
Incentives and Grants for Sustainable Development



*Sustainability and Management Practices:
A Study in Atibaia, SP, Brazil*

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Definition

Incentives and Grants for Sustainable Development are related with policies, agreements and subsidies that stimulate and support the incorporation of well-designed environmental management practices and corporate social responsibility, linking business and employee performance with good environmental strategies. In this perspective, education, requalification, improvement, research and development are identified as key priorities.

Introduction

Currently, the major challenges for sustainability, according to some authors (Ayik et al. 2017; Seto and Satterthwaite 2010), are global environmental

changes, inadequate processes of industrial growth, and the intense expansion of urbanization.

According to Philippi et al. (2014), the greater the scale of population concentration and agglomeration, the greater the adaptations and transformations of natural environment, which will increasingly require resources, producing a greater amount of waste, making it difficult to recompose the environment or even bringing permanent damage to it.

This situation is exacerbated by the global scenario of environmental changes and makes the discussion and implementation of environmentally sustainable actions more relevant.

Several strategies such as incentives and grants have been created and developed to promote environmentally sustainable actions. Such incentives include both public and private sector actions being possible to mention laws, standards, and regulations; fees and taxes; seals and environmental certifications; and grant funds and tax benefits, among other socioenvironmental policies (Emas 2015; Nascimento et al. 2013). However, these measures must be followed by educational actions at all levels, from basic to higher education, in order to create sustainable forms of society-nature interactions (Brasil 2007).

In this perspective, UNIFAAT, a Higher Education Institution located in Atibaia, São Paulo, Brazil, adopted as institutional policy the inclusion of diverse topics related with sustainability in the curriculum of its undergraduate and postgraduate courses through specific disciplines or as a

topic inserted in discipline contents. In addition, a Sustainability and Culture Research Center was created to develop research and extension projects focused on environmental issues of regional relevance.

With focus on the problem of investing in regional development and protecting the local resources supply, the profile of companies located in the region of Atibaia municipality is analyzed in this paper, with focus on ISO 14001: 2015 environmental certification. This research was realized by students of the undergraduate courses in Production Engineering and Environmental Management, and in addition to analyzing the adoption of sustainable business strategies, it is part of UNIFAAT sustainability educational policies.

Due to its privileged location, Atibaia attracts companies from a wide range of sectors, motivated by the abundance of natural resources and local strategic logistics, as important industrial areas and routes of product flow intersect and cut across this region.

These routes are the Dom Pedro I and Fernão Dias highways, both very important for the Brazilian logistics system, since they make connections between ports and airports, as well as passing through the major industrial centers of Southeast Brazil, a region that concentrates the country's greatest wealth.

For the development of the region, the companies located in the surroundings of the highways bring progress and increase of income to the municipality; on the other hand, they increase significantly the traffic in the highways and aggravate the problems of local infrastructure and to the environment.

Based on this context, the present study analyzed 75 companies within 2 km of the Fernão Dias and D. Pedro I highways, in order to outline the profile of the companies, the type of productive activities, and their environmental actions and responsibility. Another aspect analyzed was the role of environmental management policies and their relevance as a factor and incentive for sustainable development.

It has been noticed that some of the analyzed companies present as a differential aspect the ISO

14001 certification, an internationally accepted standard that defines the requirements to certify an environmental management system in operation (ABNT 2015). At the same time several companies operating in the region are not yet certified by this norm, making it difficult to control their activities that many times exploit the region's resources and discard their waste from production processes, in often inefficient and even irregular ways.

According to researches carried out, the way to manage the use of these resources is a factor that can accentuate or minimize impacts, leading to the success or failure of certain environmental policies (Philippi et al. 2014).

For this reason, there is a growing concern about the environmental performance of companies and their repercussions on the unrestrained use of resources and non-environmentally appropriate policies. Some of them are incorrect treatment of solid waste, deposition of waste in inappropriate places, and disposal of contaminated water by processes without treatment, among others. In this perspective properly implemented environmental management systems and Certification ISO 14001 can be considered incentives for sustainable development.

Environmental Management: Current Aspects

According to Barbieri (2011), environment is all that surrounds or wraps living things. The environment is not only the space where living beings exist but the very condition for the existence of life on Earth. For the ISO 14001:2015 (ABNT 2015), environment is defined as surroundings in which an organization operates, including air, water, soil, natural resources, flora, fauna, humans, and their interrelationships.

According to Jabbour et al. (2013), environmental management refers to the complete incorporation of environmental objectives and strategies into the broader objectives and strategies that exist in an organization. Therefore, environmental management is nothing more than the continuous efforts to preserve and maintain

environmental resources, as much as possible intact, aiming at maintaining the ecosystem in total harmony so that there is no shortage of resources for current and future generations.

Unfortunately the interests of urban development combined with an unbridled economy, for many years, have been emphasized over the preservation of the environment, and for Tachizawa (2015), one of the biggest challenges facing the world in this new millennium is to make the market forces to protect and improve the environment quality. This way, we arrive at the concept of corporation's sustainability, and according to Bolzan and Herrera (2012), sustainable company is one that seeks to incorporate consistently the concepts and objectives related to sustainable development into its policies and practices in a consistent way. Another contribution to the definition of sustainability is the introduction of a temporal and spatial perspective in productive practices that include the concept of intragenerational equity and a trade-off between short-term gains and long-term concerns (Gatti and Seele 2014).

Thus, before organizations seek any integration or environmental management system, they need to be well aware of what the concepts of sustainability and corporate responsibility really are (Camilleri 2017) and seek to adapt and divulge these ideas in the organizational culture. After that they need to incorporate subsidies to migrate to management systems and contribute to the implementation of the sustainable development goals set by the United Nations Agenda 2030 (Weitz et al. 2018).

As mentioned before many companies in the area analyzed on this paper do not have a quality and certified environmental management system (EMS). Ceruti and Silva (2009) mention that EMS implementation facilitates the identification of environmental liabilities, which are the necessary investments to a company to repair negative environmental impacts generated during years of operations, but also provides subsidies to its correct management. The lack of this management causes companies to incorrectly handle their waste, some because of lack of knowledge, precisely because of the absence of EMS, and others many times

because the practice of these actions are expensive to the company.

According to the State of Rio Grande do Sul Environmental Protection Foundation, Brazil (FEPAM), micro and small enterprises have difficulty in adequately allocating their waste. This happens, among other reasons, due to the cost of adequate management of this process, as it involves handling, treatment, final disposal, transport, and training, all of them adequate to the effective attainment of its purpose (ROCHA 2006).

This way, these companies remain illegitimate instead of adopting EMS. As a consequence, Mello et al. (2016) point out they do not get the benefits of a higher productive quality; better relationships with employees, suppliers, and communities; and greater control of applicable legislation and reduction of operational costs which could be monitored by simple and measurable indicators for the evaluation of their environmental performance.

In this scenario of change for sustainable actions, the Norm ISO 14001 is a tool that was developed to parameterize practices in environmental management and guide companies toward an effective EMS. According to this Norm:

The purpose of this Standard is to provide organizations with a framework for protecting the environment and enabling a response to changes in environmental conditions in balance with socioeconomic needs. This Standard specifies the requirements that enable an organization to achieve the intended and defined results for its environmental management system. (ABNT 2015)

Verde Ghaia, a Brazilian consulting firm (2017) that has been active in the South American and African markets for almost two decades, explains that companies are looking for profits and therefore any environmental program that the company has to adopt must be carried out with a sustainable policy in order to avoid damaging the company economic growth. In this way an EMS linked to environmental certification favors the entire logistics chain and stakeholders, thus being an incentive for sustainable development. Other advantages for certified companies are to open their market and export their products

for countries and economic areas that require this certification and create a strategic marketing for the company.

Due to the growing population and business expansion, as already mentioned, the amount of solid waste generated increases significantly, and such waste, when discarded irregularly, causes serious problems such as soil and groundwater contamination and air pollution, and accumulation of these wastes in riverbeds causes diverse changes and collaborates to the silting of the water courses, promoting floods. The disposal in open areas also generates other types of problems such as the proliferation of diseases caused by insects such as *Aedes aegypti*, the dengue and yellow fever disease vector, among others.

As a way of dealing with these wastes, the National Solid Waste Policy (PNRS) was created in Brazil. According to the Ministry of the Environment, Law No. 12,305/10 (Brasil 2010), which establishes the PNRS, this law contains important tools to enable the country to advance in addressing the main environmental, social, and economic issues arising from the inadequate management of waste solids, contributing in this way as an incentive for sustainable development.

Philippi et al. (2014) define the National Solid Waste Policy in three words, sustainability, innovation, and optimism, and go beyond justifying it as a legislation that proposes new challenges, mentioning the shared responsibility for the product life cycle and reverse logistics, confident in what concerns waste disposal targets in environmentally appropriate landfills, aiming and stimulating sustainability.

PNRS was a milestone in the sector for dealing with all solid waste that can be recycled or reused, be they domestic, industrial, and electronics, among others, and also for dealing with waste that cannot be reused, encouraging the correct disposal in a shared way when integrating public power, private initiative, and citizens.

This way, it is important to highlight the role of green companies for sustainable development. According to Tachizawa (2015), a green company is synonymous of good business, and in the future it will be the only way to undertake business in a lasting and profitable way, the author adds

emphasizing that the sooner organizations begin to see the environment as their main challenge and as a competitive opportunity, the greater the chance of survival.

According to Barbieri (2011), companies are expected to stop being problems and to be part of the solutions. In this perspective, the actions of companies that have implemented efficient environmental management systems and even those certified by ISO 14001:2015 can serve as incentives for sustainable development.

Another relevant aspect is the “2030 Agenda for Sustainable Development” approved by the United Nations Organization whose goals involve the three dimensions of sustainable development: economic growth, social inclusion, and environmental protection. Furthermore, goal 9 stresses the need to build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation (Saito et al. 2017).

Characterization of the Study Area

Methodological Procedures

The methodological procedures used consisted of surveys, interviews, and field research. The objective was to collect secondary data about the social and environmental reality of Atibaia municipality, including the profile of the industries.

This was carried out through governmental agencies (municipal and state environmental departments – IBAMA), public and private universities, and non-governmental organizations (civil society associations) working in the region.

The procedures also involved recognition, through field trips and interviews, of main soil uses, finding main areas of urban and industrial expansion included in the study area and analyses of possible reflections for the municipality of Atibaia and others around it.

Characterization of the Study Area: The Municipality of Atibaia

This article uses as study area the municipality of Atibaia located in the Bragantina Region, State of São Paulo, Brazil, inserted in the Atibaia River Basin and also included in the UNESCO Green

Belt Biosphere Reserve of São Paulo Municipality and which integrates the Cantareira System Environmental Protected Area (EPA Cantareira) (São Paulo 2000).

The creation of this conservation area had as objectives the maintenance and improvement of water quality, mainly in the municipalities around the Cantareira Water System Reservoirs, which supply the São Paulo Metropolitan Region and regulate the flow of water to the Metropolitan Region of Campinas (São Paulo 2000).

The Cantareira System is the largest water supply system to São Paulo Metropolitan Region (RMSP), accounting for approximately 50% of the total water supply. The Cantareira System is a set of large-scale hydraulic dams, specifically designed to supply the metropolis of São Paulo and meet the demands of the water courses located downstream of the reservoirs (Whately and Cunha 2007). Despite the proximity of Atibaia with São Paulo Metropolitan Region, there are still in this area significant remnants of Atlantic Forest (Hoeffel et al. 2005).

The duplication of the D. Pedro I and Fernão Dias highways significantly facilitated access to this region and to Atibaia municipality (Fig. 1), determining a process of industrial and urban expansion, as well as an increase in tourism, factors that have contributed to the regional socio-environmental impacts and problems (Hoeffel et al. 2005).

The main economic activities carried out in the municipality of Atibaia are based on the tertiary sector, commerce and services (76.22%); the secondary sector, industries (22.69%); and the primary, agricultural sector (1.10%) (Fundação SEADE 2014). In the tertiary sector, tourism and real estate/civil construction sectors are prominent; in the secondary sector, the metallurgical, clothing, and civil construction industries; and in the primary sector, some traditional activities of the municipality such as fruit growing, forestry, and the poultry farming.

In recent years, a growing constraint and greater control over productive activities considered to have an impact on natural resources are occurring throughout the State of São Paulo, Brazil. This has gained greater proportions in areas

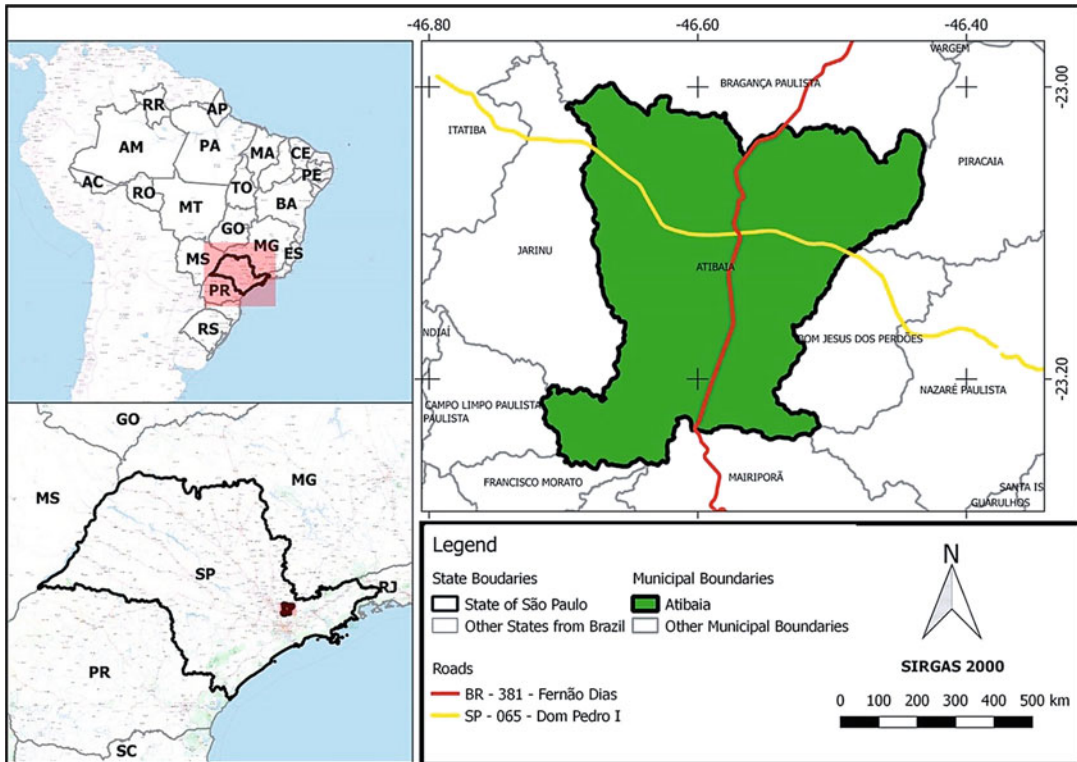
considered strategic, and among these we can cite the Atibaia River Basin. Another aspect to be highlighted was the adaptation of some industrial sectors to the environmental legislation and even the search for a differentiated standard of production and image as the one conferred by the ISO 14001 certification.

The D. Pedro I Economic Development Axis, created by the municipality of Atibaia following a regional trend, stimulates the possibility of occupying areas along the D. Pedro I Highway by industrial districts and large deposits of industrialized products, favoring the logistics sector and thus the storage, transport, and distribution of goods (Hoefel et al. 2017). A similar situation is observed along the portion of the Fernão Dias Highway connecting the municipality of São Paulo with regions located in the northern portion of Brazil and crossing the municipality of Atibaia, where there is already a growing industrial expansion allowing diverse environmental changes and impacts. With the duplication of Fernão Dias Highway, the occupation process throughout the area has intensified drastically.

The water resources available in the region, associated to the easiness of access, are the main factors that attract investments of industries in the region, besides the municipal incentives, which can be related to its population and urban expansion.

In the period from 2000 to 2014, the municipality of Atibaia presented a positive index in relation to the number of industrial establishments and at the same time there was a significant growth of jobs. These data reflect the expansion of the industrial sector that occurs in the study area, especially due to the characteristics of the road axis, Dom Pedro I and Fernão Dias, as mentioned previously, and its proximity to the São Paulo and Campinas Metropolitan Regions.

In this way, the proximity of the preserved areas found in the Cantareira System EPA and in Atibaia, and the road axes have consolidated the region as a peripheral area of the São Paulo Metropolitan Region, with direct impacts on the quantity and quality of water resources and natural resources. This situation has required environmental postures and incentives for this growth to



Incentives and Grants for Sustainable Development, Fig. 1 Map with location of Atibaia municipality and D. Pedro I and Fernão Dias highways (Source: The authors 2018)

occur in a sustainable trend, and some companies, when implementing quality environmental management systems certified by ISO 14001:2015, can be considered as innovative models that can assist in this process, as well as in developing proposals for the sustainable use of regional natural resources.

Characterization of Corporate Environmental Actions in Atibaia: Results and Analysis

The study area of this work, as already mentioned, is located in the municipality of Atibaia and more precisely in the immediate surroundings of the Fernão Dias and Dom Pedro I highways, an important intersection between the Metropolitan Region of São Paulo, Metropolitan Region of Campinas, Paraíba River Valley, and the South portion of Minas Gerais state (Fig. 1). The

highways were chosen for the installation of the companies due to their easy access between the main capitals, airports, and seaports for an easy distribution of their products.

The information contained in Table 1 refers to the companies located in the axis of the mentioned highways (Dom Pedro I and Fernão Dias) and in total 75 companies were analyzed. Of these 12 companies are ISO 14001 certified, most of the companies certified, in a total of 9 companies, are in the automotive industry, mainly due to requirements of customers that require this certification as pre-requirement for the purchase of their products. The other sectors with ISO 14001 certified companies were the electronic sector (two companies) and metallurgical (one company).

Certification, however, has been considered a regional differential and an incentive for sustainability, and companies from other sectors already consider making adjustments in their

Incentives and Grants for Sustainable Development, Table 1 Industries analyzed in Atibaia municipality, São Paulo, Brazil. (Source: The authors, 2018)

Production area	Number of companies	Certified ISO 14001?		Environmental licenses			Main waste	Main environmental management actions
		Yes	No	Yes	No	No data		
Food	6		6	6			Solid waste; liquid effluent	Waste and effluent management
Automotive	14	9	5	13	1		Solid, electronic, and chemical waste; liquid effluent; environmental interest residue	Waste and effluent management; environmental interest residue management
Construction	14		14	14			Solid waste; liquid effluent; environmental interest residue	Waste and effluent management; environmental interest residue management
Electricity	1		1	1			Liquid effluent; electronic and solid waste; environmental interest residue	Waste and effluent management; environmental interest residue management
Electronics	3	2	1	2	1		Solid and electronic waste; environmental interest residue	Waste management; environmental interest residue management Goal: Landfill for non-recyclable
Metallurgical	25	1	24	12	7	6	Solid waste; environmental interest residue	Waste management; environmental interest residue management
Chemical	3		3	3			Solid and chemical waste; liquid effluent	Waste and effluent management
Textile	1		1	1			Solid waste	No data available
Service	8		8			8	Solid waste	Waste management
Total	75	12	63	52	9	14		

environmental management systems to obtain the certification and add this differential to their business goals and image.

The ISO 14001 norm is considered a tool created to help companies to identify, prioritize, and manage their environmental risks. In order to obtain ISO 14001 certification, the companies implement and consolidate an environmental management system (EMS) that involves activities carried out in conjunction with the company's operational and administrative process, focusing on reducing environmental impacts caused by the production process, giving correct disposal for each type of waste generated, and controlling the environmental impact of each service provider. This process also requires compliance with certain

criteria, such as complying with legal environmental requirements at the federal, state, and even municipal levels and maintaining an ongoing process of EMS assessment.

Thus, the incorporation of ISO 14001 has been providing guidelines for the implementation of environmental management systems, in compliance with environmental legislation and regulations, and has stimulated analyses and discussions on corporate responsibility in relation to sustainability proposals (Moura and Silva 2013; Machado et al. 2013).

The environmental management system is established and maintained as a way to ensure that environmental impacts of activities performed by companies are in accordance with

their policies, environmental objectives, and goals and to increase environmental performance. In order for this to be achieved through risk and opportunity management, the company verifies what external and internal issues are relevant and affect the ability to achieve the intended results of the EMS. It also defines what standards, procedures, and complementary documents must be elaborated in compliance with the requirements of ISO 14001 and that all the routines established in these regulations are effectively implemented. Thus, the environmental management program aims to determine actions aimed at reducing or eliminating an environmental impact identified as significant and how the results will be evaluated. The certification adds a positive aspect and an incentive for sustainability, as it makes companies more concerned about environmental preservation.

The research showed that 12 companies out of the 75 analyzed are certified, but the majority are not, being, therefore, considered of some socio-environmental impact. Although some have environmental management systems, their efficiency is relative, and in some cases, the risks that the manufacturing process generates for the environment as a whole are not effectively considered.

Among the certified companies are certifications related to the production process and product quality of the companies. This certification examines some environmental aspects of production, but this does not guarantee sustainable global management of its products, including reverse environmental logistics, and often the post-use wastes are disposed of inappropriately. This situation has been addressed with the current revision of the ISO 14001 standard itself and with specific environmental policies such as the National Solid Waste Policy, which aims to reduce the inappropriate disposal of post-use products. Companies without policies adapted to sustainability can directly harm the environment by discarding their waste in watercourses promoting different impacts, but the same can happen with discards after use.

Although 12 companies are certified, on the other hand, of the 75 companies analyzed, 52 were adequate to the environmental licenses

required by the environmental agencies in the State of São Paulo, 9 were in irregular conditions, and for 14 it was not possible to obtain data. This data indicates a non-compliance with legal requirements, a situation which is absolutely significant if one considers the location of these companies. This once again highlights the importance of certified companies.

Irregular companies may compromise the quality of environmental resources in the study area, and it is important to highlight the significant role of public sector environmental management in developing activities to plan productive activities in the region and to control them.

Regarding the profile of the waste generated, it is observed solid and chemical residues, liquid and chemical effluents, electronic waste and those classified as of environmental interest, which require proper disposal, and gaseous emissions.

Due to the expansion of industrial activities in the roadways under study, in order for companies to increase their responsibility and action on environmental issues, public policies are also needed to make the already existing measures in the region more efficient. However, one could also think of incentives, such as stimulate ISO 14001 certification, so that environmental action can also be a competitive advantage and an innovative strategic approach.

Martins et al. (2016), when analyzing the incorporation of environmental management in small- and medium-sized enterprises, highlight this aspect when considering the great potential that exists for the implementation of a cleaner production approach, since losses in the process, which generate losses of raw material and pollution, also reduce the profitability obtained through the produced product.

Another aspect to consider is the need for greater population environmental awareness in the region and in the companies themselves. It is observed that a process is necessary that begins in the presentation of sustainable practices, projects that can be inserted from the school even in the industrial sector and that could involve broader environmental transformations like global warming, pollution, scarcity of natural resources,

etc. These actions can be highlighted and executed with small attitudes that make the difference, since responsibility for the environment is the task of all people, but for this awareness, broad actions of environmental education are necessary.

Final Considerations

The strategic location of the municipality of Atibaia has led, in recent years, to a large increase of companies, traffic of vehicles, and trade development. This makes environmental awareness even more relevant. Therefore, companies must carefully observe the practices of their suppliers, destination of waste and certificates of environmental responsibility, among other documents required.

For a company to be sustainable, it must be responsible for controlling environmental impacts caused directly by suppliers and third parties, knowing that attitudes toward environmental improvement must always be taken not only in the industrial sector but become a responsibility of all.

Although some companies present environmental certification and this characteristic can be considered as an incentive for sustainable development and others are in accordance with the legislation regarding environmental licensing, actions and programs of management in the road axes analyzed are still needed.

It is worth mentioning, nevertheless, that among the companies that do not have environmental certifications, some already have well-established environmental management actions and well-defined environmental policies such as effluent treatment, corporate environmental management programs, and adequate waste separation.

This shows that in recent years, there has been improvement in the environmental management actions in the region, due to disclosures and work done in universities, companies, schools, advertisements, and even in health centers. Thus, the importance of environmental education is significantly associated with environmental management and certification programs, since it can

guarantee the well-being of people and the sustainable use of natural resources.

Once more, the relevance of UNIFAAT's educational policies is highlighted by inserting analyses on environmental issues, sustainability, and strategies for its implementation in the curriculum of its undergraduate and postgraduate courses and in its areas of research and extension.

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