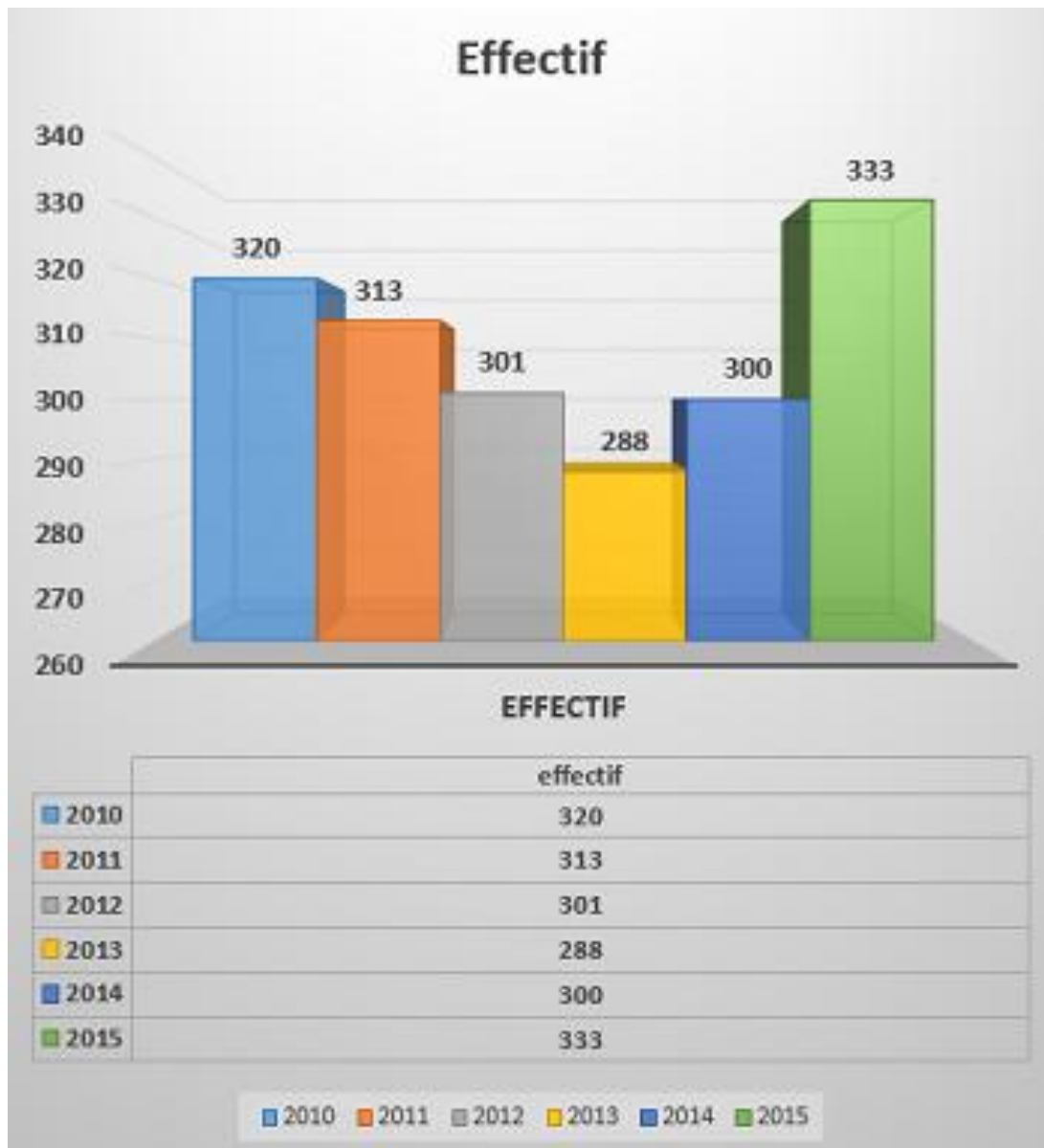
The company's objectives can be divided as follows:

1. Economic objectives: Ensuring the quality and quantity of cement necessary to meet local demand; increasing capital, repaying debts, and purchasing new investments to provide new jobs; producing a product that meets international specifications and enables the company to compete; developing the economy and seeking to establish other new plants; covering the regional shortage, particularly in cement, and reducing imports; achieving profits and contributing to the development of production lines using modern technology.
2. Environmental and social objectives: Supporting national employment efforts and reducing unemployment; providing cement at acceptable prices compared with imported cement, thereby contributing to lowering housing prices to some extent; distributing part of profits to workers to support their standard of living; and protecting the environment by equipping the plant with filters to prevent materials and gases escaping from stacks from reaching the external surroundings of the plant.

Fifth: Human Resources of the Cement Company of Tebessa

The company has human resources distributed across all administrative levels, including technical workers in quarries, exploration, operations/production, maintenance, and quality control, as well as administrative workers and others in administration, training, cleaning, and security. Figure 3 illustrates the development of the company's workforce.

Figure 3. Development of Human Resources at the Tebessa Cement Company during 2010–2015



Source: Tebessa Cement Company website: http://sct.dz/index.php?id_page=1#

The activities and tasks performed by the company's human resources are divided through an organizational structure that highlights all organizational units, including the General Directorate, which supervises the company as a whole, monitors business operations, monitors purchasing and disposal operations related to equipment, and determines workers assigned to training, among other tasks. The Plant Directorate is responsible for quality management and raw materials through their transformation into products and for monitoring their characteristics according to applicable standards. It also monitors maintenance, development, and supply operations, in addition to the commercial department.

Sixth: Physical Equipment of the Tebessa Cement Plant

The plant has quarries for raw materials and equipment, as follows:

1. Plant quarries: The plant has three quarries that constitute sources of the basic materials used in cement production, except gypsum and iron ore. Gypsum is obtained from the Eastern Cement and Derivatives Company through one of its units located in Ain M'lila (Chebata Unit), approximately 220 km from the plant. Iron ore is obtained from Ferphos Iron and Steel Company through one of its units, Boukhadra Mine, approximately 6 km from the cement plant.

1.1. Limestone quarry: Located east of the plant at a distance of ½ kilometer; its area is 230 hectares and it contains approximately 90 million tons of limestone. It can supply the plant for 140 years at a supply capacity of 631,055 tons per year.

1.2. Quartz sand quarry: Located northeast of the plant at a distance of 6 km; its area is 21 hectares and it contains a reserve of 9 million tons of sand, allowing it to supply the plant for 560 years at a supply capacity of 16,070 tons per year.

1.3. Clay quarry: Located north of the plant at a distance of 10 km; its area is approximately 70 hectares and it contains a reserve of 32 million tons of clay, allowing it to supply the plant for 153 years at a supply capacity of 216,951 tons per year.

2. Plant equipment: The Tebessa cement plant has the following equipment:

2.1. Crushing and exploration centers: The plant has three crushers with different available capacities used to prepare raw materials: the first has a capacity of 500 tons per hour for limestone; the second has a capacity of 350 tons per hour for clay; and the third has a capacity of 100 tons per hour for iron and gypsum.

2.2. Kiln: Available production capacity of 1,600 tons per hour for firing raw materials.

2.3. Raw-meal mixer: Capacity of 50 tons per hour for combining and mixing materials.

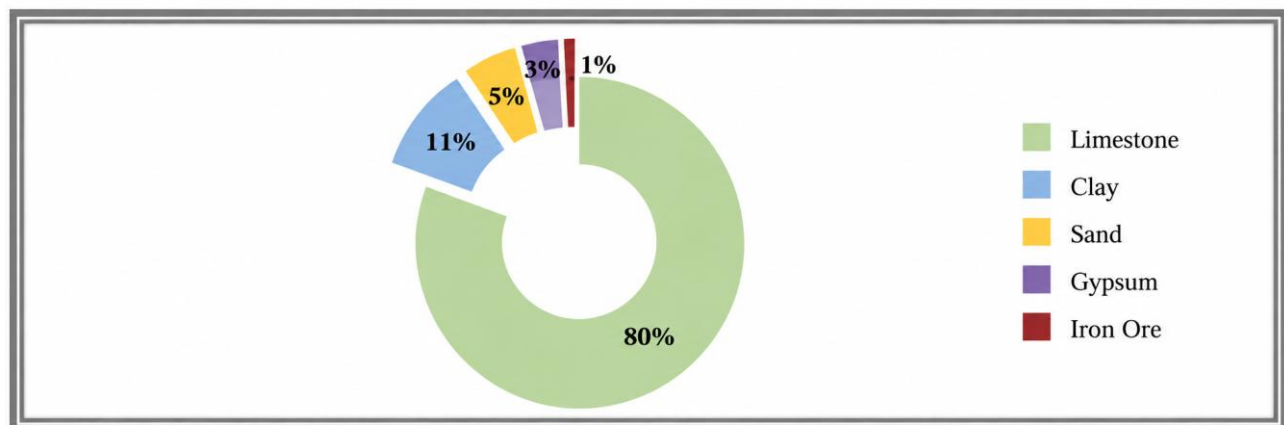
2.4. Clinker mixer: Capacity of 160 tons per hour.

2.5. Distribution center: Contains three containers for cement filling and a dedicated line for loading unpackaged product with a total capacity of 200 tons per day. Packaged cement represents 65%.

Seventh: Production at the Tebessa Cement Plant during 2010–2016

The Tebessa cement plant operates a dry-process production line. Its activity is mainly based on converting raw materials—limestone, clay, sand, gypsum, and iron ore—into cement through different stages involving chemical reactions among mixed materials, from which cement is formed at a temperature reaching 1,450°C. The main elements forming the chemical structure of cement are calcium oxide, silicon oxide, iron oxide, and aluminum oxide. Figure 4 represents the proportion of raw materials forming the cement product.

Figure (04): Percentage Composition of Raw Materials Used in Cement Production



Source: Prepared by the researchers based on the institution's analytical accounting data.

The production process at the Tebessa cement plant proceeds through the following stages:

1. Preparation of raw materials in the crushing and raw-material storage workshop: Large limestone rocks are crushed using the crusher located in the hammer quarry after explosives are used. The limestone is then removed from the storage facility through conveyor belts. Crushing converts the material from its naturally large size into small sizes ranging from 0 to 25 mm. The materials are brought by trucks and specialized machinery, with each material transported separately and then transferred to storage through rubber conveyor belts as the first production stage.
2. Preliminary homogenization in the grinding workshop: After storage, the above materials, except gypsum, are transferred to the crushing mixer, which contains two chambers, each containing a set of grinding bodies (steel balls). Thus, the three raw materials—limestone, clay, and iron ore—pass through these crushers, while sand is transferred directly to the preliminary grinding and drying workshop. The raw materials then meet in the grinding machine, where they undergo homogenization and are stored in storage containers. The meal is prepared and gradually heated by hot gases in the first preheating tower, which functions as a heat exchanger.
3. Firing workshop: The meal obtained in the previous stage is the main material for the kiln. The meal is fired at 1,450°C and, after several chemical reactions, is transformed into clinker or raw cement. The kiln is equipped with a burner operating on natural gas, and the resulting flame can be controlled. Heating proceeds counter to the direction of feeding and gradually increases until it reaches the stated temperature. After leaving the kiln, clinker is transferred to the grate cooler, where its temperature falls to 90°C. It is then placed in storage containers with a storage capacity of 18,000 tons and transferred to the raw-cement workshop by iron chains.
4. Cement workshop: Gypsum is added in this workshop at percentages determined by the measuring device to the raw cement, producing the final cement.
5. Dispatch and loading workshop: Cement is dispatched and loaded by filling bags using the packaging machine or by loading tank trucks.

Table 3 presents the development of cement production quantities at the Tebessa cement plant during 2010–2016.

Table 3. Development of Cement Production Quantities at the Tebessa Plant, 2010–2016 (tons)

Year	2010	2011	2012	2013	2014	2015	2016
Cement production quantity	560,033	580,013	563,516	537,500	368,815	614,047	562,700

Source: Tebessa Cement Company website: http://sct.dz/index.php?id_page=1#

It is observed that the company's production fluctuated significantly from 2011 through 2014 because of scheduled and emergency plant stoppages resulting from repeated breakdowns and accidents in the first grinding workshop. In 2014, the plant stopped for six months for major maintenance of this workshop to avoid repeated unscheduled stoppages. This had a positive effect on the higher production quantities in 2015, which decreased slightly by 13.1% in 2016 because production was stopped during plant maintenance periods.

Third Axis: The Cement Company of Tebessa between Commitment to Environmental and Social Responsibility and the Achievement of Sustainability

First: Environmental Policy of the Tebessa Cement Company

The Tebessa Cement Company, like many Algerian companies, adopted the environmental dimension only recently, in line with the legal requirements of the Algerian legislator. The company's awareness can therefore be attributed to several reasons, including national laws in force in environmental protection and pollution prevention; taxes imposed on the company concerning polluting materials; complaints from citizens living near the plant regarding the effects of air pollutants, particularly dust; and the company's desire to satisfy customers, especially those living near the plant, in order to continue generating profits.

For these reasons, the Cement Company seeks to prevent and reduce risks and pollution through an environmental policy based on the following: attempting replacement and improvement investments in plant machinery and equipment; reducing consumption of energy and natural resources such as water and other raw materials; controlling waste management by rationalizing production techniques and reducing waste through recycling or treatment; improving product quality in accordance with international quality standards; raising awareness and training employees in quality, safety, and environmental matters; and promoting a participatory culture of analyzing occupational hazards within the company as well as environmental hazards resulting from company activities in order to reduce the number and severity of work accidents, occupational diseases, and negative environmental impacts.

The main milestones of the environmental policy of the Tebessa Cement Company can be highlighted as follows:

1. Appointment of an environmental delegate: Industrial establishments in Algeria are subject, according to their activities and the risks they generate, to authorization by the minister responsible for the environment and the relevant minister, the delegated wali, or the president of the People's Municipal Assembly. Pursuant to Executive Decree No. 05-240 of June 28, 2005, concerning the appointment of an environmental delegate and the functions of this delegate, these functions include applying environmental laws within the organization; continuously seeking means of preventing and reducing pollution; implementing a self-monitoring system for waste and equipment; adopting new environmental-management tools, particularly environmental auditing or an environmental management system; ensuring rational use of natural resources and energy; and educating and training workers in the basics of industrial security, safety, and the environment. The Tebessa Cement Company appointed an employee responsible for quality, safety, and the environment who performs these functions within the company. This employee serves as a link between the company and the Provincial Directorate of the Environment and is entrusted with monitoring, guidance, and reporting on the efficiency of the company's environmental system. However, although the company's environmental policy is documented, it has not been disseminated as required and has not reached all employees, and its objectives remain insufficiently precise. The company also lacks copies of documents relating to environmental aspects that are accessible to all employees. Awareness of important environmental issues has been limited to relevant employees rather than generalized to everyone. In addition, there are no procedures ensuring continuous and systematic review of the company's environmental policy.

2. Compliance with new legislative conditions for obtaining an operating license: An operating license is an administrative document proving that the relevant classified organization applies provisions and conditions relating to environmental protection, health, and safety. Therefore, because the Cement Company conducts an activity with a negative environmental impact, it is required to conduct environmental studies and obtain an operating license to legally conduct its activity. The environmental study is an impact assessment or impact summary and a risk study prepared by study, expertise, or consultancy offices accredited by the minister responsible for the environment and financed by the project owner, in accordance with Executive Decree No. 06-198 of May 31, 2006, regulating the arrangements applicable to classified establishments for environmental protection. A risk study aims to identify direct or indirect risks to persons, property, and the environment resulting from the organization's activity. The Tebessa Cement Company is an established classified company and has held an operating license since its establishment. Accordingly, under this legislation it is required to conduct an environmental audit identifying the various sources of pollution and damage resulting from its polluting activities, with proposed measures and procedures aimed at preventing them through mitigation and elimination, and then submit the audit to the territorially competent wali for review and approval.

3. Fees and taxes imposed to protect the environment from pollutants: In 1992, Algeria established its first environmental tax, namely the tax on polluting or environmentally hazardous activities. The production operations of the Tebessa Cement Company have various negative environmental effects of differing severity. Consequently, the provincial tax authority imposes taxes and fees on the company because of this damage, accompanied by fines in the event of late payment. The level of pollution generated by the company was high

from its establishment and continued for several years until the replacement of the bag filter. During that period, the company paid tax charges estimated at DZD 2,000,000 annually. As the company's attention to the environment increased, these charges fell to DZD 720,000 annually. In 2006, the company decided to replace the electrostatic filter with a modern bag filter in accordance with Executive Decree No. 06-138 of April 15, 2006, regulating emissions of gases, smoke, and liquid or solid particles into the atmosphere. Actual operation of the new filter was delayed until April 2011. It reduced pollution generated by the plant and, correspondingly, reduced environmental fees. In 2012, the company paid only DZD 480,000 in environmental tax. In addition, it paid a lease fee for the quarry operating area to the State Property Inspectorate, amounting in 2014 to DZD 960,413.58, divided into DZD 644,000 for the limestone quarry, DZD 196,000 for the clay quarry, and DZD 120,413.58 for the sand quarry.

4. Waste management at the Tebessa cement plant and declaration of hazardous waste: Waste management within the company involves a set of activities beginning with identifying and classifying waste, determining quantities generated during the year, storing it, and finally treating it. Other organizations intervene to recover whatever can be reused.

4.1. Annual declaration of special and hazardous waste: Algerian legislation, under Executive Decree No. 05-315 of September 10, 2005 concerning procedures for declaring hazardous waste, specifies the nature, quantity, characteristics, treatment methods, and measures taken and expected to prevent the generation of such waste. The legislator emphasizes the need to send this declaration to the Provincial Directorate of the Environment within no more than three months after the end of the relevant year.

4.2. Waste management at the Tebessa Cement Company: The company integrated industrial-waste management into its environmental strategy in application of Law No. 01-19 of December 12, 2001 concerning waste management, control, and reduction. Waste generated by its activities is either treated and reintroduced as a raw material into the production process, such as raw cement deposited in the bag filter, destroyed by burning in the kiln, such as torn cement bags, or treated and sold at public auction to authorized processors approved by the Ministry of Environment and Land-Use Planning. After determining the degree of environmental hazard of waste according to the classification described above, the company separates waste into reusable and non-reusable groups. It collects solid waste in special storage areas, such as used machinery, wood, torn bags, and other waste, while materials that can be reused, such as belts, used oils, and grease, are collected for reuse. The company divides waste into special and solid waste to ensure proper disposal through storage or sale. For example, unusable oils and grease are stored in a known designated area for sale to Naftal, while unusable paper is stored in a designated area for recovery by the authorized company Cosider.

Second: Environmental Activities and Social Responsibility Adopted by the Tebessa Cement Company

The Tebessa Cement Company has taken steps to incorporate an environmental orientation into its various activities that pollute the environment. From 2007 through 2010, the company spent approximately DZD 1,259,000,000 on investments directed toward pollution control. It also adopted many contributions in the area of corporate social responsibility.

1. Environmental Investments at the Tebessa Cement Company

The main environmental investments are as follows:

1.1. Replacement of the electrostatic filter with a modern bag filter: Environmental investments at the Tebessa Cement Company began from its establishment. From the beginning of its activity, it used an electrostatic filter, which at the time was better than the fabric filter and was considered environmentally compliant technology. The company used electrostatic filters from the beginning of its operations to remove dust from the gas or air stream and prevent it from being released into the surrounding atmosphere. This technology used water to spray cement dust as it passed between two electrically charged plates forming a magnetic field capable of attracting cement dust to the plates. It also employed a wastewater-recycling technique based on collecting water used in the electrostatic filter, cooling it, and reusing it for industrial purposes. However, at peak times, when carbon dioxide exceeded 0.8%, the electrostatic precipitator automatically stopped to avoid the risk of explosion, resulting in the

release and rise of a dense cloud filled with gases into the atmosphere and thereby causing environmental pollution.

To reduce the effects of this phenomenon, the Tebessa Cement Company replaced the electrostatic filter with a bag filter in February 2011 at an investment cost of approximately DZD 446,000,000. After installing the modern filter, the company reduced dust emissions from production operations from 50 mg/m³ to 10 mg/m³. Its advantage is that it does not use water, although it consumes more electrical energy. It has two important characteristics for achieving the objective of reducing cement-dust emissions: it reduces cement-dust emissions during operation and can be repaired even while operating.

1.2. Installation of modern equipment for monitoring gases and dust: The company equipped the crushing and firing workshops with two devices. It installed a new device for gas analysis and control of nationally permitted levels and for precise measurement and weighing in order to reduce leakage, particularly of CH₄, NO_x, CO, and CO₂. These gases constitute greenhouse gases (GHG). The company also installed a second device called an Opacimeter to measure emitted dust quantities and attempt to reduce them to the lowest possible levels. The two devices cost the company approximately DZD 7,000,000.

1.3. Changing the method of limestone extraction: In an effort to control the greatest possible amount of pollutants (dust, noise, pollution, vibration, energy, etc.), the Tebessa Cement Company changed the traditional method of extracting limestone at the quarry, namely blasting, by purchasing two machines at a cost of DZD 227,000,000. The equipment is called a Surface Miner. Through these machines, the company eliminated the noise, dust, and vibration associated with traditional blasting.

1.4. Soil-protection activities against pollutants: Sulfur oxide (SO₂) released from cement production remains in the atmosphere for 4 to 255 days, during which it oxidizes into sulfuric acid and returns to the earth as acid rain. To protect soil, the Tebessa Cement Company purchased equipment for recovering raw materials (cement, raw meal, etc.) at a cost of DZD 38,000,000. It also renovated the packaging workshop at an investment cost of DZD 412,000,000 to protect soil from environmental pollutants resulting from its production. It also renewed the electronic control panel, which is heavily relied upon to monitor production workshops, at a cost of DZD 93,000,000.

1.5. Tree-planting campaigns: To protect soil, the Tebessa Cement Company also participated in tree-planting campaigns to protect the environment. A total of 7,800 olive trees were planted in the limestone quarry, and green areas were planted around the entire plant over an area of 65 hectares. These operations cost DZD 1,000,000.

1.6. Company activities to conserve water: Water is primarily consumed at the Tebessa Cement Company in clinker grinding; packing and conveying kiln gases to electrostatic precipitators; watering roads, olive trees, and green areas; sanitary facilities; and production-line workshops. The company implemented several measures to reduce water consumption, including eliminating leaks in the supply network; installing new pumps in the firing, cement, and raw-material workshops; installing meters with appropriate levels to monitor daily consumption; and, in addition, the new bag filter contributed to saving industrial water because it does not rely on water like the previous filter.

1.7. Saving electrical energy consumption: Raw-material mills, in addition to the clinker mill, are the main consumers of electrical energy within the cement plant. The Tebessa Cement Company plans to improve the type of mills in the future through a better system in this field. It has also adopted several measures to reduce electricity use, including reducing electricity consumption in the grinding workshop by using grinding aids, installing compensation banks in electrical substations, and controlling electrical loads during peak hours for heavy equipment.

2. Social Contributions of the Tebessa Cement Company

The main social contributions are as follows:

2.1. Care for workers' security and safety: To reduce occupational and industrial risks and protect workers' safety and health, the company implemented improvement and replacement investments, including an electronic

system to identify risk stages during production and warn workers to exercise caution. It also replaced a noise-generating machine with another machine operating automatically without producing noise, thereby protecting workers from the effects of noise. The cost of prevention and treatment of occupational diseases in 2016 was approximately DZD 702,623.50. The company continuously identifies different occupational risks in order to take preventive measures at the appropriate time. The company deals with final consumers such as contractors and public-works companies (ETP), as well as intermediaries such as companies involved in the redistribution and marketing of building materials and wholesale building-material dealers.

2.2. Serving the community through product quality: Through the environmental activities described above, the Tebessa Cement Company has sought to provide products of good quality and conforming to international standards, as demonstrated by obtaining ISO 9001 certification. These products are provided at carefully considered and reasonable prices. The company also complies with ethical aspects of competition by not violating business rules, such as prohibitions on monopolistic practices and certain pricing conditions imposed on it because it is a public-sector organization, in the presence of strong competition from Ain Touta Cement Company, Hamma Bouziane Company, El Ain El Kebira Cement Company, and the private-sector Algeria Cement Company in M'Sila Province.

2.3. Social responsibility in employment: The company provides employment opportunities for individuals. Its recruitment strategy is based on selecting qualified candidates, giving priority to educational qualifications. This does not prevent it from temporarily employing a proportion of persons with disabilities, within the limits determined by the type of disability and the nature of suitable work.

2.4. Social responsibility in training and development: The company implements a training, retraining, and apprenticeship policy for workers. Its most recent training cost amounted to approximately DZD 695,300, and the proportion of workers benefiting from it was approximately 47% in 2016. It also prepared training programs for workers outside the province at the training institute of the Algiers-based group, and training is made available to all workers through videos, statements, lists, and posters to increase awareness, particularly of the company's environmental responsibility, work accidents, and appropriate use of available natural resources.

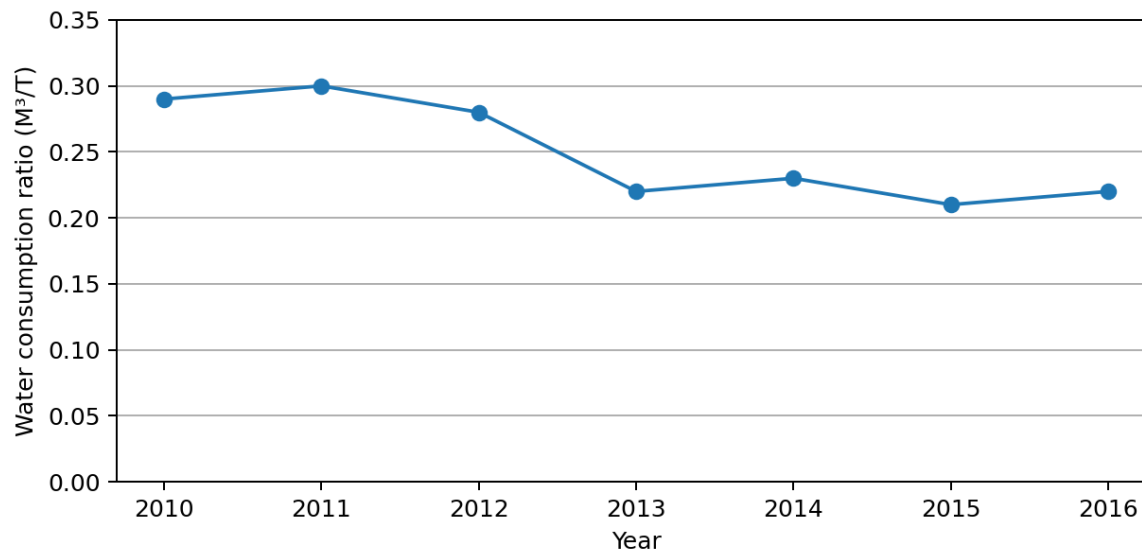
2.5. Social responsibility in changing civil society's perception: The Tebessa Cement Company seeks to obtain community acceptance by attempting to change society's perception of it because of the pollutants generated by its industry. It therefore provided employment opportunities for many residents of the area and installed the aforementioned bag filter, which improved its reputation and led to increased sales in recent years.

2.5. Social responsibility in emergency preparedness and response: The company requires workers to wear protective helmets and safety glasses, particularly maintenance, production, and mechanical workers, as well as protective gloves and footwear for electrical workers, in order to protect workers from occupational-accident risks.

2.6. Social responsibility toward suppliers: The company deals with local and foreign suppliers and relies in its dealings with suppliers on a procurement-procedure manual that includes different methods and transactions with suppliers, whether concerning payment of obligations, honesty in dealings, or training suppliers in various methods of improving work. This ensures trust and continuity in dealing with the same supplier at carefully considered prices, thereby providing a degree of stability in production operations and avoiding shortages of raw materials.

2.7. Social responsibility in preserving future generations' rights to natural resources: The company's interest in green investment and environmental protection helps it implement a sustainability strategy by improving resource productivity and reducing production costs. Table 4 shows the development of its turnover through 2015. The water-consumption indicator for producing one ton of cement reached 0.08 in 2016, a low rate compared with what prevailed before installation of the electrostatic filter, contributing to lower costs and reduced water waste. The same applies to gas and electricity consumption indicators, thereby reducing depletion of natural resources. Figure 5 illustrates water savings at the company.

Figure 5. Graph Showing Savings in Water Consumption at the Tebessa Cement Company during 2010–2015



Source: Tebessa Cement Company website: http://sct.dz/index.php?id_page=1#

2. Evaluation of the Positive Effects of Applying Environmental Standards and Social Responsibility at the Tebessa Cement Company

The most important effects can be identified as follows:

2.1. Obtaining ISO certification: Applying the ISO 14000 series in an economic enterprise may be voluntary or mandatory. The Tebessa Cement Company sought to reduce or limit waste and, within the framework of sustainable development, is committed to developing an integrated management system for quality, safety, and the environment in accordance with international standards. The Tebessa Cement Company obtained ISO 9002 certification, 1994 version, on July 10, 2001, and the follow-up audit was successfully completed on October 15, 2002. It was upgraded to ISO 9001 in January 2004. In 2006, the company obtained the TEDJ trademark, a local quality standard accredited in Algeria by the Algerian Institute for Standardization (IANOR).

ISO denotes the idea of equivalence or equality and is derived from the Greek word “isos,” meaning the idea of no difference. ISO is an international federation comprising standards and metrology bodies in different countries of the world. The organization includes various standards bodies among its members. Within these standards, the ISO 14000 series was issued for environmental management systems. The first edition of ISO 14000 in 1996 contained 23 standards, including the standard updated in 2004, which became 16 standards because the others were integrated with the ISO 9000 standard relating to products, given that most economic organizations seek to adopt both standards because of the overlap between them with regard to documentation and environmental auditing.

Documents are available on the company website: http://sct.dz/index.php?id_page=4

2.2. Improvement in company productivity: In addressing environmental and social issues under the approach of the parent organization, namely the Industrial Group specialized in the production of cement and building materials (Groupe GICA), the Tebessa Cement Company applied this approach comprehensively by establishing an integrated management system (quality, safety, and environment), continuing efforts that began in 2009. The investment operations launched by Groupe GICA in the context of sustainable development aim to increase cement production at the Tebessa company from 500,000 tons to 1,000,000 million tons, and concrete production to a capacity of 165,200 tons/year; these figures are associated with the scale of investments established by the company in recent years. The company’s attention to the environment and sustainable development produced positive results in 2015, generating financial returns that led to a noticeable increase in

turnover in line with the increase in actual company production compared with the other years shown in Table 4.

Table 4. Activity Statistics of the Tebessa Cement Company, 2010–2015

Indicator	2010	2011	2012	2013	2014	2015
Production (tons)	560,033	580,013	563,516	537,500	368,815	614,047
Shipments	558,800	584,381	561,520	528,745	365,560	642,747
Turnover (KDA)	2,483,710	3,017,642	3,135,865	3,253,958	2,404,127	4,287,336
Added Value (KDA)	1,325,872	1,765,772	1,859,252	2,031,924	1,281,101	2,637,987
EBITDA (KDA)	818,957	1,213,791	1,354,090	1,383,793	758,777	1,740,407
Net Result (KDA)	332,743	629,785	831,202	917,945	340,054	510,677
Employees (agents)	320	313	301	288	300	333

Source: Tebessa Cement Company website: http://sct.dz/index.php?id_page=1#

2.3. Benefit from environmental waste management: The Tebessa Cement Company benefited from managing its waste, as shown in Table 5, which presents the total industrial waste sold by the Tebessa Cement Company during 2015.

Table 5. Quantity of Industrial Waste Sold by the Tebessa Cement Company in 2015

Type of waste	Unit	Quantity	Unit price	Total sales price
Ferrous waste	kg	3,850	DZD 6	23,100
Batteries	kg	3,575	DZD 7	25,025
Oils	200-ml-capacity barrel	184	DZD 1,000	184,000
Rubber belts	kg	1,596	DZD 10	15,960
Total				248,085

Source: Prepared by the researchers based on documents provided by the company's Quality, Safety, and Environment Department.

The preceding Table 5 shows that the Tebessa Cement Company generated revenues through the management of its industrial waste by selling what could be sold to specialized entities. In this way, it gained the benefit of disposing of waste and its environmental risks while also generating financial returns that could be invested in increasing environmental activities at the company and could cover part of the environmental taxes and fees imposed on it.

Results and Recommendations

First: Results

1. The contribution of economic organizations to sustainable development passes through comprehensive, multidimensional responsibility affecting the economy, society, and the environment. This responsibility results from the type of activity undertaken and concerns numerous stakeholders. Each of the three dimensions has an objective that the organization should seek to achieve: the economic dimension seeks economic welfare; the social dimension seeks social justice; and the environmental dimension seeks environmental quality. To achieve these objectives, the Tebessa Cement Company seeks to assume social, environmental, and ethical responsibility together in its activities. The adoption of social responsibility by the company improved its performance and image within the local and national community.

2. The concept of social responsibility has not been defined in a manner that gives it legally binding force; environmental and social responsibility continues to derive acceptance from its voluntary nature, through economic organizations changing their management patterns while taking into account the environmental and social dimensions in accordance with their activities and financial and human capacities. Nevertheless, the Tebessa Cement Company committed itself to a specific environmental and social program involving strict compliance with laws and standards applicable to its activities for continuous improvement in environmental and social fields within the limits of its available capabilities.
3. The Tebessa Cement Company holds a significant market share in the national market through its effective contribution to meeting demand in eastern Algeria for cement and supporting and supplying the construction sector, thereby helping develop the national economy. It is a foundation of the desired economic construction because cement is necessary for establishing the structures of development projects.
4. The cement sector as a whole is now required to reduce the negative effects of this industry and meet sustainable-development requirements by adopting the technologies necessary to reduce pollution generated by the industry. This will have a positive effect on both costs and revenues, in addition to achieving rational use of available natural resources.
5. Cement-production emissions pose significant health risks, especially carbon monoxide, which is a toxic gas and also has environmental effects because it is a greenhouse gas and has harmful effects on cement facilities. The gaseous pollutants mainly responsible for making cement production an environmentally polluting industry are cement dust, sulfur dioxide, carbon dioxide, nitrogen oxides, and carbon monoxide.
6. Recovering substantial quantities of raw cement dust after installation of the bag filter at the Tebessa Cement Company enabled the company to recover significant quantities of wasted semi-finished materials, in addition to recovering the energy used to convert raw materials into raw cement dust.
7. The Tebessa Cement Company's organized, correct, and beneficial treatment of its waste benefits both the company and its surroundings and helps reduce environmental taxes and fees imposed on environmental pollutants. Therefore, adoption of environmental management by the company is a fundamental driver for achieving sustainable development.
8. The Tebessa Cement Company has kept pace with many industrial developments in its field, which helped it enhance its environmental-protection efforts, ensure organizational sustainability, reduce the negative effects of manufacturing processes, and optimize the use of natural resources. Thus, the Tebessa Cement Company succeeded in integrating the environmental dimension into all stages of its work because it regarded it as a major factor in its overall strategy.

Second: Recommendations

- Authorities concerned with the economy as a whole, not only the cement sector, should establish mandatory forms of environmental and social responsibility for economic organizations and incorporate them into their internal systems, while integrating environmental and social responsibility into the rules and principles of all organizations, as leading global institutions do to achieve sustainable development. It would be preferable to issue a social code of conduct in every organization to clarify working methods and behavior through the official websites of all institutions.
- Responsible authorities should provide incentives encouraging economic organizations to publish more of their social activities on their official websites in the areas of environment and social investment and should organize forums and conferences on their websites that are open to discussion and promotion. This would help disseminate ideas and raise awareness of the importance of environmental and social aspects in achieving sustainable development.
- All economic organizations should provide an open communication channel between themselves and society through their official websites and build a system for evaluating their social performance through these

channels, to be used periodically to evaluate their social-responsibility activities. This will strengthen their capacity for continuous improvement in their social commitments.

- The quantities of gases emitted by cement plants are large and cannot be ignored because nitrogen is abundant in fuel and combustion air. Therefore, emissions from cement facilities should be monitored using advanced equipment. Institutions should also use organic waste as fuel for generating thermal energy. Such waste differs in nitrogen content according to its origin, nature, and chemical composition.
- To ensure a significant level of success for its environmental policy, the Tebessa Cement Company should increase the number of reports prepared on its environmental situation, whether concerning industrial pollutants or waste-management methods, because increasing periodic reports submitted to the Provincial Directorate of the Environment will enable it to control and increase environmental awareness and establish the framework necessary for environmental protection in accordance with international standards.
- The presence of an environmental delegate within the Tebessa Cement Company constitutes a genuine asset. However, to maximize the benefit from this position, the environmental policy should be clarified to all workers and special training should be provided to employees whose work directly affects the environment. Everyone should contribute to finding solutions for different types of waste, drawing on their experience in handling raw materials entering the production process after becoming convinced of the genuine commitment of the company's management in this field.
- The Tebessa Cement Company should ensure that quantities of dust do not leak from storage facilities before packaging and should avoid placing cement in piles along roads inside the plant, preventing air currents from carrying the particles and dispersing them inside and outside the plant. This would improve the aesthetic appearance of the plant while also helping reduce dust dispersed from the product.
- The company should carefully focus its environmental policy on the managerial aspect because, ultimately, reducing environmentally polluting emissions from the Tebessa Cement Company and other cement plants remains a sensitive process even when modern technologies are available. It may be effective if the production process is seriously, periodically, and continuously monitored and supervised by the relevant authorities, but it may be ineffective if periodic monitoring and follow-up of equipment, installations, and emission concentrations are neglected.
- The government should increase support for organizations that integrate the environmental dimension into their strategies, to encourage them to use environmental innovations in their fields of activity and enable them to implement an environmental management system according to ISO 14001 as a strategic management model applicable to all organizations, enabling them to plan, implement, and continuously monitor improvements in environmental performance. The state should also seek to encourage institutions in the public and private sectors to compete in working according to the principles and foundations of social responsibility, achieve the welfare of members of society in a more developed and advanced manner, support participation in charitable activities and environmental events, and allocate part of profits to advancing this field and ensuring its sustainable development.

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