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ACCESS TO DIGITAL INFORMATION IN BRAZIL IN CASES OF ACCIDENTS: the example of Mariana's tragedy

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ABSTRACT

This article aims to discuss access to information on environmental accidents in Brazil, considering the digital age. The theme is justified by the importance of such information, which has the potential not only to prevent new accidents but also to save lives. To do so, we used the example of the dam accident occurred in Bento Rodrigues, Mariana district, in the State of Minas Gerais. In the methodological aspect, the method of deductive reasoning was used, with a bibliographical and documentary research technique. In conclusion, the importance of adequate dissemination of environmental accident information has been demonstrated.

Keywords: environmental accidents; right to information; accident of Mariana.

ACESSO À INFORMAÇÃO DIGITAL NO BRASIL EM CASOS DE ACIDENTES: o exemplo da tragédia de Mariana

RESUMO

O presente artigo objetiva discutir o acesso à informação sobre acidentes ambientais no Brasil, considerando-se a era digital. O tema tem justificativa em função da importância de tais informações que têm o condão não apenas de evitar novos acidentes, mas também de salvar vidas. Para tanto, utilizou-se o exemplo do acidente de barragem ocorrido em Bento Rodrigues, distrito de Mariana, no Estado de Minas Gerais. No aspecto metodológico, utilizou-se o método de raciocínio dedutivo, com técnica de pesquisa bibliográfica e documental. Como conclusão demonstrou-se a importância da difusão adequada das informações sobre acidentes ambientais.

Palavras-chave: *acidentes ambientais; direito à informação; acidente de Mariana.*

INTRODUCTION

Environmental Law in Brazil has developed considerably over the last forty years if we consider the 1972 Convention. There was a significant development in favor of environmental protection, but a lot still has to be done and the information shows itself as a fundamental pillar in this engineering.

Globalization has been hand in hand with technology, providing new forms of communication. In the meantime, e-democracy - as digital democracy became known - emerges as a means to accelerate citizen participation. The Aarhus Convention establishes in a paradigmatic way a whole framework for the implementation of e-democracy, as will be seen below.

However, digital information plays a very important role when it promotes the participation of all citizens in building a better world. The present research has this concern, aiming to demonstrate if the information related to the dams are adequately made available by the public agencies and are still used efficiently to avoid accidents and tragedies in Brazilian municipalities in which there is the extraction of minerals that use the containment dams of tailings, in their productive mode. It is well known to public agencies and private companies that any activity that has dams must obey all specific legislation for social and environmental protection.

In order to answer these questions, the method of deductive reasoning was used, with a bibliographical and documentary research technique. In this sense, initially will be drawn general considerations on the environmental legislation in Brazil and its development. Afterwards, it will enter into access to information, its principle applicable to Environmental Law and its insertion in the era of access to information. Next, the national dam safety policy and the barriers between access to information and the prevention of tragedies will be presented.

1 ENVIRONMENTAL LEGISLATION IN BRAZIL AND ITS DEVELOPMENT

In 1981, Law 6. 938, dated August 31, 1981, had already been published in Brazil, which disposed of the National Politicization of the Environment. However, there were still need of the founding principles so that Environmental Law reached its autonomy.

The Constitution of the Federative Republic of Brazil of 1988, in a paradigmatic way, establishes in its chapter VI the matter related to the environment, in which it has in the *caput* of art. 225 that: "Everyone has the right to an ecologically balanced environment, a good of common use to the people and essential to a healthy quality of life, imposing on the public power and the community the duty to defend and preserve it for the present and future generations." (BRASIL, 1988) . In this way, the Brazilian National Congress constitutionalizes the environmental protection following the constitutional steps of Portugal in 1976 and Spain in 1978, bringing in its framework the founding principles of Environmental Law.

Following the international trend, the Brazilian Constitution of 1988 incorporated the "green rights", which focus on environmental protection and recognize, both from the point of view of government tasks and individual and collective rights, the right to a healthy and balanced environment. The "greening of the Constitution" also reinforces the democratic instruments through the means of information and participation guaranteed for and in the processes of socioenvironmental deliberation (SAMPAIO, PINTO, 2016, p. 90).

It should be noted that the 1988 Constitution established the Democratic Rule of Law and, in this sense, as well as the entire legal system, the National Environmental Policy as a whole began to be based on the dignity of the human person (FIORILLO, COSTA, 2012, p. 15). Therefore, any and all environmental laws must necessarily observe the constitutionally established grounds.

After 20 years of the Stockholm Convention, in 1992, Rio de Janeiro hosted the United Nations Conference on Environment and Development. ECO-92 was considered by Guido Fernando as "the largest international meeting ever held by the United Nations and an emblematic landmark of having been an international conference full of political meanings" (SOARES, 2001), logically until overtaken by Rio + 20 in 2012.

It should be recalled that ECO-92 was the birthplace of two other major environmental conventions - the Kyoto Protocol and also the Convention on Biodiversity - and its main objective was to verify how countries were implementing environmental protection. However, it was in the context of the 1980s that the concept of sustainable development emerged, created by the "World Commission on Environment and Development", led by the Prime Minister of Norway, Gro Harlem Brundtland (SOARES, 2001, p. 73) known globally as the Brundtland

Report. The report defined "sustainable development as one that meets the needs of the present without compromising the ability of future generations to meet their own needs" (SOARES, 2001: 73). It is important to emphasize that the major conferences give continuity to the environmental constitutionalism of 1988.

Thus, according to the environmental protection designed by the Federal Constitution of 1988, it was clear that transdisciplinarity has, at all costs, the objective of protecting the environment for a healthy and balanced life for mankind, who must use this right to achieve its purpose.

Environmental legislation in Brazil is extensive and, since it is impossible to cite the entire legal framework, there are some examples that have modified environmental protection in Brazil: Law 6. 938/81 (National Environmental Policy); Federal Constitution of 1988, establishing the principles; Forest Code (Law 12. 651/12); Law of Water Resources (Law 9. 433/97); Law of Environmental Crimes (Law 9. 605/98); Statute of the City (Law 10. 257/01), which included the Neighborhood Rights; Nuclear Rejects Law (Law 10. 308 01); Biosafety Law (Law 11. 125/05); Solid Residue Law (Law 12. 305/10), which completes seven years without being largely enforced, and, relatively to the theme of this article, follows the Law of National Policy on Dams Safety (Law 12. 334/10).

Within this context, some instruments dealing with the right to information at the international level, such as the MacBride report, developed by Unesco in 1983, should be highlighted. This document was prepared by the International Commission on communication problems in the world. It was chaired by the Irishman MacBride, who was the founder of Amnesty International and Nobel Peace Prize winner (GÓES, 2010). Making a brief synthesis, this document is known as "One world and many voices", "focused the media exclusion of groups, communities, peoples, and regions and made a diagnosis on the problem of communication in the contemporary world, proposing solutions" (GÓES, 2010).

The reading of this report shows that, even after forty-four years, the existence of the problem of communication and information, which is the basis for the formation of critical citizens, still remains. This should not occur because the information "should be seen as a social good and a collective right like any other, being as important as the right to education, health, housing, justice and many other rights of the citizen" (ARAÚJO, 1999, p. 155).

To discuss more recent instruments concerning the importance of

information, the Convention of the United Nations Economic Commission for Europe, also known as the Aarhus Convention, stands out. It came into force in 2001 in the European Union and aims to guarantee citizens' rights with regard to access to information; participation in decision-making processes and access to justice in environmental matters. This document is considered one of the most important in the area of international environmental law. Mazzuoli and Ayala affirm that "[. . .] access to environmental information is fundamental to the improvement of a global culture of cooperation, being fundamental both the information, participation, and interference of the collectivity in environmentally relevant decision-making processes. "(MAZZUOLI, AYALA, 2012, p. 297).

This agreement establishes first-order rights as public consultations on a website called "The Voice of Europe". The document sets out the importance of governments fully integrating environmental information into their decision-making process, as well as the duty of public authorities to provide accurate, complete and up-to-date information on the environment (EUROPEAN UNION, 2017).

In an innovative way, the document also encourages the active and effective participation of all people when contemplating environmental education to promote environmental awareness and sustainable development. It also stimulates the public's sensitivity and participation in decisions affecting the environment, thus demonstrating the importance of using the means of communication and future forms of electronic communication as well as others (EUROPEAN UNION, 2017). However, the Aarhus Convention has not been ratified in Brazil, because ratification means acceptance of the principles defined between the signatory parties and becomes part of the legal system of the country - but that is the great expectation for the year 2018.

In Brazil, regarding the right to information, was established by the Federal Constitution of 1988, in its art. 5, item XIV that "everyone is guaranteed access to information and safeguarding the confidentiality of the source, when necessary for professional practice" (BRAZIL, 1988). The item XXXIII also states that "everyone has the right to receive from the public agencies information of their particular interest, or of collective or general interest, which shall be provided within the term of the law, under penalty of liability, [. . .]" (BRAZIL, 1988). In view of this constitutional mandate, Law 12. 527 of 2011, which regulated the right to information

by public bodies, was belatedly issued, covering, even if precariously, the existence of the void. This is the Law on Access to Information that the Union, States, and Municipalities need to implement to maintain the transparency of all acts of government, which must prevail in public management.

This information needs to be widely disseminated through government websites and portals and printed newspapers. However, the fastest way has now been the virtual information that can occur even through social networks. The problem is that if there is digital exclusion the whole process will be impaired, as already detected by MacBride. Therefore, access to information must be guaranteed to all. It should be pointed out that this article does not aim to develop the issue of digital exclusion, even though it is a topic of extreme importance, but will be for an upcoming research because it is a matter of extreme complexity that demands its own research.

2 ACCESS TO INFORMATION

The protection of access to information is embodied in the rules of Law 6938/81 and the explicit and implicit principles established in the 1988 Constitution, such as the Principle of Sustainable Development, Principle of Prevention, Principle of Caution, Principle of Polluter Pays, Principle of Participation, the Principle of Responsibility and the Principle of Information, among others that are the foundations of Brazilian Environmental Law[1].

In this work we will treat objectively the information principle in which, obviously, digital information is included that has the communicational power at a speed never before imagined and, consequently, develops "e-democracy and also cybercitizenship" as already pointed out Oliveira, Dinarte and Silva (2014, p. 149).

The rapid, effective and transparent information of public agencies, as well as private companies, make it possible to implement participatory democracy. This information channel, especially with regard to environmental information that involves hydroelectric construction or mining waste containment dams, should be efficient and as effective as possible because of the power of this information to even save lives.

1 In this sense, COSTA; REIS; OLIVEIRA, 2016; and still SAMPAIO, DYRUD; NARDY, 2003.

2. 1 Principle of Information in Environmental Law

The information principle means that people should have access to information about the environment. Even if there is no specific demand, environmental authorities have the duty to keep the information on environmental policies available to the population, as established in the Constitution of the Republic of 1988, art. 225, § 1, items IV and VI, as already described in this work. It is important to reinforce that information should be available and efficient for the knowledge and action of those involved in cases where the site is at risk due to natural accidents or even man-made accidents.

Law 6938 of August 31, 1981, which establishes the National Environmental Policy, states in its art. 9th that the national information system on the environment is one of the instruments of the National Environment Policy. In this way SINIMA was created, that is, the National System of Environmental Information, regulated by Law 10. 650, of April 16, 2003. This system is not finished and continues in improvement. It is the instrument responsible for the management of information within the scope of the National Environment System (Sisnama), in accordance with the logic of shared environmental management among the three spheres of government, with three structuring axes:

> Axis 1 - Development of tools for access to information;
> Axis 2 - Integration of databases and information systems. These two axes are interconnected and deal with geoprocessing tools, in accordance with guidelines established by the Electronic Government - E-gov, which allow the composition of interactive maps with information from different thematic and information systems. They are developed with the support of the General Coordination of Information Technology and Informatics (CGTI) of MMA;
> Axis 3 - Strengthening of the production process, systematization, and analysis of statistics and indicators related to the attributions of MMA. This is the strategic axis of SINIMA whose primary function is to strengthen the production process, systematization and analysis of environmental statistics and indicators; recommend and define the systematization of a basic set of indicators and establish an agenda with institutions that produce environmental information;

> allow integrated evaluations on the environment and society. (MMA, 2017)

Certainly public bodies have taken into account documents such as the 1998 Aarhus Convention (Denmark), since, according to Machado (2016, 123), the aforementioned Convention understands that "information on the environment means all information available in written, visual, oral or electronic or in any other material form on (a) the state of the environment, such as air and atmosphere, water, soil, land, [...]". Also add natural sites, biological diversity, among others.

Machado (2016, p. 12) further teaches that "environmental information received by public agencies must be transmitted to civil society, except for matters involving proven industrial or state secrecy. "Environmental information must be transmitted systematically and not only in so-called environmental accidents. The author adds that they should be "transmitted in order to allow enough time to the informed to review the matter and be able to act before the public administration and the judiciary [. . .]"(MACHADO, 2016, p. 12).

However, despite the existence of several means of communication, this work identifies the importance of information in the digital era and its efficiency and applicability in cases of accidents involving tailings dams.

2. 2 The digital information age

The transformation undergone by the world with the digital information age is unprecedented. The most obvious social change was the form of communication. Castells argues that the internet is an old technology that was implemented in 1969 and spread twenty years later by many factors, which are not the time to list them (CASTELLS, 2000). Therefore, this diffusion modified the way of watching television, journalism and the creation of new social spaces on the Web, which combine sociability and experimentation. Thus, there were radical transformations in the economic and cultural areas - this is what Castells calls the "key-spatial-feature of the networked society and the networking between local and global" (CASTELLS, 2000, p. LX).

Since 1988 the Spanish sociologist Manuel Castells has dedicated himself to this theme as one can see from the three volumes of the book "Information Age: Economy, Society, and Culture": the network society,

the power of identity and the end of the millennium. And despite having favorable opinions about the network, the said author considers that:

> Nowadays, people produce forms of sociability rather than following patterns of behavior. The changes in the relations of production, power, and experience converge to the change of the material bases of social life, space and time. [. . .] Technology reduces time to a few random instants and thus disarms the sequence of society and the development of history. (CASTELLS, 2014, p. 475)

The author also warns of what he called "real virtuality," which consists of "[. . .] a system in which reality itself (ie material/symbolic existence of persons) is completely immersed in an environment of virtual images in the world of make-believe, in which symbols are not just metaphors, but encompass real experience itself. " (CASTELLS, 2014, p. 475).

Castells' experience and knowledge are important because he makes distinctions of terms that are very easy to confuse. In this sense, the author explains what he means by network society:

> All expressions of all times and all spaces are blended into the same hypertext, constantly reorganized and communicated at any time, anywhere, according to the interests of the emitters and the moods of the receivers. This virtuality is our reality because it is in the structure of these timeless symbolic systems devoid of place that we construct the categories and invoke the images that shape behavior, influence politics, cherish dreams and provoke nightmares. (CASTELLS, 2014, p. 476)

The author alerts that the network often creates conflicts, contradictions, and challenges in the form of social organization (CASTELLS, 2014). In this respect, he concludes that "[. . .] information societies cannot be reduced to the structure and dynamics of networked society". (CASTELLS, 2014, p. 476). Therefore, the information society is characterized as the post-industrial or informational one marked by a new economy (CASTELLS, 2014).

In short, understanding the terms used routinely by people, one begins to discover the meaning of this whole situation of transformation

with the introduction in a society of the information age that must be used responsibly:

> [. . .] it is possible to affirm that information is the basis for a citizen's critical formation about everything that interferes with his well-being. In relation to the interests and public affairs of society, access to information becomes a tool to combat corruption and illicit acts of government: for accountability and good governance of public bodies; to evaluate the performance of government by providing data on the economy, social policies and other issues of public interest; for public participation through open and informed debate. (ALVES; ANDRELO; CABRAL, 2016, p. 49)

The need to inform citizens about the integrality of existing environmental legislation and the actions of Federal, State and Municipal Governments through their services are fundamental for the replication of information in many ways, such as on NGOs sites, blogs, Twitter, Facebook, etc. In addition, it is necessary to use the entire legal structure created for this purpose, mainly to inform the population located near dams, be they hydroelectric dams or dams to contain tailings from mining - hence the importance of specific legislation on dam safety.

3 THE NATIONAL DAM SECURITY POLICY: LAW 12. 334/2010

Brazil constitutes, economically, as a predominantly mineral country. Within this context, many Brazilian municipalities have to mine as their main economic characteristic and need to build tailings dams, especially those with iron deposits. Environmental licensing for the construction of these dams will not be the object of this article, but rather what they can cause without the necessary information for the communities close to these facilities.

Against this backdrop, information is vital. As already seen, Brazil is currently concerned with informing citizens about the situation on the environment, as can be seen on the websites of the Ministry of the Environment (MMA), the National Water Agency (ANA), the National Water Resources System and many other state channels. Oliveira et al emphasize that:

> Access to open data, especially public government data, enables citizens to interact with the community, and with their governments in their various spheres. Therefore, ensuring free development applications and platforms based on open data is one of the pillars of a democratic society nowadays. (OLIVEIRA; DINARTE; SILVA, 2014, p. 152).

However, several accidents and tragedies have occurred in Brazil without the information helping to reduce the degree of human, environmental and economic losses. The emblematic example that gained international notoriety was the case of Samarco Mineração SA. In brief synthesis, the accident happened on November 5, 2015, when there was the rupture of the containment dam of mineral waste belonging to the Samarco company. The mud of the so-called Fundão dam installed in Bento Rodrigues, in the state of Minas Gerais, flooded a vast area with tailings from its production process.

Bento Rodrigues is a sub-district of the Minas Gerais municipality of Mariana, located 35 km from the center of Mariana and 124 km away from Belo Horizonte. It was a municipality with an estimated population of 600 inhabitants, which occupied about 200 properties. It was a mining town from century XVII and the road of the Royal Route crossed its urban center. In addition to the Fundão Dam, the sub-district houses the Santarém Dam, both operated by the mining company Samarco.

The mud from the dam ruptured areas up to 2,5 m high and reached the channel of the Rio Doce from that point to its mouth, characterizing itself as the largest environmental disaster in Brazil. The rupture of the Fundão Dam caused 19 deaths, devastated the entire life of the city of Bento Rodrigues and polluted to the coast of Espírito Santo, affecting fishing and water supply in several cities, such as Governador Valadares - Minas Gerais, which was one of the more affected.

The Federal Public Ministry (MPF) estimated the preliminary amount of repair as R$ 155 billion. The Public Civil Action filed reaches 359 pages, with more than 10 thousand pages of technical reports, inspection reports, and statements that instruct it. In its midst, the MPF formulated more than 200 applications. Subsequently, it was postulated, among other requirements, that the companies Samarco, Vale and BHP, in an act of solidarity, deposit in a own private fund, under management and supervision of an independent audit, the initial value of R$ 7. 7 billion,

corresponding to 5% of the minimum valuation of the damages, and present adequate guarantees to the full reparation of the damages. (PGR, 2016)

It is important to point out that in Brazil there are currently about 17. 259 dams cataloged by the National Water Agency (ANA), although not all of them consist of ditches from mining tailings. To these corresponds the amount of 3. 772, many also linked to Hydroelectric Dams (ANA, 2017).

The State of Minas Gerais has inventoried about 731 dams of mining tailings, according to information from FEAM - State Foundation for the Environment. This list contains the name of the company and the situation of stability of each. The basins of the Rio São Francisco and Rio Doce concentrate most of the mining tailings containment dams in the State of Minas Gerais, and this information is managed by the State Environmental Foundation (MINAS GERAIS, 2017). However, such data took a long time to compile for a country that has the strategic mining profile, since it was only in 2010 that ANA began this collection of statistics.

Minas Gerais, in turn, started the inventory in 2011, logically after several accidents. These accidents that occurred previously did not obtain international repercussions, but had harmful social and environmental consequences, as the Public Prosecutor informs:

> In 2001, the rupture of the Macacos dam, also in Minas, left five dead. In 2003, in Cataguazes (MG), more than 600 thousand people were left without water supply due to the rupture of the Cataguazes Papel dam, with the discharge of 1. 4 billion liters of black liquor. In 2007, the Miraí dam (MG) broke and poured more than two million liters of bauxite sludge. A thousand and two hundred houses were hit and about 4. 000 people were evicted. In 2009, the breach of the coal fines dam at the Cruz de Malta mine in Santa Catarina compromised the waters of the Mãe Luzia river. As early as 2014, a reservoir of coal fines broke at the 3G mine in Santa Catarina, severely damaging the waters of the Tubarão River and the local fauna and flora. On February 5, 2016, the sand mining dam breaking in Jacarei, São Paulo, committed the waters of the Paraíba do Sul River, the main water source for residents of Rio de Janeiro and Sao Paulo, states hit by a serious water crisis. (PGR, 2016)

It is admirable that only after so many accidents came the edition Law 12. 334, of September 20, 2010, but oversight of ventures becomes

essential for such tragedies not to recur.

Resuming the event of Bento Rodrigues, in the analysis of the first information by the MPF were detected "[...] failures in the inspection of the enterprises due to lack of structure and outdated legislation, which does not provide financial guarantees, environmental regularity, and waste reduction." (BRAZIL, 2017a). Toledo, Ribeiro and Thomé warned that "[...] the safety of a dam is related to the maintenance of its structural and operational integrity, a *sine qua non* condition for the preservation of the ecological balance, life, health, and must be considered in all its phases". (TOLEDO, RIBEIRO, THOMÉ, 2016, p. 80) - which certainly did not occur with the Fundão dam.

Objectively, Law 12,334 of 2010 instituted the National Policy for the Safety of Dams - PNSB, for the accumulation of water for any use, the final or temporary disposal of tailings and the accumulation of industrial waste. Through it was established the National Information System on Dam Safety (PNSB).

The PNSB changed the redaction of art. 35 of Law no. 9. 433/1997 (which instituted the National Policy on Water Resources), regarding its competence. The same law also modified arts. of Law 9,984/2000, which created the National Water Agency (ANA), the federal entity for the implementation of the National Water Resources Policy and the coordination of the National Water Resources Management System. (BRAZIL, 2003)

The Ministry of the Environment, attuned to and in compliance with art. 7 of Law 12. 334/10, through its National Council of Water Resources, created Resolution 143/2012, which establishes the general criteria for the classification of dams by category of risk, associated potential damage and by their volume. The MMA also developed Resolution 144, which established guidelines for the implementation of the National Policy on Dams Safety, application of its instruments and performance of the National Information System on Dam Safety (SNISB).

Also in compliance with the Dams Security Law, came the Portaria 416/2012 of the National Department of Mineral Production (DNPM) which, in addition to creating the National Mining Dams Registry, established the Safety Plan, Periodic Safety Review and Inspections Regulatory and Special Safety Requirements for Mining Dams, pursuant to Law 12. 334/10. Also created by the same body, Administrative Rule 526/2013, which established the periodicity of updating and revision, the

qualification of the technical responsible, the minimum content and the level of detail of the Emergency Action Plan for Mining Dams (PAEBM), as Law 12. 334/10.

In the three years following the publication of Law 12,334 in 2010, a race against time was initiated by public agencies, in order to regulate it. However, in addition to regulating, such bodies should also oversee all ventures in an ostensible way, which did not happen.

3. 1 When information is not efficient to avoid tragedies

Despite all the legal framework established, the recent legislation has not obtained the necessary implementation of an extreme risk activity for society and the environment, such as mining. On the other hand, "engineering has not yet been able to develop a technique that ensures total safety to dams and may never do so" (SAMPAIO, 2016, our translation)[2]. Now, no legislation or information will be effective if engineering is not successful. However, what the accidents have indicated is the lack of planning and articulation between the public authorities and society, disregarding the imperative need for communication and actions that are reliable to what was planned.

In the case of Samarco, the absence of an Emergency Action Plan was verified, although the company was aware that its activity is risky and obligatory under the law. And, although it seems absurd, the Fundão Dam was characterized as having a low risk of disruption, as recorded in the FEAM archives (FEAM, 2017). Due to this erroneous classification, there was no complexity to approve the company's licensing.

It is important to note that all information on the public service sites mentioned has not been used or expanded to provide accurate data as it should be. Soon, the robust legislation of human and environmental protection became innocuous before all those affected by the disaster of Mariana.

The context of a dubious environmental licensing added to the absolute inoperability of communication of all forms after the accident. The Company's Emergency Plan (SAP), in turn, "[...] did not provide for strategies to warn potentially affected communities in an emergency situation, in the event of a disruption, in violation of national legislation"

2 "Engeneering was not yet able to develop a technique that ensures full security to dams and maybe it never will".

(SORIANO et al, 2016).

Soriano et al. affirm that "[...] communication failures in this disaster are in contrast to the current trend of alert and risk communication systems" (2016, p. 56). This is because there must be involvement of people as participants in the planning and operation of alert systems.

> People-centered alerting systems, in contrast to technically-oriented systems, are called *bottom-to-up* ", starting with communities that could be affected and planning the system according to the characteristics of these communities (SORIANO et al, 2016, p. 56).

Therefore, it is important "to ensure that alert systems are planned, implemented and operated with the aim of empowering the people who need them most" (SORIANO et al, 2016, p. 57). Such empowerment "[. . .] refers to adequate information about the risks they face and how to minimize losses if a catastrophic event is anticipated" (SORIANO et al, 2016, p. 57).

To make a parallel, in the United States the information about environmental disasters are disclosed by the Federal Emergency Management Agency[3] (FEMA, 2017, our translation), which provides on its website all information about any possible accidents, for example, biological threats, chemical threats, cyber incidents, earthquakes, explosions, tornadoes, tsunamis, floods, accidents dams, among others.

This website provides fundamental information in all cases mentioned. When the citizen accesses one of them, he receives detailed information about what to do and how to do in case of accidents. Therefore, there is information and maps that form a mechanism not only for prevention but also for contingency in the event of an accident - especially with regard to accidents with dams of all kinds.

Specifically on the dam safety information *(Dam Safety),* the federal government agency states that "the dams are the most critical parts about our nation's infrastructure, and yet, all citizens are benefiting from this type of structure including the flood prevention, water supply, electric power and recreation" (FEMA, 2017, our translation)[4].

3 Federal Emergency Management Agency.

4 "*Dams are a critical part of our nation's infrastucture and all Americans enjoy the benefits they provide, including flood protection, water supply, hydropower, irrigation and recreation*. " As for this situation, it still informs the organ: " *However, our dams are aging and many are deteriorating, while downstream and upstream populations are increasing. Everyone has a role to play in creating a future where all dams are safer-including dam owners, engineers, community planners/leaders, and federal*

In this same sense, there is in Brazil the Ministry of National Integration which has among its competences the monitoring and evaluation of integrated national development programs and also works against droughts and water infrastructure and civil protection (MIN, 2011). The site of this Ministry contains information on the occurrence of environmental disasters such as floods, floods, hail, floods, mass movements, tornadoes and vendors, which are provided by the National Secretariat for Civil Protection and Defense. This body was created by the National Policy on Protection and Civil Defense - PNPDEC, instituted by Law 12,608 of April 10, 2012, which aims at disaster risk management and disaster management, with the purpose of ensuring social, economic and environmental conditions suitable for the dignity of the citizen. (MIN, 2017)

However, the information created, managed, and made available on the MIN website - unlike the US FEMA site - is incomplete, inaccessible, and undisclosed - problems that, associated with the desperation of the citizen in an emergency, will result in ineffectiveness. The existence of the National Center for Risk and Disaster Management - CENAD, created in 2005 through Decree no. 5,376, which aims to manage, with agility, strategic actions of preparation and responses to disasters in national territory and depending on the case also international. (MIN, 2017)

After analyzing the entire Brazilian legal framework, it is possible to think that Brazil is prepared for extreme events such as dam accidents since everything indicates that somehow the information reaches those involved in disaster situations. However, the experience of Mariana's tragedy evidenced the lack of precise information "everything about everything" - from the trivial about "where to go" to the imperative of "how to survive" in case of a dam accident - and also the lack of a plan emergency response that provides the immediate and urgent response required for an accident of such magnitude. All this with no consideration for the information and plans absent in Brazil about what is perhaps the most important: how to prevent accidents.

and state regulators" (FEMA, 2017). "However, our dams are aging and many are deteriorating, while upstream and upstream populations are increasing . Everyone has a role to play in creating a future where all dams are safer - including barrage owners, engineers, planners/community leaders, and federal and state regulators. " (FEMA, 2017).

CONCLUSION

Brazilian environmental legislation has developed significantly from the 1980s to the present day. This constructive journey came from the concept of sustainable development to the forging of an e-democracy, based on the Arhus convention and other documents thanks to information technology.

Digital media and information technologies can and do contribute to reducing the number of victims of environmental accidents and, in general, by communicating risk and contingency measures in the event of an accident. Ease of access and speed in the transmission of information represent tools that allow the drastic reduction of risk, especially when official communication is efficient.

Information should be considered a citizen's right because it is through it that knowledge can be transformed into effective actions, as already defended by MacBride in the report "One world and many voices" [*Um mundo e muitas vozes*]. Access to information from public and private agencies enables the implementation of participatory democracy. Therefore, reliable information should be made available under the terms established by the various laws commented on in this work, such as Law 6938/81, which created SINIMA, and Law 10. 334/10, which specifically establishes the obligation of information on tailings dams, in addition to other environmental agency regulations.

The digital information age, as approached by Castells, should provide an efficient service in dams accident cases, but for this, all public environmental agencies should be in line to disseminate accurate, coherent and easily accessible information - which exists in Brazil in fact. The little information compiled on the website of the Ministry of National Integration - where the types of accidents are listed - are difficult to access, outdated and under-publicized. This situation undermines the public's confidence in official information and conveys a sense of abandonment and neglect, especially in relation to those who live near the risk areas.

The disaster of Mariana highlights the importance of the media and also the need for accuracy and speed in the dissemination of information. The accident demonstrates the total unpreparedness of public services in the collection and processing of information, which directly influences their inability to take action to prevent new occurrences. The negative consequences of government disorganization spread like the mud of

Mariana to all sides, causing losses of lives, environmental economics. The most objective conclusion is that public environmental agencies should seriously implement the entire legal framework on dam accidents in the country.

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