

DISASTER RISK MANAGEMENT AND NON-STRUCTURAL CIVIL DEFENSE'S ACTIONS IN THE MUNICIPALITY OF BLUMENAU/SC - BRAZIL

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Abstract: *This study reports the importance of environmental education as a usual tool in the prevention of risks of natural disasters. The research is exploratory and has a descriptive qualitative methodological approach. Indirect documentation techniques were used, with bibliographical and documentary research. The work was divided into three stages: data collection, systematization of information and synthesis. As a result, civil defense experience with the partnership of the Department of Education of the city of Blumenau and the effective actions in Schools were described. The project includes several actions, as follows: Civil Defense in the School, Junior Civil Defense Agent, Evacuation Plan and Lectures. The report of this experience in Blumenau has served as assistance and incentive for other municipalities to implement similar actions related to risk prevention of disasters that are aligned to the National Policy for Protection and Civil Defense.*

Keywords: Disasters. Environmental Education. School.

GESTÃO DO RISCO DE DESASTRES E AÇÕES NÃO-ESTRUTURAIS DA DEFESA CIVIL DO MUNICÍPIO DE BLUMENAU / SC – BRASIL

Resumo: O presente trabalho objetiva relatar a importância da Educação Ambiental como uma ferramenta usual na prevenção de riscos de desastres naturais. A pesquisa é do tipo exploratória e descritiva, de abordagem metodológica qualitativa. Foram utilizadas as técnicas de documentação indireta, com pesquisa bibliográfica e documental. O trabalho foi estruturado em três etapas: levantamento de dados, sistematização das informações e síntese. Como resultado, foi descrita a experiência da Defesa Civil com a parceria da Secretaria de Educação da Prefeitura do município de Blumenau e as ações efetivas nas escolas. O projeto conta com algumas atuações, sendo elas: Defesa Civil na Escola, Agente Mirim de Defesa Civil, Plano de Abandono e Palestras. O relato dessa experiência de Blumenau tem servido de subsídio e incentivo para outros municípios implementarem ações semelhantes de prevenção de risco de desastres que estejam alinhadas à Política Nacional de Proteção e Defesa Civil.

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Palavras-chave: Desastres. Educação Ambiental. Escola.

GESTIÓN DEL RIESGO DE DESASTRES Y ACCIONES NO ESTRUCTURALES DE DEFENSA CIVIL DE LA MUNICIPALIDAD DE BLUMENAU/SC – BRASIL

Resumen: El estudio muestra la importancia de la educación ambiental como una herramienta habitual en la prevención de riesgos de desastres naturales. La investigación es exploratoria y descriptiva, con enfoque metodológico cualitativo. Se utilizaron las técnicas de documentación indirecta, con la investigación bibliográfica y documental. El trabajo se divide en tres etapas: recolección de datos, sistematización de información y de síntesis. Como resultado, la experiencia de la defensa civil se describe en la colaboración entre el Departamento de Educación de la ciudad de Blumenau y la acción efectiva en las escuelas. El proyecto incluye varias acciones, como sigue: Defensa Civil en la Escuela, Agente Mirim de Defensa Civil, Plan de Abandono y Conferencias. El relato de esta experiencia de la ciudad de Blumenau ha ofrecido subsidio y incentivo para otros municipios, para implementar acciones similares en la prevención de riesgos de desastres que están alineadas con la Política Nacional de Protección y Defensa Civil.

Palabras-llave: Desastres. Educación Ambiental. Escuela.

1 Introduction

It has been registered a considerable increase of natural disasters worldwide, not only in frequency and intensity, but also in impacts with increasing damages (GUHA-SAPIR et al., 2011). As EM-DAT data (2012), the average of disasters in 1950 was 45 events per year, reaching more than 450 events in the 2000s. Such situation should worsen due to various issues, especially climate change and population growth.

Climate change tends to increase further in the coming years, according to the predictions of the Intergovernmental Panel on Climate Change (IPCC, 2014). Such climate change will increase the severity of weather-related disasters as for example, floods, landslides, droughts, cyclones and severe storms (BERGHOLT; LUJALA, 2012).

The complexity and the cumulative effect of natural disasters have increased the number of people affected and exposed goods, with growth of economic losses and transboundary impacts due to the globalization process (SILVA; NISHIJIMA, 2011) and population growth.

In 2012, as reported by the Brazilian Annual Natural Disaster, the incidence of this event type have had a significant impact in Brazilian society. 376 incidents were officially reported, and affected 16,977,614 people (BRASIL, 2012). According to Freitas et al. (2012) rapid population growth in cities, combined with its disorderly distribution by territory, resulted in occupations on the banks of rivers and slopes. The absence of a housing policy capable of fulfilling the demands for decent and safe housing is in much of the disaster origin.

The complexity of these factors which ends up amplifying the risk of disasters is, in the view of Carvalho and Damacena (2013), boosted by two cross-cutting factors, common and underlying most disasters, which are the vulnerability and resilience.

According to the United Nations International Strategy for Disaster Reduction – UNISDR (2009), vulnerability is the characteristic of a community to be susceptible to the harmful effects of danger. And resilience is the ability of a community exposed to risks to resist, absorb, accommodate and recover from the effects of a hazard in a timely and efficient manner, through the preservation and restoration of its basic structures and functions. To

O'Riordan (2002) the vulnerability to natural disasters can be described as the society's inability to avoid the danger related to natural disasters or the condition of being forced to live with these risks. This situation stems from a combination of economic, social, environmental and political processes. Conversely, resilience is the behavioral, community and political component, which captures the ability of a population group undergoing a dangerous phenomenon to absorb shock and adapt to return to an acceptable state. The probability that a population is affected by hazards is known as risk. Therefore the risk depends on the vulnerability and danger or threat.

In Blumenau, floods are part of the local reality since the establishment of Cologne in 1852. According to historical records there were recorded around 80 events rated over 8 meters, considered to cause serious problems to the population (FRANK, 2003).

Also mass movements, especially landslides, have become a recent risk in Blumenau, because the slopes have undergone an accelerated process of occupation over the past three decades due to population growth and the limited flat area of the city.

To understand the history of Vale do Itajaí, it is inevitable to consider three interrelated processes: i) the foreign colonization and ethnic identity of the population; ii) the socio-economic development based on the textile industry and the production of urban territory; iii) the progressive destruction of the environment and the problem of flooding. These processes result in a paradox: one of the highest human development index (HDI 850) recorded among Brazilian metropolitan areas versus a community highly vulnerable to disasters. However, when evaluating the history of over 150 years of living with the floods, the design and implementation of a diverse range of programs are found and activities covering both the constructions (dams in the upper valley, river improvement in Blumenau and Gaspar region, channels, dikes and sluices among others); and the information and management tools (flood warning system, civil defense, flood letters, studies and research) (MATTEDI et al., 2009).

The phenomenon of heavy rainfall is natural but disasters are largely socially constructed (MATTEDI et al., 2009).

The 2008 disaster which combined in a single event mass movements and flood is considered the disaster of greater intensity registered in the Itajaí's River Basin.

According to Sevegnani and Frank (2009), more than 80,000 people were displaced and homeless, 63 municipalities in emergency situations, 14 in a state of emergency and 135 deaths, 24 in the city of Blumenau. In 2011, the municipalities of Itajaí's River Basin were once again hit by floods (CEOPS, 2012).

The disaster, in November 2008, consisted of a combination of natural and social variables. As natural variables, it is possible to mention the intense rainfall, fragile soils and rugged terrain which rely heavily on vegetation cover for its protection. As social variables, it can be mentioned the development based on forest clearing, occupation of river banks and slopes for housing and industries installation, rectification and channeling of streams, resulting in a very rural and urban matrix. The combination of the two sets of variables produced a territory vulnerable to disasters, and the inability to understand the relationship between these variables and to intervene consistently reproduces and increases the risk (MATTEDI et al., 2009).

With regard to reducing vulnerability and increasing resilience, based on prevention, preventive measures can be classified into: structural as the engineering works that minimize the problem in the short term, but that usually have a high budgetary cost, are palliative and cause other environmental impacts, creating a false sense of security. And the non-structural measures, which have an educational character and planning, with results in the medium and long term, low cost, easy to apply and allow a correct perception of risk.

The concept of Environmental Education (EE) has had a remarkable evolution of meaning over time (TRACANA; FERREIRA; CARVALHO, 2012). Currently, it appears as an educational proposal, dialoguing with the knowledge, theories and educational traditions (CARVALHO; STEIL, 2008) in order to seek to overcome the dichotomy between nature and society. It is a comprehensive form of education, which aims to reach all citizens in a permanent participatory learning process. It also seeks to develop in the student the formation of a critical awareness of environmental issues, and is critical to the ability to capture the origin and the development of environmental problems (SILVA; NISHIJIMA, 2011).

The environmental education, by raising awareness amongst individuals, begins to change attitudes and values for new relationship habits and perception of nature. This change in behavior becomes important factor in the prevention of risks of natural disasters.

The Brazilian Law No. 12.608, from 2012, which established the National Policy for Protection and Civil Defense amended the Law of Guidelines and Bases of National Education, making it mandatory that the principles of civil defense and protection to be included in the curriculum of elementary and secondary education in an integrated way to the mandatory content (BRASIL, 2012).

The aim of this study was to report the importance of environmental education as a tool to be used in the prevention of risks of natural disasters, based on the experiences of Civil Defense from Blumenau in the development of the following: Civil Defense in Schools, Civil Defense Junior Agent, Evacuation Plan, and Lectures in other municipalities.

The study is characterized as an exploratory research, where there is insignificant or no accumulated and systematized knowledge on the subject; and descriptive when there is obtaining information about a phenomenon or on certain population and the description of its features. It has no commitment to the explanation of the phenomena described, although it may provide the basis for such explanation (UNIVALI, 2006).

The techniques used were bibliographical and documentary research, with data collection in Civil Defence Board, linked to the Citizen Defense Department of Blumenau.

The paper is structured in the following context: Theoretical framework, in which environmental education issues were addressed, set out in federal and municipal legislation, global actions to environmental education for disaster and how Blumenau's experience can be replicated to other municipalities of Itajaí's River Basin. In the results, the actions of the Civil Defense from Blumenau with the Civil Defense Project in Schools (Civil Defense Junior Agent, Evacuation Plan and Lectures in other municipalities) were presented. Some important issues were also addressed: the National Protocol for Integral Protection of Children and Adolescents at Risk and Disaster situation.

2 Legal basis for the establishment of the Environmental Education and Disaster Risk Management

The last decades were marked by evident signs, especially in developed countries, an increasing concern for the environment (PALÁCIOS; DAL FARRA; GELLER, 2011).

In 1972, the United Nations Conference on the Human Environment in Stockholm, Sweden was held and in 1975, the Belgrade Conference, Yugoslavia, formulated principles and guidelines for an environmental education program. It was established that environmental education should be ongoing, multidisciplinary, integrated regional differences and oriented to national interests. This meeting led to Belgrade Charter, a document which is considered a milestone for the development of the movement around the theme environment.

The Intergovernmental Conference in Tbilisi, Georgia, in 1977, addressed the importance of educational activities on the environment for all people. In 1987 the International Conference was held on environmental education and training in Moscow,

promoted by UNESCO, which was the inclusion of environmental education in the educational systems of countries. In 1992 was held the United Nations Conference on Environment and Development, Rio 92, event in which the "Agenda 21" was approved with important issues for sustainable development.

The Brazilian Federal Constitution of 1988, art. 225, § 1, section VI establishes the need to "promote environmental education at all levels of education and public awareness for the preservation of the environment." In 1999, the Law No. 9795 established the National Environmental Education Police, which in its art. 1 establishes:

Art. 1 - The term environmental education is understood by the processes by which the individual and the collectivity build social values, knowledge, skills, attitudes and competencies aimed at the conservation of the environment and of common use, essential to a healthy quality of life and sustainability (BRAZIL, 1999).

Prior to National Environmental Education Police, at the federal level, the National Water Resources Policy was established by Law No. 9.433 from January 8th, 1997. The duties of this public policy have been to work in environmental education to the community, disseminating information perception of the value and importance of water for economic and social development of the country. As an example in Itajai's River Basin, there is the Piava Project that built a water protection policy and led the community to engage in the integrated management process of water resources, through various educational activities (FRANK, 2010).

The Law No. 12.608, from April 10th, 2012, established the National Policy for the Protection and Civil Defense. In the art. 29 of the referred Law, altering the art. 26 of Law No. 9394 from December 20th, 1996, laying down the Guidelines and Bases of National Education, is effective, added the following paragraph: "§ The 7^o elementary and high school curriculum should include the principles of protection and civil defense and environmental education in an integrated manner to the required content."

At the municipal level, the Supplementary Law No. 747 from March 23rd, 2010 from the city of Blumenau established the Environmental Code. The objective is to promote environmental education in an integrated manner to educational programs in educational institutions and encourage the strengthening of a critical awareness of the environmental and social problems among the regions of the city, towards the construction of an environmentally balanced society based on the principles of freedom, equality, solidarity, democracy, social justice, responsibility and sustainability.

Complementary Law No. 870, from January 1st, 2013, established the new administrative structure of the Blumenau's Municipal Executive Power and defines competence of the Municipal Department of Education, plan and execute the Municipal Education Policy, in line with the guidelines of the Municipal Education Council and the Law of Directives and Bases of National Education (LDB). It should be noted that, as explained above, National Policy for the Protection and Civil Defense changed the LDB, including the principles of protection and civil defense and environmental education in an integrated manner to the mandatory content in the elementary and high school curriculum.

Still, according to the complementary Law No. 870, from January 1st, 2013 is the responsibility of the Municipal Defense of the Citizen, to develop strategies and guidelines to guide prevention and permanent protection against natural disasters.

In the municipality it was also established the Special Committee for Risk and Disaster Management, through decree No. 10124 from September 26th, 2013. Having advisory, technical and permanent nature, it is responsible for the preparation and monitoring of Municipal Protection and Blumenau's Civil Defense's policy and development plans and actions to be applied coordinately among the various organs and municipal entities for

prevention, mitigation, preparedness and response to natural disasters, according to the providing for the Federal Law No. 12.608/2012.

3 Education for Disaster Risk Reduction

The 1990s was declared the International Decade for Natural Disaster Reduction (IDNDR), and one of its main goals was instilling a culture of disaster prevention through the wider application of known mechanisms of scientific and technological nature by a more informed population. But the most important task in the medium and long term was to strengthen and expand programs that would reduce the number and cost of disasters, because prevention is not only more humane than the recovery, it is also much less expensive (IDNDR, 1999).

The United Nations established in 2000 an International Strategy for Disaster Reduction (ISDR), a global platform with the goal of helping all communities to become resilient to natural disasters effects and the move from protection against hazards to the management of risk through the integration of risk prevention to sustainable development. The strategy was based on the experience of IDNDR in Yokohama Action Plan for a Safer World, 1994, and the strategy *Safer World in the Twenty-first Century: Disaster Reduction and Risk*, 1999 - reflects a multisectoral approach and interdisciplinary focused on disaster reduction.

The Hyogo Framework for Action (HFA) 2005-2015 *Building the Resilience of Nations and Communities to Disasters* adopted by 168 Member States of the United Nations, including Brazil, the World Conference on Disaster Reduction held in January 2005 in Japan, decided to employ the knowledge, innovation and education to build a culture of safety at all levels, as a priority action. It was a global incentive for schools to initiate discussions and actions by the year 2015, to contribute to the minimization of disasters and to the process of resilience of cities. The campaign aimed to inform and mobilize governments to disaster risk reduction is integrated into educational curriculum in countries and that school buildings to be built to withstand natural hazards (UNISDR, 2005).

In the same period, the Secretariat of the International Strategy for Disaster Reduction (ISDR), in charge of the task of supporting governments in the implementation of the Hyogo Framework, launched a global campaign called the "Disaster Risk Reduction starts at school from 2005 to 2006" , mobilizing global efforts to mainstream Disaster Risk Reduction (DRR) (UNISDR, 2007). When the Second Session of the Global Platform for Disaster Risk Reduction ISDR (International Strategy for Disaster Reduction) held in 2009, commitments were made to integrate DRR into the school curriculum by 2015, commitments were strengthened in 2011, in the Third Session of the Global Platform (UNISDR, 2009; UNISDR, 2011).

The Sendai Framework from 2015 to 2030 is the successor instrument to the Hyogo Framework for Action (HFA) 2005-2015. The Sendai Framework is built on elements which ensure continuity to the work done by States and other interested parties under the HFA and introduces a number of innovations as solicited during the consultations and negotiations (UNISDR, 2015).

In Brazil, in 2010, the National Civil Defense Secretariat organized the 1st. National Conference of Civil Defense and Humanitarian Assistance with the theme *Towards a Comprehensive and Continuous Action*. From the participatory process, guidelines resulted referring to the theme *Civil Defense at School*.

In compiling reports on national progress in implementing the planned curriculum in the Hyogo Framework, slightly more than half of the 70 countries reporting data related to the inclusion of themes and topics related to DRR, especially at the primary level, the

International Strategy of the United Nations Disaster Reduction (UNISDR, 2011). So, while global governments were ready and willing to answer the essential Hyogo Framework and to meet the 2015 deadline, there was still no understanding of the nature of DRR in the curriculum and how to develop and implement it. There was a proliferation of documents offering views of good practice and pointing to windows of opportunity for the integration of DRR in the curriculum, but no clear picture of how to proceed and few ways to know what other countries are doing (UNESCO/UNICEF, 2012).

Reducing disaster risk should be treated systematically across the curriculum and across grade levels. The theme should extend beyond basic science of risks and safety measures and consider the construction of prevention, mitigation, vulnerability and resilience. In this sense, UNESCO/UNICEF established a consultancy in 2011 on the integration of the global DRR in education curriculum in 30 countries on UNICEF practice area, presenting a report this progress.

According to the report, Lesotho, a small country in southern Africa, provides an example of nation in a complete reconfiguration process of its curriculum, distant from a traditional model based on academic subject. This seems to be opening a number of promising opportunities for the integration of DRR in the curriculum. In parallel, Malawi, East Africa, led the way to organize its curricula according to the seven main categories of skills that are likely to help incorporate climate change to a more complete learning related to DRR.

Another approach to the integration of DRR in accordance with the report of the curriculum is the specific approach to the subject. Under this heading, a new subject area is developed within which the RRD becomes the main focus or an essential component. This has been the case of Georgia with the *Time of the head of the class*. The Russian Federation also has a single subject called *Security Fundamentals of Life*. Other examples are the *integrated study period* in Japan, as well as the local content curriculum in Indonesia and Laos.

Some countries focus only on natural hazards that are closest to their experience. For example, Kazakhstan covers earthquakes, fires, floods, landslides and inundations; Cambodia focuses primarily on floods, covering also volcanic eruptions, earthquakes, hurricanes, drought and deforestation; the British Virgin Islands cover landslides, hurricanes, earthquakes and volcanic activity. On the other hand, a number of countries bring natural hazards and human-induced technology together in their curriculum of DRR. Laos and Madagascar respectively include civil conflict and malnutrition next to natural disasters, while the New Zealand program extends to "unnatural disasters" such as pandemics, biological, terrorist bombs and threats.

In West and Central Africa there has been a continuing interest in DRR education combining natural disasters on education against the conflict, which has been called *RRD-plus* (UNICEF, 2011).

In Brazil, the Proposal for Disaster Risk Reduction Program in Schools (CEPED, 2013) in the volume *Practical Guide for Playful Educational Activities in RRD* already has records of practices that are being carried out in schools nationwide.

The city of Joinville, also in Santa Catarina, has two programs: *Civil Defense at School* and *A Plan to Save the Planet*. In these, we work with lectures and video of Monica's Gang *A Plan to Change the Planet*. The video addresses the issue of climate change and caring for nature. There is the *Piava Project - Prevention of Drowning Incidents in the summer in fresh water*, care tips to prevent drowning and also of environmental preservation. Similarly in Santa Catarina, the city of Itajaí presents the *DC at School Project 2012*, where civil defense presents lectures with exhibitions, slides and videos as tools for students of 5th and 6th grades.

The State of São Paulo has the under construction project *Build and Seize Plan* developed by Civil Defense State Coordination/SP with the support of the State Public Universities (IGCE-UNESP; IG-UNICAMP, USP) and private (PUC/SP), State Department of Education and Municipality of Ubatuba/SP and São Paulo, and Municipal Civil Defense of São Paulo with the overall objective to elaborate curriculum guidelines for Elementary Education I, II and medium on the principles of Protection and Civil Defense.

The cities of Duque de Caxias, RJ; Barro Alto, GO; Francisco Morato and Franco da Rocha, SP have the *Project ECOnciousness and environmental games Tents*. In the Community Educator Program, where the students of public education are able to mobilize and sensitize the community about the social and environmental problems of their region, they are called Environmental Pedagogical Agents.

Reducing disaster risk in Brazil and the world, linked to formal education becomes increasingly present due to global campaigns, public policies and measures such as the curriculum reorientation.

While school systems are greatly affected by disasters, they are also the key to reducing the risk and strengthen resilience to disaster. Similarly, in a given time, the fight is restricted to achieve a law, another time the fight is in their implementation (BOMFIM, 2013).

Education has no power to alone solve the major problems which society faces, but their contribution is essential (VASCONCELLOS; LOUREIRO; QUEIROZ, 2010). Quality education can offer preservation of life and knowledge for a better livelihood, skills and attitudes that protect children and young people, during and after emergencies.

What people know and what they were exposed to, is of utmost importance when it comes to saving lives and reduce losses. Therefore, the inclusion of disaster risk reduction (DRR) in the school curriculum will increase the safety of school systems and the capacity of communities liable to disasters to recover (UNESCO/UNICEF, 2012).

Education for disaster risk reduction is a construction of the students' understanding of the causes, nature and effects of the risks and which at the same time promotes a range of skills and abilities that allow them to contribute proactively and as multipliers in the prevention and mitigation of disasters. In this case, the *multiplier* expression may be understood as the quality of spreading a message in a dialog. Thus, despite the community not being directly involved, there is an expectation of the active role of these subjects to work with the school community, featuring the sense of participation and multiplication of the values learned in the classroom (SANTOS; BOZELLI; SPINET, 2012).

As children often make up a large part of the population affected by disasters, ignore their ability to help means weakening the community as a whole in cooperation of the situation. Therefore, the child should be educated in disaster risk reduction to improve both know their home, as their community, and thus prevent disasters. The child's learning is also important for them to know how to deal with disasters during and after the fact, knowing what to do and where to go to. The child may also act as an agent to promote the subject, teaching their families and communities on how to avoid risk situations and how to act in response to disasters (CEPED, 2013).

It is considered that the mode of production and consumption in which we operate and the social relations that are established from it have, for decades and even centuries, led us to a development process linked to environmental degradation of human interference on natural resources has a direct impact on their quality of life. Hence, the importance of environmental education, which in its scope includes the disaster risk reduction culture.

This debate can bring a profound impact on emancipatory potential of environmental education, a desire to overcome the perverse logic of modern rationalism that promotes development at any cost, degrades and destroys with brute force nature (TRISTÃO, 2013).

Bring such understanding to school spaces and from them establish points of connection with disaster risk reduction actions is the crux of the inclusion of the topic. In this sense, the Blumenau's experience was analyzed in the implementation of *Civil Defense in Schools* can be replicated in other municipalities in the Itajaí's River Basin, in order to share positive attitudes and actions of Civil Defense in partnership with the Department of Education.

4 Results and discussion

Education is a social experience which involves the discovering itself, relationships with others and the construction of knowledge, according Fachini and Silva (2014). To Torre (1998) the theory should be reversed from theoretical-practical to practical-theoretical method and, in which the pedagogical knowledge is not the result of an academic reflection, but reflection about the practice. It starts with the experienced reality, simulated, observed or described.

The Civil Defense of Blumenau, from its practical experience, has carried out environmental education to reduce disaster risks as presented below.

4.1 Civil Defense actions of Blumenau at Schools

The Citizen Defense Secretariat in the city of Blumenau is composed of four directors: (1) Civil Defense (2) Geology and Natural Hazards Analysis, (3) Projects (4) Alert System so called ALERT BLU. The Civil Defense Board in 2012 articulated the partnership with the City Department of Education for programs and Integrated Projects Board of Blumenau City Hall for the presentation of ideas and the viability of the actions with municipal education students.

Therefore, the Civil Defense in Schools and Civil Defense Junior Agents classes of actions lectures are held, mostly by the social worker and project coordinator Luciana S. Correia and the social worker Juliana M. de Azevedo, both workers in the Civil Defense from Blumenau's municipality. There is also the participation of geologists from the Geological Department, Analysis and Risks and also the Fire Department.

The Civil Defense in School Program has developed its activities in the Municipal School of Visconde Taunay, as pilot Project by reference in question sustainability throughout the year 2013. The initial project was in the first series, but due to great effect, was extended to others series of elementary school. Later, the program was taken to the Municipal schools (Figure 1) and State schools located in areas of risk and very high risk, being held in 2014 in 10 schools in classes of 4^o grades.

Figure 1 - Civil Defense at School.



Source: Department of Defense of the Citizen, 2013

The Civil Defense in School Program has its importance gradually recognized and each year a greater number of schools looking for the municipal Civil Defense to be part of such actions. In 2015, the actions are involving both public and private schools, always in a number of 10 schools each year.

The subjects were divided into four modules as follows: 1) Basic Notions of Civil Defense; 2) Risk Perception; 3) Disaster; 4) Closing Activities. (Exposure and QUIZ) (Figure 2).

Figure 2 - Closing Activities, QUIZ, Civil Defense at School.



Source: Department of Defense of the Citizen, 2013

The Civil Defense of Santa Catarina also provides municipalities Civil Defense, booklets with illustrated stories brochures on the topics: Civil Defense, dangerous products, prevention, communication, storms, floods, landslides, drought and hail. Through the series of booklets "Our Security, the Civil Defense" works to disaster prevention and risk reduction in the municipalities, communities and schools, informing the population the meaning, importance and role of the body in the municipalities and the state.

The project also aims to make a documentary with interviews circuit with junior officers, firefighters, civil defense secretary, and principals of schools, agent's parents and students, for closing the activities each year.

Classes are taught by the social worker and project coordinator Luciana S. Correia and the social worker Juliana M. de Azevedo, both of Civil Defense from Blumenau. Prefecture's geologists also participate in lectures (Figure 3).

Figure 3 - Participation of geologists of the city of Blumenau, SC



Source: Department of Defense of the Citizen, 2013

4.2 Civil Defense Junior Agent

From the pilot school of Visconde de Taunay, 20 students of final grades of elementary school were selected to be active participants of civil defense as junior agents (Figure 4). In this group, students have two classes of 60 minutes, every 15 days, with a theoretical and a practical lesson.

Figure 4 - Solemnity possession of Junior Agents of Civil Defense from the Municipal Viscount of Taunay School, with the Mayor of the city of Blumenau



Source: Department of Defense of the Citizen, 2013

The junior agents of Blumenau's Civil Defense already presented to other students the steps to become a junior agent in the city. The lecture was held at the Municipal School Pastor Faulhaber and Municipal Primary School Alice Thiele, which are located in a dangerous area from the south of the city of Blumenau. The objective was to strengthen and make students aware of the importance of agent activity in the city. The group has also visited the Primary School Standard Hubert, at that opportunity; agents visited a risk area in the region of Coripós.

In the year 2015, the action Junior Agents is being conducted with the Primary School Norma Hubert.

Because of this, the formation of a group of Civil Defense Junior Agents helps to enable them to strengthen prevention and sustainability in the neighborhood, reducing risks, and the vulnerability of children and adolescents, to disasters, emergencies and disasters. In addition, agents are also encouraged to the creation of information strategies for the prevention behaviors to the visually impaired.

The performance of the Junior Agents in the neighborhood becomes the protagonists of culture change in the communities, in that it will be multiplying their knowledge and fostering new perspectives of life through the orientation process to the community on prevention behaviors of risk factors and reduction of personal, property, social and environmental damage.

4.3 Evacuation Plan

Another non-structural action of Civil Defense of Blumenau is the evacuation plan. Since Laws No. 12.645, of May 16th, 2012 and No. 12.608 of April 10th, 2012, students from 50 local schools put into practice the Evacuation Plan.

This aims to prepare the educational units in the event of incidents and disasters such as landslides or fire, for example. The work was coordinated by the Civil Defense in partnership with the Department of Education and Unimed/Life Project.

The Municipal Primary School Pastor Faulhaber, on October 10th, 2014, featured a structure set up to implement the plan, focusing on the slip in the morning and in the afternoon, the fire (Figure 5). An elaborate scenario was used in action in the back yard of the teaching unit and an audible siren. The fire department, junior officers of Civil Defense, 25 employees and 190 school students participated in the action. In the morning all the students left in one minute and twenty five seconds.

Figure 5 - Evacuation Plan at Municipal Primary School Pastor Faulhaber



Source: Department of Defense of the Citizen, 2013

The proposal of the Evacuation Plan, which is part of the celebration of National Safety Day in Schools, is to promote human protection and maintain school community safe at risk. In practice, the activity is a real training, including evacuation of them from within the teaching unit to ensure their physical integrity.

In the year 2015, besides the abandonment plan, it was conducted a drill exercise facing gravitational mass movements due to celebrations of the municipal Civil Defense week in July. The action was attended by all the directors of Citizen Defense Department and it took place on Araranguá Street community, along with Alice Thiele School and the Santa Luzia Church, which is currently a temporary shelter in the event of disasters in the area.

4.4 Lectures in Other Municipalities

The Civil Defense Program staff at the school, developed by Blumenau Prefecture, was also in Benedito Novo town promoting lectures for students of the 6th grade of the Basic School Nolasco Teófilo de Almeida (Figure 6) and the city of Botuverá at the Municipal School of Águas Negras and Municipal School Ribeirão do Ouro in the classes of the 4th and 5th grades (Figure 7). The focus of the work of the Citizen Defense Department together with to teaching units from Blumenau and other municipalities aims to build important skills for children of how it works and what to do to work together with the civil defense in case of adverse events.

In this regard, the actions taken by the Civil Defense Blumenau are important not only to the municipality but also to the whole region in which it operates, working as a model to be released and followed in building resilient communities facing natural disasters.

Figure 6 - Lecture in Benedito Novo, SC



Source: Department of Defense of the Citizen, 2013

Figure 7 - Lecture in Botuverá, SC



Source: Department of Defense of the Citizen, 2013

The coordinator of Civil Defense program in the School of Blumenau, Luciana S. Correia was requested by the Civil Defense coordinator of Benedito Novo, on July 2nd, 2014 commented on the importance of replication of the project to other municipalities:

Given the history of floods and mudslides in the region, they felt the need to work prevention in school. Because the city of Benedito Novo does not have yet a civil defense structure as the one of Blumenau. The partnership between municipalities is very important. We share with them our experience from the process of cooperation with the Department of Education, the search for partnerships and the implementation of the program in the units. In addition, the visit was essential to reinforce the idea that working with students contributes to improving the quality of life of communities, from the production of knowledge about the causes of climate events and the incorporation of new preventive practices (verbal information).

By the year 2015, classes have been structured and guided the everyday experiences of Civil Defense, without proper pedagogical support that results in an adequate assessment of the teaching-learning process. This demand was identified in the "Risk Disaster Management and Public Policy" discipline taught by the Post-Graduation Program in Environmental Engineering at the Regional University of Blumenau (PPGEA/FURB).

Thus, a partnership was made between the Civil Defense and the University, through extension programs *Cidadania pela água na bacia do rio Itajaí* (Citizenship through water in the basin of the Itajaí) and *Construir* (Building).

This articulation has allowed the involvement of the teaching-learning process, research and extension with the work of undergraduates and graduate students in the development of activities with schools, guided by the transdisciplinary approach. Challenges, which are to break the isolation of disciplines and to expand the relationship with the world through eco-formation. "The eco-formation leads us to reflect as citizens while belonging to the world and the environment, because we are not isolated to this environment." (FACHINI and SILVA, 2014, p.90).

There are currently a dissertation and a thesis production as well as video lessons on the environmental education topic to reduce risks of natural disasters. Two video classes will be produced, one linked to the Civil Defense Program at the School and another facing the Junior Agents, which serve as teaching and learning tools, allowing individuals to identify the knowledge acquired. It will also help the multiplication of knowledge, involving parents and teachers in the educational process.

5 Other important aspects to consider in non-structural actions in Civil Defense

In the midst of adversities produced by disasters, the possibility of violations of the rights of children and adolescents are magnified to the extent that the usual conditions deteriorate protection.

In this context, it was elaborated the National Joint Protocol for Integral Protection of Children, Elderly and Persons with Disabilities in Risk and Disaster Situation, established by Ministerial Decree No. 2 from December 6th, 2012, with the main objective to ensure full protection and reduce the vulnerability of these subjects of law in situations of risk and disaster.

The back Protocol brings news about the accommodations shelters:

Restrict as much as possible the use of schools as temporary shelters, to allow it to accomplish their educational function, coordinating actions along with the areas of education and social assistance. And avoid the use of schools as a place of shelter in order to ensure their educational function, preserving the continuity of school activities for children and adolescents (BRASIL, 2012).

Very important issues not previously discussed and aimed mainly to the continuity in the educational process.

The National Protocol construction process is already considered an international reference for its character of integration and mainstreaming, focusing on the guarantee of rights to protection of those who need special attention.

At this point, after the imposition of the Protocol, it is essential to move forward in the accession of States and Municipalities, aiming at expanding the scope of the guidelines and provided guidelines to ensure the rights of children and adolescents, the elderly and people with disabilities. For this, it is essential the participation, support and training for public officials, civil society, private sector and international cooperation agencies at the three levels of the Federation.

In the contingency plan of Blumenau the total number of registered shelters is 60, and of these, 42 are schools. Between schools, there is 01 private school, 15 state schools and 26 public schools. Note that the City Civil Defense has knowledge of the protocol. However, due to the city's characteristics and the need to have registered shelters with an appropriate structure for sheltering, it was imperative to keep the registered schools, and these sites have top priority for replacement and deactivation.

6 Final Considerations

Civil Defense Actions at School, Junior Agent of Civil Defense, Evacuations and Plan and Lectures, in development in the city of Blumenau, are a reflection of a series of policies implemented in the international and national levels.

The concept of Disaster Risk Reduction (DRR) has had a remarkable evolution of meaning over time. This theme in environmental education can be seen as a key tool for the explanation of process values and attitudes in order to create a deep and lasting recognition of the problems associated with environmental issues. These non-structural measures for environmental education, disaster risk reduction management are feasible and effective.

Through the approval of National Policy for Protection and Civil Defense in 2012, It is vital to the implementation and continuity of these non-structural actions to prevent disaster risk in Blumenau, especially after the disaster of 2008. These experiences should be disseminated and implemented in other municipalities of Itajaí's Valley Basin, for joint construction solutions for disaster risk reduction.

It is vital that the "Civil Defense in Schools" program and the action "Junior Agents" continue to be built on the practical experience of the Civil Defense and the experience of students, contributing to the eco-formation and change of behavior of those involved. Up to this date, there is the effective participation of students, promoting their awakening to change their attitudes, serving up this way to one of the principles of environmental education as a continuous process of ecological education. However, there is the necessity of evaluating the process of teaching and learning, which take place through a partnership with the PPGEA/FURB enabling the opportunity of links between university, city hall and society. Forming an ideal tripod in the construction of knowledge.

And much more than the protectionist awareness directed to the nature or passive concern at environmental issues, disaster risk reduction into the school curriculum to develop interests in the citizen, attitudes of participation, decision-making about the issues that they are close to, developing a sense of responsibility and solidarity.

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