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## Review Paper

# Environmental Impact: Contextualization and Current Reality

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### ABSTRACT

The environmental impacts of human acts have been a global concern of the contemporary era. The conflict between economic development and environmental protection is a very important topic to be ~~discussed~~ considered before ~~making~~ beginning any human activity that may cause negative effects to the environment. This work ~~was designed~~ aimed to review the types of environmental impacts, their classes, and the Brazilian laws related to ~~this content~~ them. ~~Furthermore~~ Additionally, this work shows the consequences of human actions on the environment around the world ~~in nature~~ that without the proper assessment can lead to disasters and ~~consequences~~ outcomes that may never be reversed. Although environmental impacts and sustainability are not new subjects, environmental disasters still occur with a certain regularity worldwide, pointing to the ~~people's~~ human negligence ~~of as a possible outcomes~~ source from of their conducts environmental disasters. It is ~~of major importance~~ important that for companies, farmers, and ~~people in~~ the general public to realize how the environmental impacts of their daily lives ~~and acts, as well as~~ and the ~~needed~~ required measurements to minimize the negative effects.

*Keywords: Environment, Impact, Pollution, Assessment, Disaster*

### 1. INTRODUCTION

~~In general,~~ Since the 1960s, there ~~have~~ has been a high global concern with the environment and the equilibrium between environmental protection and economic development [add reference]. Such ~~relation is variable when considering developed countries against countries in development.~~ Developed countries, with stable economies, tend to prioritize environmental protection, while developing countries, ~~in development,~~ attempting to compete in the global market, ~~with difficulties to compete in the global market,~~ tend to prioritize the economic development [add reference].

~~However,~~ Despite all this concern of environmental protection, there ~~is~~ seems to be a loss of focus which is supported by the frequency of environmental accidents around the world, which affect soil, water sources, and ultimately society [add reference]. ~~some disinterest in certain environmental factors being an example the environmental accidents which frequently happen around the world, compromising soils, springs and, consequently, direct or indirectly, society as a whole.~~

In order to prevent ~~the this from continuing~~ occurrence of environmental accidents and their subsequent hazards, it is necessary ~~the to develop~~ educational ~~ment of~~ materials that can be used as a tool to raise environmental awareness ~~over of~~ individuals and society in general ~~ies~~ about the concepts of environmental safety and the reality of environmental mishap in

the 'real' world related to this subject, as well as the actual reality in the world which we are inserted.

## 2. REVIEW

### 2.1 Environment

Brazil [1] defines the environment as the set of conditions, laws, influences, and physical, chemical, and biological interactions, which allow, harbor, and rule the life in all its forms.

However, such this definition is generally incomplete, opening leaving gaps for that can result in different interpretations by courtroom the juries, notwithstanding besides the diversity of terminologies related to the environment, derived from many other fields and subjects different contexts. In one side of knowledge From one perspective, the environment is considered a source from which society takes extracts the necessary (natural) resources for its development and survival, being these resources usually called naturals. Over Another perspective, it is considers the environment as a the source of life where ecological functions occur naturally, giving rise to the concept of environmental resources, that is e.g., there is a supply of resources or the possibility of providing functions that support the life within nature/the environment [2].

This affirmation perspective is supported by [3], which does not define environment as a medium only to be defended or preserved integrally, but as a system with competence the capability to provide resources, and renew social forms and matters of development, being this also supported in a more actual context by [4].

Theys [5] conceptualizes the environment in two ways, the objective and the subjective. The objective conceptualization treats the environment as a union of many natural objects of different scales and organizing principles among them, being that able to bthat are considered biocentric, since the species involved are not hierarchically organized in this classification do not have superiority over others. On the contrary, the subjective conception treats the environment as the relationship between humans and the medium, that is, between subjects (societies, individuals) and objects (fauna, flora). Fiorillo [6] separates the environment into different classes such as artificial environments, digital environments, cultural environments, work environments and natural environments.

### 2.2 Pollution

Environmental topics took years to be considered part of the public debate in Brazil after this theme as included in the international agenda, leading to the creation of laws that addressed the issue of environmental protection, particularly with problem situations related to pollution [add reference]. In an uncomplicated way, pollution is understood as any form or condition that is harmful to living beings [add reference]. Such These conditions are usually are the result of from human activities which, in a certain way, "dirty" the environment [2].

While in Brazil, laws against pollution were addressed passed in 1975 in Rio de Janeiro, and 1976 in São Paulo, other countries of the world, such as including the United States (-USA) and United Kingdom (UK), started were concerned about worrying with pollution years

before [add reference]. In 1948, the USA already had a law to control water pollution, and in 1955 a law referring to air pollution, similarly in 1956, the United Kingdom that, in 1956, UK passed decreed a law of for clean air [2].

It can be understood as pollutants are elements, entities, or factors that are possible to can be measured and compared to with standards established by legislation (laws) and regulations (guidelines for implementing laws) imentations, such as for chemical compounds in the waters, gases emitted into the air, vibrations, noises, and radiations, etc. [add reference] noises and harmful gases thrown in the air. However, such a definition is absent in the Brazilian National Environmental Policy Law, that defines equals pollution as causing an 'to environmental impact'. Not all being that not all pollutions have has an impact, as its cause but most, all pollution causes an environmental impact. Thus, Due to the confusing nature of this term of interpretation caused, this term it began to be replaced by a broader term, environmental impact [1, 2].

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### 2.3 Environmental impact

Environmental impact is commonly associated to with damages to nature [add reference]. The literature also bring contains different ways of some ways of classifying environmental impact such as ication such as all kinds of alterations caused to the environment in a simplified form or as a whole, alterations caused by human interference, or the effect of an action induced by the man over the ecosystem [7, 8].

According to Munn [9] it is necessary to introduce the dynamic processes that occur in the environment, so it can be established that the environmental changes that may can be determined assessed as impacts. Still, according with this author, when determining the impact of an undertaking activity, it is necessary to compare two hypothetical situations, one considering how the situation without the undertaking activity would affect the environment, and the other considering the undertaking activity installed occurring in the environment. The difference between these two situations will show the environmental impact caused by the undertaking activity and not the difference between the actual two situations with the future one with the undertaking, which generally shows an environmental impact smaller than the one considering the future situation.

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The NBR ISSO 14-001 [10], of 1997 defines environmental impact as any changes in the ambient environment, adverse or beneficial, that results affects, as a whole or in part, of the activities, products or services of an organization. Being t This concept is largely used by companies and organizations for their environmental management.

Environmental impact can also be defined as any kind of alterations that the environment undergoes by, being it whether chemically, physically or biologically, resulting from human activities that release any kind of matter or energy that may, directly or indirectly, affect the populations health, economical and/or social activities, the values of the environmental resources and the biota [11].

According to Sanchez [2] this definition is still not correctly followed when carrying implementing the an environmental impact assessment or when using the following its restrictive sense as in the court interpretations realized by the courts, being another definition of pollution.

#### 2.3.1 Classification of environmental impact

In the context of environmental impact, it is possible to carry out a stratification and classify the other existing environmental impacts ~~as being them~~ positive, negative, direct, indirect, local, regional, strategic, immediate, medium or long term, temporary, permanent, cyclic, and reversible. It is worth pointing out that an ~~undertaking activity~~ may cause more than one environmental impact during its execution [2].

#### **2.3.1.1 Positive environmental impact**

A ~~p~~Positive environmental impact is ~~considered to be the one~~ that improves any environmental factor or parameter, ~~being these incitas~~ defined by the government [2]. As ~~an~~For example, it is possible to mention the relocation of a ~~street~~ population to a block of ~~popular improved~~ houses, waste management, recovery of riparian forest, implementation of new ~~undertaking activities~~ [12].

#### **2.3.1.2. Negative environmental impact**

When a certain action is taken, and this results ~~in some kind of damaged damage~~ that harms the quality of a parameter or an environmental agent, there is ~~the a~~ negative environmental impact [2]. ~~These must be discouraged by the government and, if necessary, through penalties arising from the authorities.~~ As example of negative environmental impact there is the clandestine destination of pollutants by companies or citizens, directly into the air or water without proper treatment.

#### **2.3.1.3 Direct and indirect environmental impact**

~~The A~~ direct environmental impact is ~~that one with a simple reaction~~ where there is a cause and an effect, while ~~the an~~ indirect impact is when a secondary reaction or a chain reaction ~~is caused by the first action~~ [2]. The extinction of a forest decreases or extinguish the local biological diversity, causing a direct impact. The gas release by a company may cause acid rain, being it an indirect effect [13].

#### **2.3.1.4 Local, regional and strategic environmental impact**

When the impact does not affect other regions, but only the place within the ~~undertaking activity~~, it is considered to be as a local impact, as an example can be mentioned a mining ~~undertaking activity~~. When the impact ~~extrapolates the action expands beyond its local surroundings, as in the implementation building of a highway~~, there is a regional impact. A ~~s~~Strategic impact is that of collective or national interest, such as the implementation of irrigation projects in the Brazilian northeast by means of the transposition of a river [13].

#### **2.3.1.5 Immediate, medium or long-term and cyclic environmental impact**

~~One An~~ action which ~~causes an effect to happens~~ immediately is called ~~an~~ immediate environmental impact, ~~as an~~For example, ~~an immediate environmental impact is experienced by there is the mortality of fishes who die in a river caused by the due to the release liberation in it of toxic compounds into it.~~ The bioaccumulation of contaminants (like methyl mercury) in the food chain is an example of medium or long-term ~~environmental~~ impact, ~~because it taking takes time for these effects to appear, and, when determined effects occur at regulars in time intervals, there is the called a cyclic environmental impact~~ [13].

#### **2.3.1.6 Temporary and permanent environmental impact**

An example of a temporary environmental impact is ~~can be exemplified by the overflow leakage of petroleum (oil) into onto a stone coastline which is gradually absorbed, by the environment in a certain amount of time.~~ Radiation is an example of a permanent environmental impact, and its effects can many times take many years to be minimized realized [13].

### 2.3.1.7 Reversible and irreversible environmental impact

The burning of tires causes ~~an air pollution that, with the time, comes dissipates and the air returns back to its original conditions, and thus this is an example of being a reversible impact.~~ An ~~erosion process caused due that results from to~~ excessive rainfall is an irreversible environmental impact, since the soil needs thousands of years to rebuild its mass and fertility [13].

## 2.4 Adopted measurements

When ~~known~~ the environmental impact of a particular ~~undertaking activity is known, the Brazilian environmental legislation and associated regulations determines which compensatory or mitigationary measurements are to be made enacted, except in positive/benefic cases.~~ Compensatory measurements are applied when the ones where there is a negative impact, and there is the requirement for without the possibility of it to be minimized, being necessary some measure action to occur to compensate for the damage caused. Mitigationary measures allows the minimization of a negative impact, such as the use of ecologically correct-safe products in constructions [2].

## 2.5 Environmental Impact AssayAssessment (EIA)

The emergence of the Environmental Impact ~~AssayAssessment~~ (EIA) as a mechanism for environmental management ~~for in~~ the last 40 years coincides with the recognition of the nature, scale, and implications that environmental changes have brought for human actions [14].

The (USA) National Environmental Policy Act (NEPA) was the first one that represented a formal incorporation of the study analysis process about on environmental impacts in the legislative form [15]. The law established a national policy which would guide the federal agencies agency activities which may or may not affect the population, communities, and protect the natural environment in a significant way, besides being an answer to the popular interest as well as for scientists for the increase in the contemporaneous environmental changes [16].

Internationally, the institutionalization of EIA ~~had a minimum progress in the last~~ has progressed slowly over the past few decades, but has receiving received particular increased emphasis through the growing political recognition of the problems associated with climate change, biodiversity loss, threats to hydric-hydrological resources and water quality, and damages to marine areas in addition to other forms of global environmental changes [14].

Various interpretations exist about the EIA, as an activity that identify identifies, predicts, clarify clarifies and transmits information about any activity that will may harm the public welfare, as an instrument of environmental policy. The EIA is composed of a grouping of

procedures that ~~is~~ are capable ~~to~~ of ~~assure~~ ensuring that a systematic exam of the possible environmental impacts of an ~~undertaking~~ activity proposed and its alternatives ~~is~~ undertaken, ~~which~~ The EIA results ~~are~~ should be demonstrated ~~displayed~~ in a proper way ~~for~~ to the lay population and for those responsible for making the decisions ~~on~~ activities with environmental impact ~~er~~ yet, an ~~ordinated~~ process that ~~evaluate~~ in advance the repercussions of the human acts [9, 7, 17].

The Environmental Impact ~~Assay~~ Assessment must be ~~elaborated~~ implemented for any ~~undertaking~~ activity that may or will cause future damages to the environment, and must be ~~accomplished~~ before the activity can start ~~this way its realization must be previous to the~~ undertaking installation. Based on this approach, the EIA is ~~carried mainly in~~ performed for mining ~~activitie~~ undertakings, pipelines, hydroelectric ~~projects~~, highways, industries, slurry treatment stations, and sanitary landfills [11].

This instrument (EIA) ~~has been is~~ very used in ~~Brasil~~ Brazil since 1986, based on its ~~requirement and~~ along with the Environmental Impact Report, ~~all which is covered by in~~ Brazil's ~~the~~ national environmental legislation [11, 18].

### 2.5.1 Environmental impacts classifications

~~In~~ Since the EIA was developed in the 1970s, a number of different analyses and associated forms have been developed to make this process ~~more comprehensive, nees area, a~~ specific number of forms has developed since the 1970s, including the Social Impact ~~Assay~~ Assessment (SIA), Health Impact ~~Assay~~ Assessment (HIA), and the Strategic Environmental ~~Assessment~~ (SEA). To ~~a certain extent~~ each of the other processes were developed because of one tends to have arisen through some level of dissatisfaction with the EIA ~~in and in~~ how it has been ~~practiced~~ implemented [14].

### 2.6 Brazilian Legislation

Brazil has one of the most complete and advanced ~~sets of~~ environmental legislations ~~of in~~ the world ~~[add reference]~~. The idea of protecting ~~its~~ areas and natural ecosystems of ~~the in~~ the Brazilian environment ~~dates from back to~~ 1934, when the Brazilian Forestry Code was created, and, since then, many codes, resolutions, laws, and decrees appeared with the intention of ~~assure~~ assuring the protection of the national ecosystems ~~protection~~. However, the legislation is not adequately applied due to the ~~inexistence~~ lack of resources and ~~lack of~~ technical capacity ~~for to~~ enforce ~~itment~~ [19].

The environmental crimes law, or Nature Law (law nº 9.605, ~~of~~ February 12<sup>th</sup> ~~of~~ 1998), deals with violations and punishments, in addition to defining and classifying environmental crimes into six types: ~~a) Crimes~~ crimes against the Fauna: ~~aggressions~~ committed against wild animals, ~~being whether them native or in migratory route~~; ~~b) Crimes~~ crimes against the Flora: ~~destroying or damage~~ damaging permanent preservation forests, even if they are ~~in newly formation formed~~ process, or if being used ~~improperly~~ to use it against the protection rules; ~~c) Pollution~~ pollution: ~~the pollution that which causes, or may cause, damages~~ damage to human health, ~~the death of animals and expressive liquidation of the flora~~ plants; ~~d) Crimes~~ crimes against urban planning and cultural heritage: construction in preservation areas or its surroundings, without authorization, or in discordance with ~~the conceded~~ authorization; ~~e) Crimes~~ crimes against the environmental administration: false or misleading statements, ~~omission of~~ omission of information and technical-scientific data in environmental licensing or authorization processes; ~~and further administrative infractions~~; ~~f) actions or omissions~~ that violates legal rules of use, enjoyment, promotion, protection, and recovery of the environment. The individual or legal entity that infringes the law, if proven

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guilty, ~~author~~ whether initiator or conspirator ~~or co-author~~, can be penalized with fines ranging from ~~R \$ 50.00 Brazilian reais~~ to R \$ 50 million Brazilian reais. ~~Such~~ This punishment also can be reversed if the ~~causer~~ initiator is responsible and proves the ~~works~~ to recovery of the environmental damage [20].

### **3. COMPANIES AND THEIR MEASUREMENTS FOR THE ~~REDUCTION OF NEGATIVE ENVIRONMENTAL~~ IMPACT REDUCTION**

#### **3.1 Svenska Kullager Fabriken**

Svenska Kullager Fabriken, or SKF is a company of global importance in the supply of products and services for fences, bearings, lubrication systems, ~~hand tools and machine tools~~, and mechatronics [add reference]. The company ~~intended~~planned, in 2016, to ~~implant tactics for~~implement the a program that they called the 'Beyond Zero' strategy, which ~~has as~~ ~~fundament~~ the thought of ~~was designed to increase~~ positive environmental impacts ~~creation~~ by going beyond the simple idea of operational reduction of environmental impacts. Besides the ~~reducing~~in ~~carbon production~~emissions, energy spending, and reduction of production related costs, the strategy ~~aims~~aimed to bring innovation to the production system in order to diminish or prevent ~~negative~~ environmental impacts. Among the strategies used by the company ~~there~~was an aggressive management system ~~of to reduce~~ energy expenses in all 140 of its industrial ~~locations~~es around the world; ~~use~~ of different kinds of transportations that ~~to will~~ reduce carbon emissions, and besides the adoption of a ~~better~~enhanced logistics ~~of planning for the transportation~~ and distribution ~~for of~~ its products [21].

#### **3.2 Coca-Cola Enterprises**

In the ~~same idea of~~With respect to the reduction of ~~negative~~ environmental impacts reduction, the Coca-Cola Enterprises ~~Corporation~~ aims ~~plans~~ to have a low-cost carbon emission reduction effort in its production ~~process~~ aligned to a 'zero waste' philosophy, which ~~focusing~~focuses on innovation, packaging, and recycling [add reference]. The company already guarantees that 99,5% of ~~its~~its wastes is already recyclable, however, its goal is to recycle even more ~~packages~~resources than the ones used in its production of more than 12 billion bottles ~~annually~~ [21].

### **4. ENVIRONMENTAL DISASTERS**

The ~~An~~ environmental impact can be considered as an environmental disaster when the ~~damages~~damage caused ~~are~~is irreparable or incalculable [add reference]. ~~In the sequence there are~~The following sections illustrate some of the main environmental disasters ~~from occurring in~~ the past decade.

#### **4.1 Hungary, 2010**

In October 2010, in Ajka, ~~happened~~one of the most serious environmental accidents in Hungary ~~occurred~~ [add reference]. In an aluminum factory, the containment dams ~~have~~were broken ~~down~~ and, approximately one million cubic meters of toxic solid wastes ~~were~~was

scattered along, released into the streets of Ajka. The "red sea" of wastes reached up to two meters high in some parts of the city. As a result, four deaths were confirmed, 123 were injured, and more than 400 inhabitants of the region had to be removed/relocated, which/who showed/displayed a reaction to the toxic substance in question [22, 23].

#### 4.2 United States, 2010

In April 2010, an explosion at the on the Deepwater Horizon oil rig, followed an explosion that generated the largest oil spill in the history of the United States [add reference]. This accident caused 11 deaths, 17 were injured, and about 3.9 million barrels of petroleum (oil) polluted the water during the for 87 days until the company British Petroleum (BP) could finally close/stop the leakage. An enormous black mark was formed on the American Gulf Coast due to the oil leakage. This disaster caused environmental consequences with the decimation of the local marine fauna/fisheries, and the political and economic consequences, mainly in the tourism and fishing/water-related activities of in the region, since the beaches were interdicted/closed for various/several months [22, 24].

#### 4.3 Brazil, 2015

In november/November 2015, in the interior of Minas Gerais, a dam that contained contaminated mud from the mining process of the company Samarco corporation, in the interior of Minas Gerais, broke/failed. This caused the liberation/release of about approximately 62 million cubic meters of wastes, which advanced/overflowed toward the city of Mariana and other neighboring cities. This tragedy caused 18 deaths, besides/excluding the contamination of the Rio Doce basin, which is responsible for the supplying of more than 230 municipalities in Minas Gerais the state and in the state of Espírito Santo state. The Brazilian Institute of Environment and Renewable Natural Resources ("IBAMA – Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis"), evaluated the ecological impact and considered/determined that more than 80 species of in the river were in risk, 12 of which 42 were specific to this habitat, and these may have become/ be extinct due to the dam breach. Thus, it is/Many -believed that the river will not/never return to its natural state [24, 25].

### 5. CONCLUSION

From the literature consulted, it is possible to conclude that the 'environment' has/is a broad concept, which encompasses much more than the natural environment or the physical environment, or exclusively physical, as it is customary to imagine. The Brazilian environmental legislation is very complete and points out to the use of various techniques and methods for the evaluating of the environmental impact of a particular enterprise or activity, and directs that an installation or activity that when done previously the installation is effective in eliminating or reducing the negative environmental impact/effects. Even so, there was/is a deficiency in the the public's compliance with Brazilian environmental laws and inspection of pertinent Brazilian environmental legislations. There is also a need to for greater understanding of the Brazilian environmental policies and the duties of the general public regarding the environment.



## COMPETING INTERESTS

The authors declare no competing interests.

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