This is a single article featuring Bogotá, Colombia which is in three separate but related sections under separate titles.

DISASTER RISK EDUCATION AND SCHOOL SAFETY IN BOGOTÁ

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SEISMIC RETROFITTING AND REHABILITATION OF SCHOOLS IN BOGOTÁ

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SAFE SCHOOLS IN SAFE TERRITORY

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Disaster Risk Education and School Safety in Bogotá

Claudia Coca

Introduction

Disasters are closely related to imbalances among social, physical, ecological, and economic areas; those imbalances increase vulnerability and exposure to different kinds of natural, socionatural, and anthropogenic hazards. Pressures on natural and built environments are the result of settlement and urbanization patterns, population growth, and consumption and production models, among other aspects. Weak development policies in terms of environmental, sectoral, and land management contribute to urban unsustainability. The education sector is not outside those systematic social, physical, ecological, and economic losses in which a radical effect on increasing vulnerability is evidenced from real-life human conditions such as poverty, inequality, and poor planning processes, and knowledge appropriation. Within these local and global contexts taking into account community needs constitutes the main axis for advancing more sustainable cities.[1/]

Local context

Bogotá is located in the eastern mountain branch belonging to the complex system of the Los Andes mountain range in Colombia. It has an urban area of approximately 300 km^2 and a population density of approximately 3,529 per km^2.[2/] The city is the major population concentration within Colombia. According to the 2005 census estimates from the National Statistics Department, 2007 projections yield over 7 million inhabitants. The population rate has increased due to social conflict-induced migration and because of the economic development in the city that represents work opportunities and services.

From the administrative point of view, Bogotá has a central government which is the Bogotá Capital District, but also has twenty decentralized prefectures. Bogotá's disaster

risk management is handled by the Directorate of Emergency Prevention and Attention that coordinates at least forty-one entities belonging to the District System of Emergency Prevention and Attention. This Directorate has been in charge of technical and scientific knowledge on disaster risk, risk reduction, and emergency response.

Bogotá is located in a moderate seismic hazard zone and has been affected by several recent earthquakes, in 1785, 1826, 1827, and 1917. Earthquake vulnerability has dramatically increased since the 1950s due to massive migration and due to at least 75 per cent of the city growing in a unplanned way and without earthquake resistance standards. For similar reasons and due to poor land use, floods, and landslides also pose hazards. There are more than 450 unstable hillside zones that have been occupied. Due to drainage deficiencies and people settling in river floodplains, there are also flood hazard zones, especially in the south and the east of the city. Anthropogenic hazards exist too as a result of several economic activities that involve transportation, storing, and industrial processing of hazardous materials including chemicals and fuels. Bogotá experiences approximately 180 structural fires and a few forest fires in the hills of the city every year. Finally, because of the high level of cultural development, many large events such as concerts, sports, festivals and religious celebrations occur leading to the possibility of crowd-related hazards.[3]

Risk management mainstreaming in the planning process has been implemented in the different development sectors and these policies have allowed some reduction of accumulated vulnerabilities. These efforts constitute important advances in searching for urban sustainability and the education sector is one of the best examples for showing an experience that must be reviewed and applied in different contexts.[4]

Educational experience

Based on the discussion above, vulnerability reduction is fundamental to make safer communities.[5] Before describing the experience of Bogotá, it is important to review at least one case in which the education sector was affected by a hazard in another national context. A detailed analysis of socioeconomic effects of a disaster on this sector has not been made, instead focusing on ex-post methodologies of physical losses in terms of infrastructure. That does not cover social losses such as casualties, livelihoods, or how much the state lost in terms of its investments.

On 25 January 1999, an earthquake occurred in the coffee-growing area of Colombia, located 350 km to the west of Bogotá, causing approximately 1,185 deaths, 8,500 injuries, and estimated financial losses of US$1,875 million.[6] According to the same source, the education sector losses were approximately US$137 million. Just in Armenia, one of the most affected cities, twenty-two schools were destroyed. The event occurred during the school vacation which is the reason why at least 9,335 students, 3 per cent of population of the city, were not directly affected. The unavoidable question is: What would have been the political, institutional, social, and economic implications if the students had been inside these schools during the earthquakes, leading to mass casualties?

On the whole, Colombia's historical process of school development is similar to all countries of Latin America in that most of them had an informal and community origin. Often, they were located on land that nobody else wanted to use, but at the same time it is very difficult to convince people about risk in and around schools because the community

participated in the siting and construction. Nowadays, public investment in education, health, public services and social inclusion[7] are about 66 per cent of the total public budget.[8] In spite of important social policy advances, 17 per cent of the population still has unsatisfied social needs. Nevertheless, formal education includes 92.5 per cent of the total school population. This population is estimated to be 1,650,000 students representing 25 per cent of the whole city. More than one million attend, and are located in, 760 public schools and at least preschool and primary education is free.

In order to understand how risk management policies arose in the education sector at the end of 1990s, it is fundamental to point out that there were many previous efforts in the public risk management process as well as scientific, technical, and normative developments. In 1997, the Directorate of Emergency Prevention and Attention in Bogotá published seismic microzonation[9] maps of the city which resulted from a technical study performed by La Universidad de Los Andes and the national geological institution, Ingeominas. This study established, among other aspects, seismic design and earthquake resistant parameters for infrastructure. In 1998, a new *Seismic Resistant Building Code* for Colombia was adopted, NSR 98[10] (*Normas Colombianas de Diseño y Construcción Sismo Resistente*). One of the most important requirements of this new code was the seismic vulnerability evaluation and rehabilitation of essential buildings. At the same time, the seismic code also provided a period of time for doing so. Initially, the period was six years, but in 2001, this time period was extended by up to twelve years. According to these requirements, a study[11] was contracted by the Education Secretariat of Bogotá in 2000 to identify the structural conditions of the public schools. At that time, there were 710 schools and most of them were constructed in the 1960s without taking into account earthquake resistant requirements or appropriate learning environments. This study showed that 434 of these schools had high seismic vulnerability, three were in areas vulnerable to flooding and twenty were likely to be affected by landslides.

In 2004, with the support of the World Bank, the programme "Fiscal Vulnerability Reduction to Natural Disasters"[12] was formulated at the national level. In the framework of this programme, the city administration of Bogotá promoted the initiative to reduce the seismic vulnerability of public schools, also supported by the city council which constitutes the main administrative authority for providing financial resources. The main purposes of this project were emphasized from the perspective of the rights of citizens, particularly related to children's right to life and their right to a high quality education.

Due to high costs implied by vulnerability reduction for all 434 vulnerable schools, which meant relocation in some cases, the most critical 201 were declared as being priority. From that, the project "Integrated Project of Rehabilitation of Buildings and Risk Management in Public Schools"[13] was formulated and incorporated into Bogotá's *2004-2008 Development Plan*, named "Bogotá without Indifference". The objective of the programme includes the reinforcement and improvement of schools from an integrated point of view. That means that the purpose was not only complying with earthquake-resistant construction requirements for existing buildings but also organizing the education infrastructure according to minimal living standards and following the *District Master Plan of Education Equipment (2006-2019)*. In addition, this programme was based on the implementation of a pedagogical strategy to incorporate risk management into the culture. Both structural and nonstructural objectives were described to get a comfortable

and safe school environment and a high quality education service extended across most cases of vulnerable schools.

Pedagogy on disaster risk topics was directly taken into account by the Education Secretariat. One of the most important initial actions was a survey of children's risk perception[14] in twenty schools. This survey showed hazard concepts to children and how they have to face other daily social threats that become "invisible" with regards to the natural and socionatural hazards formally addressed. Table 1 presents some examples of these kind of hazards by scenario and age. These findings implied new strategies for a more integrated approach to risk management that included the relevance of these social problems. Percentages of anthropogenic hazards are correlated with age and frequency. These findings implied new strategies for a more integrated approach to risk that included the prominence of social aspects.[15]

TABLE 1. IDENTIFICATION OF TWO MAIN HAZARDS BY SCENARIO AND AGE

	Student's Age				Teachers and Directors
Scenario	5 - 8	9 - 12	13 - 15	16 - 18	
School	Building* Falls	Building* Weapons (Knives and Blades)	Building* Gangs	Building* Kind of land	Building* Kind of land
Home	Fire Robbery	Weapons (Knives and Blades) Stove	Fire Kitchen	Robbery Gangs	High speed cars Robbery
Neighbourhood	High speed cars Robbery	High speed cars Robbery	Floods Robbery	Park	Contamination
City	High speed cars Floods	Earthquake Kidnapping	Earthquake Floods	Floods Landslides	Floods Landslides

Note: * Mainly roofs, walls, stairs, and windows.

Curriculum tools, instruments, methodologies and didactic materials were designed to make it easier for teachers to teach on developing a culture of vulnerability reduction and therefore on protecting one's own life.[16] In general, the Education Ministry at the national level is in charge of the standard academic curriculum for preschool, primary, and secondary education. Those curricula are organized in thematic fields with specific competence or capacities for each grade. Therefore, the survey led to a second important action through the Education Secretariat of Bogotá: the review and redesign of the curriculum's thematic guide on risk and disasters based on national standards.[17]

This guide was organized from both a theoretical and a practical point of view. It was focused on a constructive learning process according to the needs of the context in terms of hazards and vulnerabilities. In this way, it constitutes an important methodology and also an instrument to improve teachers' work on incorporating the topic into the fundamental educational areas such as mathematics, language, social science, and natural science. The pedagogic sequence of the guide's content was structured into four basic steps: (a) natural phenomena or event knowledge; (b) identification of human actions that be-

come or exacerbate hazards and that should be avoided; (c) reduction or mitigation; and (d) self-protection and emergency response. Consequently, from preschool up to secondary education, skills in terms of knowledge, aptitudes, and attitudes have been identified and reinforced. To complement this programme, a self-protection campaign was implemented: "Prevention is my tale: Disasters...I do not run risks!" (*Prevenir es mi cuento: Desastres... ni de riesgos!*). This campaign has supporting materials such posters, video clips, a risk calendar, stories, and games that help teachers in their work on the topic.

Results of the policy

From the financial point of view, the investment regarding the structural retrofitting and improvement of the schools has been about 349,904 million Colombian *pesos* (about US$162.7 million) and the total beneficiary population has been more than 300,000 students. This figure does not include the new fifty mega-schools which have to comply with the present earthquake resistance requirements and also optimal school living conditions. The total amount of both projects is 998,000 million *pesos* (about US$464.2 million).

According to Bogotá's inventory in 2003, there was 1,430,000 m^2 of school infrastructure in total; 680,000 m^2 of this infrastructure had been reinforced and in most of cases the buildings had been replaced. The overall results of the programme from the engineering point of view are: 172 structurally reinforced schools, 326 nonstructurally improved schools, and fifty-four expanded schools. Additionally, 1,045 teachers have been trained on risk and disaster curricula and on the design and implementation of school risk management plans. Seventy-three schools have already formulated and implemented their internal plan, the rest are still in process. Students of 110 schools have been working on searching projects on natural and social hazards and nine schools have received financial support for the implementation of these projects. 11,352 children worked through painting the ideas of "My school is reinforced and resists earthquakes" and "In my school, I learn about prevention and attention to emergencies". This idea was advocated mainly by ISDR and UNICEF, although other international agencies were involved too, and was coordinated by the Education Secretariat of Bogotá.

Finally, a School Risk Management Information System (SIGERSED) was designed and has recently been tested. The main objective of this system was to provide real-time information on the state of public schools, in terms of general hazards and vulnerabilities that yielded their risk analysis, their risk management plans, and designed and implemented pedagogical projects. This system permits monitoring and evaluation which is ongoing.

Conclusions

The direct impacts of this work so far are relatively clear, particularly in terms of the students and teachers who have been educated on risk and the school buildings which have improved safety. Other impacts are the subject of continuing work, particularly the employment effects, the ecological impacts, the changes to land use, and how much the state avoids or reduces losses and contributes to urban sustainability through these programmes. This approach must be considered not only as a simple case of risk management mainstreaming into a socio-economic development plan but also as an exchange process through the educational sector. Many other educational aspects are linked to the vulnerability reduction process, such as the access, sustainability, security and quality of

education. Equity is also important in that the divide between public and private schools has being reduced in terms of comfort, space available, resources and materials per student, water reserves, sports spaces, and access for people with disabilities.

Therefore, this article shows the importance of the contribution of vulnerability reduction in urban contexts and how public management, including through risk management and the education sector, contributes to local sustainability and to sustainable cities in which a human rights perspective, focusing on aspects such as protecting life and high quality education, are the main frame of reference. Improving education in both physical and pedagogical aspects constitutes one of the fundamental bases for improving the next generation and for preserving material and non-material assets of society.[19] Then, local sustainability will contribute to global sustainability.

NOTES

1/ D. Murillo, "Falacias del desarrollo sustentable: una crítica desde la metamorfosis conceptual," *Revista Economía, sociedad y territorio* IV (July-Demeber 2004):653.

2/ Alcaldía Mayor de Bogotá. Available from www.bogota.gov.co; accessed 2007.

3/ R. A. Vargas, "Estrategias de intervención para la gestión del riesgo en la ciudad de Bogota D.C.," *X Reunión de la red por la descentralización y el desarrollo Municipal* (FEMICA, 21-24 October 2003, La Antigua, Guatemala).

4/ Claudia Coca, "Evaluación diagnóstica de la gestión del riesgo del Sector Educativo en el marco de la Sostenibilidad Urbana de Bogotá" (Tesis de Maestría en Medio Ambiente y Desarrollo, Instituto de Estudios Ambientales IDEA, Universidad Nacional de Colombia, Bogotá, 2007). (Unpublised)

5/ P. Blaikie *et al.*, "Vulnerabilidad, El entorno social, económico y político de los desastres," *La Red de Estudios Sociales para la Prevención y Atención de Desastres* (Bogotá, 1996).

6/ United Nations Economic Commission for Latin America and the Caribbean (ECLAC), (30 April 1999).

7/ According to Bogotá's Development Plan, social inclusion is understood as the government responsibility to guarantee, from a human rights perspective, equal rights and services access especially for those in vulnerable conditions.

8/ Secretaria de Hacienda Distrital, *Así crece la ciudad. Boletín 2007* (Bogotá, 2007).

9/ Dirección de Prevención y Atención de Emergencias de Bogotá, *Microzonificación sísmica de Santa Fe de Bogotá* (Bogotá, 1995).

10/ Asociación Colombiana de Ingeniería Sísmica (AIS), *Normas colombianas de diseño y construcción sismo resistente NSR 98, Ley 400 de 1997* (Bogotá, 1997).

11/ Proyectos y Diseños Ltda, *Evaluación preliminar de vulnerabilidad sísmica de centros educativos distritales* (Secretaría de Educación, Distrito Capital de Santa Fe de Bogotá, Abril de 2000).

12/ Secretaría de Educación del Distrito Capital, *Proyecto 332, Vigencia 2004-2008. Subdirección de Plantas Físicas, Dirección Administrativa, Subsecretaría Administrativa.*

13/ Departamento Nacional de Planeación - Consejo Nacional de Política Económica y Social, *Documento Conpes 3398* (Bogotá, D.C., 28 November 2005) (*Mitigación Sísmica Sector Educativo*).

14/ Corporación Frailejón, *Investigación Diagnóstica en Percepción y Gestión del Riesgo en 20 colegios públicos — Informe Final* (*Contrato* No. 566) (Bogotá, D.C., 15 December 2004). (unpublished).

15/ This survey served as a complementary diagnostic to other initiatives such the Infancy and Adolescence Policy from Bogotá Prefecture that takes into account a component called "Secure City"/"Ciudad Segura" and also the project "Secure Roads"/"Caminos Seguros" implemented by the Education Secretariat of Bogotá.

16/ O. D. Cardona, "Curriculum Adaptation and Disaster Prevention in Colombia" in J. P. Stolman, J. Lidstone, and L. M. DeChano, *International Perspectives on Natural Disasters: Occurrence, Mitigation and Consequence* (Kluwer Academic Publishers, Dordrech, The Netherlands, 2004).

17/ Claudia Coca, "*Guía temática multimedia para la gestión del riesgo,*" (*Secretaría de Educación del Distrito Capital, Subsecretaría Académica, Dirección de Gestión Institucional*) (*Contrato 578*) (Bogotá, Enero 2005).

18/ J. M. Naredo and S. Rueda, *La "ciudad sostenible": Resumen y Conclusiones* (1997).

ADDITIONAL REFERENCES

Bermejo, R., *La Gran Transición hacia la Sostenibilidad. Principios y Estrategias de Economía Sostenible*. Editorial Los Libros de la Catarata (Madrid, 2005).

Cardona, O. D., "*Estimación holística del riesgo sísmico utilizando sistemas dinámicos complejos*" (Doctoral Thesis, Universidad Politécnica de Cataluña, Barcelona, 2001).

Coca, C., "*Guía temática multimedia para la gestión del riesgo,*" (*Secretaría de Educación del Distrito Capital, Subsecretaría Académica, Dirección de Gestión Institucional, Contrato 578*) (Bogotá, Enero 2005).

Departamento Nacional de Estadística de Colombia. Available from www.dane.gov.co; accessed 2007.

Presentación Plan de reforzamiento estructural de colegios de Bogota. Available from www.sedbogota.edu.co/secretaria/export/SED/svirtuales/Reforzamiento_Estructural.html; accessed 2007.

Secretaría de Educación del Distrito Capital. Available from www.sedbogota.edu.co; accessed 2007.

_____ *50 nuevos megacolegios* (Institutional information brochure) (Bogotá, 2007).

_____ *Personal communications*: Isidoro León Céspedes, Administrative Director, and Carlos Cárdenas, Project Coordinator, (Bogotá, 2007).

Secretaria de Hacienda Distrital, *Así crece la ciudad* (Boletín 2007) (Bogotá, 2007).

Sistema de Información para la Gestión del Riesgo y la Atención de Emergencias de Bogotá. Available from www.sire.gov.co; accessed 2007.

Wisner, Ben *et al.*, *At Risk: Natural Hazards, People's Vulnerability and Disasters* (Second edition) (London: Routledge, 2004).

Seismic Retrofitting and Rehabilitation of Schools in Bogotá

Omar D. Cardona

Twenty years ago, in a positive response to the Nevado del Ruiz volcanic eruption and Armero disaster in 1985 which killed 25,000,[1/] the National System for Disaster Risk Management of Colombia was created. This inter-institutional and multisectoral organization, based on administrative, fiscal and political decentralization, was the framework on which to base thinking on what, who, and how to encourage the seismic reinforcement of essential buildings and lifelines, including schools, as a key activity of the country's disaster risk reduction policy.

The financial investment of the city administration of Bogotá in recent years has been close to US$460 million. This has been used to improve, rehabilitate, and retrofit schools; to build new schools; and to promote risk management through awareness, curricula adaptation, and preparedness. The activities have been implemented in both primary and secondary education and are the product of the wide involvement of people and institutions involved in urban and socioeconomic development, as the principles of the National System stipulated from the beginning. The decision the World Bank to provide US$80 million deserves credit along with the remaining notable funds coming from the city administration, guided by the mayor's desire not only to rehabilitate beams, columns, and foundations but also to provide children with a better school environment and a higher educational quality.

Taking into consideration that disaster risk management is not a discipline, sector, or institution, but is a strategy of development and quality of life, cities such as Bogotá, Manizales, and elsewhere in Colombia are examples of the feasibility of disaster risk management. The topic involves public development policies, risk perception and analysis, disaster preparedness and management, and risk transfer and financing. Schools — but also hospitals, bridges, fire stations and other emergency services, and key governmental buildings, to mention just a few cases — have been reinforced in those cities to reduce their structural vulnerability. These outstanding outcomes, and good examples (fortunately not isolated) of public policy and governance at the local level coupled with the support, concurrence, complementarity, and subsidiarity of the central government, all together signify that disaster risk management it is not an utopia, but could be a reality — even in developing and less affluent countries.

Twenty years ago, at the time of the Nevado del Ruiz disaster, to speak about the seismic retrofitting of essential buildings was considered by some of us to be an impossible task — especially with the assumption that it would not be affordable. But the comprehensive framework and coherent conceptualization of disaster risk management from the development perspective was the starting point to reach the current results.

We first required the strengthening of the inter-institutional and interdisciplinary work by continuing training and public information. We updated our seismic building code to include structural vulnerability requirements. Appropriate evaluation of hazards, resilience, and vulnerability from different perspectives, microzoning, and land use planning were necessary and they led to the updating of laws. Scenarios of probabilistic losses along with environmental, social, and economic cost-benefit analyses were completed in

order to identify effective risk mitigation, risk transfer, and risk financing measures. Community participation, preparedness, and public information were achieved to conclude that risk management is not possible without the convergence of scientific and technical knowledge, the administrative political will, and the community acceptance and demand for improved security.

For those of us who have had the opportunity and privilege to be involved in several of these activities from the beginning of the process, observing the effectiveness of a good risk management theory and practice is very rewarding. Notwithstanding, it is worthwhile highlighting that there are still several safety deficiencies and much work remains to be done. The development shortcomings to resolve and the guarantee of sustainability are remaining challengers for the present and future generations regarding effective disaster risk management performance.

NOTE

1/ D. S. Mileti, (team leader), P. A. Bolton, G. Fernandez, and R. G. Updike, (1991) The Eruption of Nevado del Ruiz Volcano, Colombia, South America, November 13, 1985. Natural Disaster Studies, volume 4, for the Committee on Natural Disasters, Division of Natural Hazard Mitigation, Commission on Engineering and Technical Systems, National Research Council (USA) (Washington DC: National Academy Press, 1991); see also B. Voight, "The 1985 Nevado del Ruiz volcano catastrophe: anatomy and retrospection," *Journal of Volcanology and Geothermal Research* 44(1990):349-86.

Safe Schools in Safe Territory

Gustavo Wilches-Chaux

Several months ago, I began a press article asking and wondering if today there are more disasters than before — or if the media simply reports more. We wonder now about the same question with respect to the dangers and threats that lie in wait for children and young people in today's world. Are there more or do the media merely report more?

The answer to each question is: both.

A quick look at newspapers proves that assertion. A psychopath enters a school in Pennsylvania and shoots dead seven girls from a pacifist Amish community, which due to its nature, is supposed to be apart from the rest of the world. That is the third massacre of pupils which occurred in the US in one week. A similar incident happened in Canada, a society which seems to be less affected by that kind of wickedness, at least to the extent of the US.

As I write this article, the daily news includes reports about a Colombian priest and a US Congressman, both accused of sexual abuse of children, each in his own country. Last night's television news in Bogotá dedicated several minutes to cases of abuse and violence against boys and girls in different places across the nation, urban and rural, most of the crimes being perpetrated by their biological parents, step-parents, or close relatives.

The reporter Maria Elvira Samper then wrote:

> According to Bogotá's Coroner's Office, between January and May of this year, 64 suicides were reported and in a survey requested by Bogotá's City Council between 2000 and 2002, the monthly average of suicide in the country was 170 cases, this is about 6 a day. In Colombia, as in the rest of the world, the highest rate of suicide per 100,000 habitants, more than 40 per cent, occurs between the ages of 15 and 24, a population group highly active from every perspective: family, social, economic... The problem is so serious that the World Health Organization treats suicide as a public health problem.[1]

The same magazine[2] reported in its online edition the day before that "according to governmental sources, in the countryside, 7 out of 10 young people belong to irregular armed groups, and 63 per cent of people arrested are between 18 and 30 years old". This means that the *infanteria*[3] is one of the main components in these armed groups.

The United Nations Children's Fund (UNICEF) asserts that the 20 per cent of the 15 to 20 million people affected by landmines are children, and the *Observatorio de Minas de la Vicepresidencia de la República* (Vice-president's Mine Observatory, the national institution in Colombia for locating and defusing mines) reports that 418 boys and 117 girls have been victims of those mines between 1990 and the first five months of 2006.

This concerns only some kinds of explicit violence against the young. The enumeration would be endless if we went deeply into the kinds of implicit "cultural violence" which takes place every day, in all societies, against human beings and especially against women, most of them girls and youngsters.

In order not to drift from the same theme, *Cambio* magazine reports that cosmetic surgery of women's breasts has increased close to 700 per cent around the world and that the number of Colombian women who undergo breast size increase is between 25,000

and 50,000 every year, according to the *Sociedad Colombiana de Cirugia Plastica* (the Colombian Society of Plastic Surgery, the professional association of plastic surgeons in Colombia). Silicon implants have become a way to reach the paradise of dreams. Other sources affirm that 95 per cent of people most affected by anorexia are women between 14 and 18 years of age. These are pathological responses to cultural impositions (not excluding profiteering) which force women to feel unsatisfied with their own bodies and, consequently, to instill violent attitudes against themselves, against their real image, and against their normal way of being.

So far we have been speaking exclusively about the "real reality". If we examine the Internet, we find that new and more complex forms of threats against teenagers and children are proliferating. They break into our houses, into the childrens' rooms, and into their most private spaces. Where is the limit, then, where we can guarantee that a territory is able to offer true safety to children? That is, what is a "safe territory"? And within that context, what is a "safe school"?

The "safe territory"

In general terms, we can assert that a safe territory is one which is able to offer to its habitants the necessary conditions to carry on and claim their right to live with quality and dignity, which includes the use of the so-called DESC (*Derechos Economicos Sociales y Culturales*) approach, meaning economic, social, and cultural rights of people.

The territory is not just a physical space or a geographic area, but is an emergent result which arises from the interaction between the dynamics of the ecosystems and the dynamics of the communities, which are inseparable. In other words, the territory is born from the permanent interaction and mixing between nature and culture — although some "cultures" may try to pretend to ignore this relationship. Many factors affect a territory's traits in offering or not offering safety.

Ecological factors or **ecological security**, from which the territory is able to offer the goods and environmental services which are required to live and to produce, at a collective level and at an individual level. Some of those services are obvious; for example, water for drinking and hygiene, air for breathing, fertile land to farm, and landscape to enjoy. Others are not as evident; for example, stable land on which to build, water or wind to produce energy, and relative weather stability to maintain routines in the different aspects of human activity. Close to these factors (and to all of the rest which will be mentioned), are two important aspects of the safety of the territory: security and nutritional sovereignty. That means the capacity of the territory to produce food "with cultural sense" which we require for living, and the capacity of society to maintain sovereign control over the production, reproduction and commerce of food.

Social factors, conventionally called **social security**, integrates among others the right to work, the right to a home, the right to health, and the right to education. None of these four rights is able to be fulfilled without the ecological security mentioned in the previous paragraph.

Economic factors or **economic security** allow the people in a territory to produce earnings and surpluses which, at the same time, provide them with access to adequate goods and services which today must often be bought, such as drinking water, health, a home, and education.

And last but not least, **judicial and institutional security**, which is normally known as *Estado de Derecho* (Rule of Law and Democracy). This means a territory in which there are predefined rules and institutions with the task of monitoring, enforcing, and inducing respect for these rules. These rules must start, of course, through dedication to, and respect for, human rights.

Should we add cultural security as an independent factor? That will, for instance, provide a reason to live for children, young people, men, and women, to love themselves the way they are and to fight to change the word instead of allowing themselves be defeated. But I think that this is an emergent result of the interaction of other factors. And yes, it definitely should be one of the most tangible expressions of a territory's safety.

These multiple interactions among all these factors make up a net or spider's web, whose strength to resist without breaking the impact of specific external threats or those arising from the inside of the territory, constitutes the territory's safety.

Those threats could be from natural sources (such as an earthquake, a volcanic eruption, the effects of the El Niño and La Niña phenomena, or a hurricane) or from human sources (such as armed conflict, changes of political regimes in the same or a different country, a drop in price of a strategic product in the international market, or the entering into force of specific agreements or free trade treaties).

The actual or potential impact of a particular threat is determined by the strength or weakness of this web, not by the intrinsic characteristics of the threat. For example, coastal ecosystems, whose capacity for resistance and resilience which provide wetlands and the mangrove swamp, among other ecological factors may be more or less intact, will not only be able to withstand hurricanes, but will also be able to from them — hurricanes will regenerate the water cycles and contribute to the catharsis of ecosystems.

A community endowed with strong and effective legislation, technology, and infrastructure enabling it (and its individuals) to take on particular production and commercial risks without endangering its survival will be able to deal with the effects of a free trade deal. However for a society characterized by features such as "sink or swim" or "survival of the fittest", treaty concerning free trade may constitute a great threat, at least for the most vulnerable groups are which generally the most numerous. And sooner or later, the weak points, or some of them, become threats for the rest.

The effects of El Niño and La Niña, as part of the El Niño-Southern Oscillation (ENSO), constitute threats to the territories in which they take place, depending on the degree of vulnerability of those places. We can thus assert that culture is the set of strategies developed by communities in order to adjust materially and symbolically to the dynamics of their territories. And since culture is an integral part of the territory, all cultural transformations, adaptive or not, are actually territorial transformations Ecologists speak about the simultaneous evolution of living forms and their environment; that is, co-evolution.

Depending on the location, El Niño may manifest itself through strong and persistent rain, or through strong and long-lasting drought in the same year. If an ecosystem or river basin has an effective immune system (this means a relatively strong ability for self-regulation), the mountainsides will be protected by native vegetation, meaning that this vegetation may absorb the strength of the rain such as through deep roots which prevent soil from being washed away. And meandering rivers will be provided with adequate

floodplains on each bank to accommodate heavy rains. In cases of drought, nature has mechanisms which enable rainwater to be retained during rainy periods, and gradually releasing it during dry periods.

In this way, cultures which have co-evolved in close contact with their ecosystems (characterized by droughts and floods) have developed species able to survive and to reproduce in both types of environmental conditions. These species and the techniques to exploit them are part of the biological and cultural diversity of the communities, even though they are not always the most "profitable" or "productive" as seen from the exclusive viewpoint of the market. For that reason, many species and the cultural strategies linked to them have disappeared or are in danger of extinction due to the boom of monocultures and uniformity. This is one of the reasons why the vulnerability of the human species is increasing in respect to climate change.

When a specific territory has witnessed land-use changes which alter the capacity of self-regulation of the ecosystems, as with the community, events which previously did not pose a threat immediately acquire this characteristic. A period of heavy rain or severe drought, which formerly were just normal "stages" in the life-cycle of the ecosystem and communities, becomes a threat and a potential disaster, and a reflection of the magnitude by which a community has failed to readapt. This re-adaptation is not, as shown before, exclusively ecological, and neither are the reasons the perturbation exclusively ecological.

Socially exclusive decisions, adopting the wrong economic measures and not integrating with the territory's dynamics and complexity, may lead to land-use alterations which result in greater vulnerability of the ecosystems and communities. They may also affect the people's ability to claim respect for their fundamental rights, starting from survival.

As a consequence, ineffective politics weakens governance, government legitimacy, and community cohesion. If that government tries to recover those lost faculties by repression and armed force, then the social-institutional web suffers further damage rather than improvement. That is, the state may end up endangering the rule of law, democracy, and human rights. From both sides, the web starts to tear apart.

In this context, what is a safe school?

To those in the field of risk management, the factors directly related to school safety have as much to do with structural quality (the ability of the building to resist, for instance, the effects of an earthquake) as with the territorial conditions where the school is built. A safe school must be built on terrain which will not slide or flood in the case of heavy rain and where there is no danger of mud or rock slides.

The safety of a school is also a fractal: a small reproduction of the territory's overall safety. The school is safe to the degree by which it is governed by a rule of law and democracy guaranteeing coexistence among the individuals of academia; the degree to which the rights of all are recognized and respected; and the degree to which each of those individuals can exercise pre-established mechanisms to claim and re-establish these rights if they are offended.

A safe school is one which belongs to an educational system which guarantees and uses the necessary resources to maintain the goods where education is being given as well as educators' welfare; for instance, by properly paying and supporting the teachers, executive staff, and all the institutional staff. That will reach a high level of quality for

education.

A safe school is one in which environmental education (education about coexisting sustainably with the environment and the society) and risk management education constitute inseparable components of what Colombia calls the *Proyecto Educativo Institucional* (Institutional Educational Project). That means that, among other practical outcomes, the educational community is provided with an educational plan for risk management. But it does not end here.

Safe schools in safe territories

A safe school is inconceivable outside of a safe territory, since the real safety of the scholarly institution is directly proportional to the safety of the territory to which it belongs. The schools (understood in the widest sense of the word, as institutions where education is given formally or informally) are open systems into which the surrounding reality penetrates through processes and channels which can be informal and formal, such as through institutions. Beyond the safety which the educational institution may offer its students, an important part of their lives is developed physically, socially, and culturally.

Even if a disaster has not happened, the interruptions or the public services (for example, water, electricity, and transportation) affect the development and progress of the educational activities, in the same way as the alterations to the coexistence of people in peace have confused many communities as being "normality".

Plenty of schools in the world confront, on a daily basis, the challenge of maintaining themselves and working in adverse conditions, in terms of the risk generated by human and natural threats. Often, threats from armed conflict or wars are even more immediate and dangerous than environmental threats. How could a safe school be defined; for instance, in Sub-Saharan Africa, where many people, including pupils and teachers, suffer directly and indirectly the consequences of HIV/AIDS?

These thoughts may lead us to the conclusion that it is almost impossible for safe schools to exist, since safe territories do not exist — neither in the developed countries nor in the developing countries. This conclusion may doom us to resignation and inaction. However, if we employ the essence of risk management, we will remember that the objective is not to eliminate risk, since risk is a part of normal life, but to interact with the factors that generate risk, reducing those factors when possible and trying to avoid them becoming disasters.

A safe school, then more than a statistical achievement, would be a dynamic process, in which interaction occurs in a conscious way among players and factors which belong as much to the education community as to the wider social environment.

Essential measures, such as reinforcing the building or the implementation and start-up of an education plan for risk management (which considers as much human threats as natural threats), contribute without hesitation to improving school safety, and may also positively influence the safety of the surrounding territory. If the educational plan for risk management penetrates into the school, it may also penetrate and contribute to transforming its educational and community dynamics.

The school may become a nucleus where integrated safety is radiated to the rest of the territory. Environmental education (included in the education plan for risk management) has developed strategies which strengthen the school's ability to interact with the

environment, not only from the academic point of view, but also in recognizing that the school and the education community in general (including students, teachers, parents, and education authorities) may become a leading player in the process of building territorial security.

In Colombia, they are called *PRAE* (*Proyectos Ambientales Escolares* meaning environmental education projects) or *PROCEDA* (*Proyectos Comunitarios de Educación Ambiental* meaning community projects for environmental education). In other countries, they exist with different denominations or without any specific denomination. They are simply processes of education with a high level of quality.

Then, more than speaking about "safe schools in safe territories", we could speak about "safe schools for building safe territories". Or we could speak about both, at the same time. This is because such processes in life are a two-way street. They are co-evolutionary.

NOTES

1/ Maria Elvira Samper, *Cambio* (online magazine) (Bogotá, undated, 2007).

2/ *Cambio* (online magazine).

3/ *Infanteria* is the Spanish for infantry or foot soldiers in an army. The author wants to play with the word since *infantil* and derivate words in Spanish refer to children and childhood. This is in order to emphasize the use and abuse of very young people as cannon fodder by these armed groups.

COMMENT

Arrietta Chakos

> Disaster makes it clear that our interdependence is not only an inescapable fact but a fact worth celebrating — that the production of civil society is a work of love, indeed the work that many of us desire most.[1]

All too often, the lessons offered by disasters are unheeded or soon forgotten. In the three studies on Bogotá and Colombia, Claudia Coca, Omar D. Cardona, and Gustavo Wilches-Chaux, respectively demonstrate the necessity for disaster resilience and show Colombia has integrated risk mitigation practices into its daily life. Successful sustainable development crosses sectoral lines, is multidisciplinary, and fulfills overlapping purposes. We see in these case studies examples of where the qualities of sustainability enrich development plans and implementation and that school safety is often an initial focal point for community regeneration.

Coca's article, "Disaster Risk Education and School Safety in Bogotá, Colombia" depicts how the city was primed to be an active partner with the World Bank in a critical seismic risk reduction programme for schools. This partnership developed after a 1999 earthquake west of Bogotá destroyed twenty-two schools. This event punctuated ongoing risk management efforts in Bogotá to assess regional risk and to develop resilient mitigation strategies via establishment of seismic resistant building codes targeting the safety of educational facilities. An effective policy tactic, the notion of a child's "right to life" in a safe school, served as a moral incentive for this work.

Coca outlines the risk assessment process, citing attendant educational and social policy issues that affect tenuous infrastructure situations. These thematic links are merged in Bogotá's culminating policy document, a master development plan (*Bogotá without Indifference*) and the substantial financial investment of US$162.7 million that follows to seismically improve nearly 48 per cent of the educational building stock. The plan's comprehensive approach weaves seismic safety into the fabric of municipal life; improvements to educational infrastructure link pedagogical, social, and capital needs as defined project outcomes. Implementation of a multidisciplinary approach in a capital programme is unusual and a noteworthy accomplishment. Coca's emphasis on the plan's sociological and educational components shows sustainability must be present at many levels, not solely in built environment upgrades. Bogotá's development of a "culture of vulnerability reduction;" the Ministry of Education's risk curriculum, along with substantive student/teacher participation in school site risk management and preparedness ('Prevention is my tale'); and vigorous partnerships with the United Nations Educational Scientific

and Cultural Organization (UNESCO) and United Nations International Strategy for Disaster Reduction (UN-ISDR) point to a robust, multisectoral initiative. Coca's conclusion points to ongoing impacts that educational facility and programme improvements have on community sustainability, and even "global sustainability." Undeniably, such examples mirror the positive, active ways communities can change the world one city at a time; one only hopes the tempo for change quickly accelerates in coming years.

In "Seismic Retrofitting and Rehabilitation of Schools in Bogotá, Colombia," Cardona echoes Coca's findings in his discussion on Colombia's efforts to systematically reduce public sector risk. He points to the galvanizing influence of the 1985 Nevado del Ruiz disaster that mustered the nation to create the National System for Disaster Risk Management, a framework for subsequent implementation of risk reducing programmes (i.e., Bogotá's programme). He also cites the important role that multinational institutions like the World Bank can play as mitigation investor and support for risk reduction policy. Using a systemic management strategy, communities undertake technical risk assessments to guide mitigation decision-making informed by community participation and political acuity. This overview, then, serves as a policy brief to Coca's practitioner assessment.

Wilches-Chaux's study on "Safe Schools in Safe Territory" complements Coca's and Cardona's practical analyses. His examination of how to define safety at the a macro-level, "a safe territory...offer(s) its inhabitants the necessary conditions to carry on and claim their right to live with quality and dignity..." embodying "cultural security" as a primary quality of that territory, enriches our thinking. The purposes of schools, as crucibles for real-life learning, and adult responsibility to create resilient institutions given environmental, political or social disruptions must be properly matched. We see schools dynamically interact with the "wider social environment," and "may become a nucleus where integrated safety is radiated to the rest of the territory." This is a salient point given that cities often initiate safety measures first in school buildings. An unintended, though happy, consequence is that further community awareness and improvements follow; a case in point is California's Bay Area region where large-scale, sustainable mitigation grew from initial efforts to protect children in vulnerable schools.

Together, these writers portray a vivid picture of hearty community resilience built from the tragedy of disaster — theirs is a lesson we cannot ignore. The ever-growing threats communities face from disasters demand urgent attention and innovative ways to involve those affected by risk — officials and local stakeholders must actively share in the betterment of their communities. Collective commitment to sustainability is highlighted in Coca. She shows a continuous thread of participation among officials and the school community, so that while capital improvements proceed, a larger cultural shift takes place as well. It is through like shifts that we create sustainability, as we see risk reduction as more than hardening physical structures. By pairing improvements to the built environment with social innovation, we see it is possible to create a multi-layered, viable culture of mitigation such as Colombia's. Hazards' experts have long espoused such notions and are now challenged to connect these crucial policies so government decision-makers, land-use planners, and residents in disaster-prone regions embrace risk awareness and implement damage prevention.

Other nations and disaster-prone regions have addressed the challenge of school safety, albeit in an *ad hoc* way. In many respects, this is a problem without a vocal constituency

between major disasters — children cannot champion this cause; few adults wish to. Seeing other examples of positive deviance in New Zealand; British Columbia in Canada; portions of the western US; and Japan gives reason for some optimism. Wilches-Chaux discusses the concept of "co-evolution," alluding to the dynamic interchange between environment and inhabitants. He suggests adaptive change, as a response to risk knowledge, is an inevitable outcome in surviving populations faced by an evolutionary challenge. We see co-evolution at work when multidisciplinary approaches to sustainable development cross sectoral lines and share larger, social purposes, as shown in Colombia. Attaining the goals of school and community safety is a hard-fought challenge. Experience shown in the case study suggests that deliberate, focused action is successful when the network of civil society is activated and mobilizes its resources to best serve those most in need.

NOTE

1/ Rebecca Solnit, "The Uses of Disaster: Notes on Bad Weather and Good Government," *Harper's Magazine* (October 2005):37.