

Contributions



The Quest for a Culture of Seismic Prevention Based on Building Life Skills

This article, which is intended as a contribution to a culture of seismic preparedness, is based on the research I conducted for my Master's degree. It is consistent with the priority established by the Hyogo Framework for Action to "use knowledge, innovation, and education to build a culture of safety and resilience at all levels and to strengthen disaster preparedness for an effective response at all levels."

When I began to define the ideas that should guide my thesis research, it became clear to me that it should be linked to my work in the area of disaster risk management and to the expertise acquired during the course of my master's studies, so as to create value added for my own work and for the recipients of the final product: the greater San Juan community (San Juan Province, Republic of Argentina).

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Although I only had a basic understanding of seismic risk, I understood that my contribution should preserve the traditional focus of mitigating physical hazards and vulnerability, while incorporating the social variable into the equation. This would be a step towards the goal of “seismic prevention,” a quest dating back to that painful day, January 15, 1944, when an earthquake in San Juan damaged, in just 60 seconds, over 50% of the urban infrastructure which, at the time, covered a surface area of approximately 16 km².

While compiling information relevant to this issue, I came across Law N° 25.817, approved by the National Congress and enacted by the National Executive Branch on December 9, 2003. Through this law, the “National Program for Education on Seismic Prevention” was launched. After consulting a number of key references, I learned that the law had not been implemented at the national or provincial levels, beyond the formalities of adherence to national law.

One of the difficulties hampering the implementation of this law was related to the need to enter into “agreements to coordinate actions” between the National Institute for Seismic Prevention (INPRES) and the Ministries of Education of the 16 provinces comprising the Argentine seismic region. The goal of these agreements is to standardize seismic prevention policies. Nonetheless, and even when I determined that the Federal Council of Education and Culture of the Nation was the ideal forum to carry out this objective, I understood that it would only be possible through the political decision of the provincial authorities, taking into account that the body is headed by the Minister of Education of the Nation and made up of the education ministers of all the 23 provinces of Argentina and the autonomous city of Buenos Aires.

Regardless of the political factors, I understood that my contribution should focus on designing a draft that, once the “agreement” was signed, would serve as an alternative solution for the implementation of this law (the National Program for Education on Seismic Prevention).

As I assessed different possible solutions, I learned that the following considerations were important to take into account:

- A clear educational focus
- A defined target population
- A methodology based on “skills” building rather than simply transmitting theoretical knowledge.

In keeping with these parameters, alternative solutions should “produce a culture of prevention focusing on building life skills.” Such skills can be identified as “self-protection” from the standpoint of disaster risk management. This entails an attitude instilled in the individual on how to act during and even after an adverse event (an earthquake in this case), despite the paralysis that such an event tends to produce in people.

Bearing in mind that this cultural change will take place over the years, I understood that the target population should comprise the first level (preschool) and levels 1 and 2 of the basic public education of the San Juan province (ages 5-12). I also decided to exclude from the sample the 3rd cycle of the EGB in order to adapt the proposal to the educational structure of the San Juan Province.

The selection of these educational levels is based on the children’s ability to assimilate information, their willingness to incorporate knowledge, and the possibility of transferring it to their families, given the level of involvement of their parents at those educational levels.

The best proposal I was able to identify was one I called UNICAS (Unidad Itinerante de Capacitación en Sismos/ Mobile Seismic Training Unit). UNICAS represents the outcome of the efforts made by a team of INPRES and the Ministry of Education staff in the San Juan province. The draft included a seminar-based training format which would be carried out during the school year and would include theoretical knowledge as well as appropriate tools for its transfer at the various educational levels of the target population.

Although instructional materials, brochures and other training tools (including multimedia programs) are available in our country, they have not been developed based on the educational system and have not been effective in achieving the goal of prevention as defined in this study.

The thesis leaves it up to the work team to determine whether or not it would be useful to begin only with a teachers training or if it would be more appropriate to do it parallel to the transfer of knowledge to students as a time-saving measure. It is very important to bear in mind, however, that there are 6,928 teachers in the province at those levels, working in 720 schools. This means that it would take three years to train the teachers alone, according to the proposed schedule.

The opportunity to implement the “reference” program is established in Article 7 of the law, which empowers the Chief of the Cabinet of Ministers (2003) to “proceed with the relevant restructuring and budgetary modifications in order to comply with the provisions of this law”, an aspect that is made possible today by the recent approval of the law of extraordinary powers granted to the Chief of the Cabinet of Ministers, and because, essentially, it will not entail any expenditures on the part of the provinces located in the Argentine seismic region.

After presenting the thesis, the Catholic University (where I studied), agreed to forward my study to the government. At that time, the second half of 2006, then-Provincial Deputy Miguel Martín Martín pledged to introduce a bill amending the “traditional” law of provincial adherence to national law. I was

consulted by the deputy, along with architect Hemilce Benavidez (the thesis director) in order to contribute supporting elements. On November 23, 2006, Provincial Law N° 7761 was passed and included the following provisions:

1. Establishes the Provincial Ministry of Education as the law's implementing authority empowered to enter into agreements to coordinate actions with the National Institute for Seismic Prevention;
2. Establishes a 90-day period to carry out the aforementioned action; and
3. Authorizes the Executive to carry out the necessary regulation, reorganization and budgetary allocations to enforce this law.

On May 8, 2007, the date on which INPRES was founded and

is therefore commemorated as the "National Seismic Prevention Day," a reference "agreement" was signed between that national agency and the Ministry of Education of the San Juan Province, which included, among other provisions, the establishment of an "Interdisciplinary Committee" authorized to work on the identification of concrete actions to be carried out in the future.

I believe that the San Juan province, which has the highest seismic risk level in Argentina, has pledged that "disaster mitigation begins at school."

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Economic Development and Environmental Protection Thoughts from a law perspective

Look what it took for humans to be human! Look what it took for us to realize that the resources on our spaceship called Earth are finite and do not automatically replenish themselves! In order for us to understand this, we have had to go through different stages, difficult and slow at first, though somewhat quicker in recent times.

Articulating with a broad-based consensus the idea of “fundamental law,” which would recognize, first and foremost, the respect of life, liberty, equality and human dignity, and embodying this idea in a written code baptized Constitution were achievements that took centuries to attain and were the outcome of the birth of the modern State—that liberal, minimalist State that was limited to guaranteeing people’s private lives and security, as well as justice when needed. Of course it was not always so effective in practice, but at least the idea of the civil and political rights spread throughout the known world.

Industrialization brought the concentration of economic resources in the hands of the dominant few, while most people, simple workers, saw their rights being violated. This situation sparked numerous protests aimed at reclaiming their social, economic and cultural rights. As a result, societies wrote constitutions in the mid-19th century that enshrined the social State based on the rule of law—a State that is more involved with and supportive of its citizenry—attaining what we know as “second generation rights” through the so-called “welfare State.”

Following these, “third generation rights” came to light in the mid-20th century, in response to unfettered, negligent industrial growth for which economic profit is a priority, even if this means harming the environment and people’s quality of life, many times irreversibly.

These rights do not displace the earlier fundamental rights, but rather, complement them by stopping abuses that could put our entire way of life in jeopardy.

Now we have the “ecological guarantees of economic rights,” which entail rights and, in turn, responsibilities for all those under their protection. This movement started voicing its views globally in the Stockholm Declaration of 1972, followed by numerous agreements, such as the Earth Summit, held in Rio in 1992. Then, in 2005, the

UN World Conference on Disaster Reduction was held in Kobe, Japan, which resulted in the Hyogo Framework for Action (HFA), a document that includes specific, concrete measures to be taken between 2005 and 2015.

At the same time, governments around the world have been amending their constitutions to bring them into line with the new legal concept that protection of the environment is a fundamental right. For example, in 1994, Argentina amended article 41 of its Constitution, enshrining environmental protection as a right and responsibility, to ensure that it is the right of everyone to “enjoy a healthy environment and the responsibility of all to preserve it.” Authorities must guarantee this right and make it a guiding principle of their social and economic policy, embodying the concept of sustainable development, which from our standpoint can be simply defined as economic development with environmental protection.

It is clear that an optimal solution to this issue is a long way off. Successes are few and the path is slow. It will entail costly changes in production systems and, especially, education and information at all levels, to make our environmental stewardship effective.

The important thing is that the path has been blazed. Let us follow it without pause, for the well-being of present and future generations. There is no shortage of laws. What we need is to get the word out about this specific legislation. When people and organizations are knowledgeable, understand these pressing issues and exercise their rights, they will be able to have fair legal protection that in turn will enable them to commit to a sustained, integrated environmental protection. “Information sharing,” one of the aspects highlighted in the HFA, should include information on “environmental rights.” In this way, different social and institutional sectors will be able to strengthen their actions aimed at “ensuring that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation” (HFA, Priority for Action 1).

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Discovering the “Inter-cross-multi-discipline” of Disaster Risk Management

The Disaster Risk Management Postgraduate Seminar, which the University of Salvador in Buenos Aires, Argentina, has offered for several years now, has become an important regional yardstick for training human resources to work and play a pivotal role in the area of risk management.

The Napoleonic University, with its rigid compartmentalization of disciplines, is retreating before new multi-disciplinary fields, such as ecology, and the convergence of a various disciplines united by the common goal of disaster risk management.

In this context, the graduation ceremony for the VI Disaster Risk Management Postgraduate Seminar in 2007, which was held on December 5, 2007, featured, as a paradigmatic example, the allusive words of graduate Lt. Col. Julio E. Ruarte:

Dean Juan C. Lucero Schmidt
Academic Secretary, Professor Stella Maris Palermo,
Course Director, Professor Julio Juan Bardi

Esteemed Professors and fellow seminar participants,
Special Guests

“Today’s ceremony is very important for each and every student. In addition to providing a forum to congratulate and recognize the efforts of the university authorities, professors and support staff for having conducted this seminar, for us, the participants, today brings to an end another cycle of studies in our lives.

It has been widely known that, for several years now, USAL has pursued this initiative to address the issue of risk management and disaster reduction as an indicator of educational quality, thereby helping to foster a culture of prevention. In other words, and almost in military terms, USAL evaluated the educational situation, saw a gap and decided, with initiative and determination, to fill that gap and take advantage of it.

We, the VI graduating class of the Disaster Risk Management Postgraduate Seminar, are part of the results of that decision.

It all began in August when we arrived at the university and headed towards the now famous classroom 43 in the School of Philosophy. I remember that the first thing our beloved Professor Bardi said was a strange word: “Inter - cross - multi- disciplinary”. Personally, I have to admit that it was the first time I heard such a term and, just as with all first times, it piqued my curiosity...

Then, there was time for presentations by the students and we were pleasantly surprised to learn that present among us were trained and experienced individuals from many areas: the Civil Defense of Córdoba, Santa Fe and Buenos Aires; the Ministry of Social Development, the Municipality of San Isidro, the National Prefecture, the National Gendarmerie, the Superintendence of Firefighters of the Federal Police, the Joint High Command of the Armed Forces, the Argentine Navy, the Argentine Army and representatives from the private sector.

At that moment I understood the significance of the word “multidisciplinary” to which Professor Bardi was always referring.

As the weeks and classes went by, professors and students began to get to know each other. At the urging of the former, seminar participants shared their rich experiences with wise, constructive and very detailed comments that often replaced the planned class schedule. This did not concern our seminar director. Indeed he always encouraged that sort of “de facto forum.”

And there I came to grasp the meaning of the word “interdisciplinary”.

During the last classes, examples were given of what each of us had tried to convey, not only in terms of how each organization operated but also how to integrate their various types of capacity to optimize the outcomes.

As I became aware of this, I realized that the “cross-cutting” element had already been achieved... at least at the academic level.

With this brief description I believe I speak for all of my fellow seminar participants when I affirm categorically that USAL has fulfilled its objectives and that we graduates today are delighted to have participated in this process.

We would like to express to the university authorities that this postgraduate seminar has enabled us to grow intellectually and has motivated us to take our new expertise back to our respective workplaces.

As students, we have witnessed the academic and intellectual acumen of the professors and authorities of this university and, even more importantly, we have established professional bonds with you.

Esteemed professors, we thank you for your efforts and dedication in transmitting your knowledge to us.

I would like to thank my colleagues in the 6th graduating class of the seminar on disaster risk management:

- For your kind and constructive company in the classroom and,
- For the opportunity you have given me to represent you as a speaker today. It has been a great honor to prepare these words of farewell.

And the fruitful and beautiful friendship we have built in this university has taught us that, when it comes to *disasters*, we are all working towards the same goal but often we do not know each other well enough. And this is the reason why this *inter-cross-multi-discipline* is so important to create a culture of prevention. If we are clear on this concept, we will have done our part to help build a better future for our beloved country. Thank you very much.”

Lt. Col. Julio Ricardo Ruarte speaking on behalf of the participants of the Disaster Risk Management Postgraduate Seminar:

Towards Disaster Risk Reduction in Central America

Mario Fernandez Arce, Center for Geophysical Research (CIGEFI), Disaster Research Program, University of Costa Rica



Photo: © Jan Mercier

Figure 1. View of Puntarenas, Costa Rica, a coastal city that has developed on a sandbar

Before September 1992, Central America underestimated tsunami-related hazards, until a wave almost 10 meters high hit the Pacific Coast of Nicaragua, inundating vast stretches of land and killing 170 people. The tsunami was preceded by a slow seism only slightly perceptible to the local population, which did not realize it was in danger and was caught unaware by the destructive event. It was after this that people started studying this hazard in the region and discovered that since 1539, 49 tsunamis have hit the shores of Central America, 37 in the Pacific and 12 in the Caribbean. They have taken a toll of nearly 500 lives in the region. Local sources produce tsunamis, but they are not the only reason. Earthquakes in

Alaska and Colombia have also generated tsunamis that have traveled all the way to Central America, leaving destruction and death in their wake. The following table lists the most destructive tsunamis on record in Central America.

As in other parts of the world, our tsunamis are mainly caused by large earthquakes that occur under the ocean floor. They originate in four well-known geological areas: the Middle America Trench, the Panama Fracture Zone, the North Panama Deformed Belt, and the Polochic-Motagua-Chamelecón-Swan Fault System (Gulf of Honduras).

Year	Country of origin	Effect
1854	Costa Rica	Villa Golfo Dulce (now Puerto Jiménez) destroyed
1856	Honduras	Omoa, in Honduras, left in ruins
1882	Panama	75-100 deaths
1902	El Salvador	185 deaths
1913	Panama	Pedasi, a city on the Pacific Coast of Panama, destroyed
1957	Alaska (USA)	Caused deaths in Acajutla, El Salvador
1992	Nicaragua	An almost 10-meter-high wave killed 170 people in Nicaragua

Table 1. Most Destructive Tsunamis in Central America: 1539-2008

The Middle America Trench is the boundary where the Cocos plate is subducting under the Caribbean plate. The continuous collision of these tectonic plates is the primary cause of our large underwater earthquakes with the potential to cause tsunamis. But the collision of the two plates is not the only factor contributing to the generation of tsunamis. There is another element that further complicates the situation and increases their likelihood. Seamounts are being subducted completely under the Caribbean plate (mainly off the shores of Costa Rica); that is, they are not breaking up. Since they are not being destroyed, as they submerge beneath the overlying plate, they raise and deform the ocean floor, taking the shape of an underwater volcano or mountain. This increases the inclination of submarine slopes and with this, the possibility of undersea landslides that could set off tsunamis.

The area known as the Panama Fracture Zone is located at the boundary between the Cocos and Nazca plates, south of Punta Burica on the border between Panama and Costa Rica. This area is made up of a series of ruptures in the ocean floor along a north-to-south axis, where there is horizontal movement of rock blocks between the fractures. This is a very geologically active zone in which these continually moving blocks generate great tectonic force and therefore, a large number of earthquakes, all of them under the ocean. Since displacement of the ocean floor occurs horizontally, there is less potential for generating tsunamis, but even so, the zone is considered to be another source of tsunamis in the region.

The North Panama Deformed Belt is an uplifting of the seabed located off the Caribbean coast of Costa Rica and Panama. It is characterized by compressive forces and rifting both on the seabed and in the continental sector. These events suggest that the Caribbean plate is subducting underneath the coast all along this belt. Though there are not many earthquakes in this sector, they are very strong. In 1882, the biggest earthquake in Central America occurred in this area. Known as the San Blas earthquake, its magnitude was 7.9 and it was located near the San Blas Islands, to the north of the Panamanian mainland. Another strong seism along this belt was the Limon quake of 1991 (Costa Rica), with a magnitude of 7.6, as a result of the liberation of energy accumulated in one of the main faults of the system. Both earthquakes killed people and caused tsunamis.

The Polochic-Motagua-Chamelecón-Swan fault system is located at the boundary between the Caribbean and North American plates and extends along the Guatemalan-Honduran border. It cuts through Lake Izabal, enters the Gulf of Honduras and continues to southern Cuba. This system generated the tragic Guatemalan earthquake of 1976.

Vulnerability

Our vulnerability to tsunamis originated in and is intimately linked to the past, to production processes and to our development. Although the coastal regions of Central America had been inhabited by indigenous peoples since pre-Colombian times, our main coastal population centers were established in the 19th and 20th centuries

to facilitate trade. Due to the historical consequences of politics, economics and social processes, a segment of Central America's population currently lives in areas vulnerable to tsunamis. Thus, this vulnerability is the result of human social arrangements shaped by and for production processes.

But vulnerability to tsunamis is not static; it continues to accumulate and grow. Our coasts continue attracting nationals and foreigners, tourists and residents. Tourism is leading to impressive development on both coasts of our region, though especially on the Pacific. The growth of tourism on the Costa Rican Pacific is such that people now talk about certain geographical areas that are economically competitive, such as Brasillito-Papagayo and Dominical-Osa. In this first region, coastal population centers are growing, spurred on by recreational tourism, as they also are in the second region, though there the focus is more on ecological tourism. Therefore, we could say that this modern-day vulnerability stems from the level of development that has taken place, and from the lack of development planning. Dire conditions, such as poverty, the lack of resources or social exclusion are not the elements that are increasing people's vulnerability to a tsunami-related disaster.

Vulnerability is estimated based on three components: physical exposure, resistance and resilience. The first one results from the physical location and the nature of the surrounding natural and human-made environment. Resistance is related to the capacity of an individual or a group of people to protect themselves against the impact of a hazard, and is a reflection of their physical, psychological and economic health, individually or as a group. The best efforts to increase resistance are focused on broader goals of economic, political and social inclusion. Resilience is the ability of an individual to cope with or adapt to a threatening stress, and results from planned preparedness in the face of a potential hazard, and from spontaneous, premeditated adaptation in response to a felt hazard. Below, we will analyze each of these components as they relate to a tsunami hazard.

Both coasts are exposed to tsunamis, though the Pacific coast is more so because it is right in front of the area where the Cocos and Caribbean plates are colliding, the primary source of our underwater earthquakes. This coast is also more populated than the Caribbean side. On the other hand, however, the topography of the Pacific is characterized by high elevations, making it a coastal region with many high, safe areas where refuge can be sought at the sign of a hazard. The Caribbean coast is just the opposite; there is much less seismic activity, but, in general terms, its flat landscape offers very few secure sites where people can escape from a potential tsunami.

If resistance means being able to protect oneself, and if greater resistance has to do with economic, social and political inclusion, we can conclude that we are currently as vulnerable as we ever were. In fact, our vulnerability may even have increased, since the gap between the rich and the poor appears to be growing, social change is not taking place and people do not have a voice in political decisions. We continue to be a poor region with limited rural development, dengue fever on both coasts, a high level of citizen insecurity and a growing wave of violence and crime. Given

all of this, it is easy to conclude that conditions are not conducive to enhancing our resistance to hazards in our region.

The only component that is improving is resilience, basically due to the education offered to students and coastal residents.

Disaster risk reduction in Costa Rica

Disaster risk is a convolution of hazards, as a result of vulnerabilities. Both hazard and vulnerability coexist and are mutually dependent. This means that there is no vulnerability if there is no hazard, and there is no hazard if one is not exposed or vulnerable. Given that there is a hazard of tsunamis and vulnerability to them in Central America, there is also risk. And if there is risk, measures must be taken to reduce the potential losses to the people and systems that are exposed to such hazards. Disaster risk reduction involves three public policies: risk identification, risk reduction, and disaster management.

Risk identification

Individual perception, society's interpretation, and the objective estimation of risk factors —hazard and vulnerability—, all play an important role in this aspect. Before the 2004 tsunami in Indonesia, practically no one in Central America knew what a

tsunami was, both because they do not occur regularly and because they do not cause disasters very frequently. As a result, they were not perceived of as being a hazard. Therefore, people did not usually see them as an element in their surroundings and did not have an image or understanding of them. However, the situation changed with the events of 2004, when pictures of the great tsunami and its tragic outcome were seen in almost every corner of the world. People's attitudes shifted from incredulity and denial to perception and acceptance of the risk. Now, a large number of Central Americans think that tsunamis are big waves that are usually destructive. There is greater awareness of the issue and people are more willing to consider making changes to ensure preparedness and mitigation efforts. However, some members of society still show signs of indifference, lack of interest and skepticism.

The estimation of risk factors has been previously addressed (Fernández et al., 2000; Fernández and Rojas, 2000; von Huene and Ranero, 2000; Fernández, 2001; Fernández and Alvarado, 2005; and Fernández and Ortiz, 2007) and is supplemented by this article. There is a real possibility of local tsunamis on both coasts. More detailed studies need to be done, including the potential for inundation, in order to understand the hazard and vulnerability of a specific area. In Puntarenas, the main Pacific port in Costa Rica, preliminary estimates have been done regarding tsunami inundation.

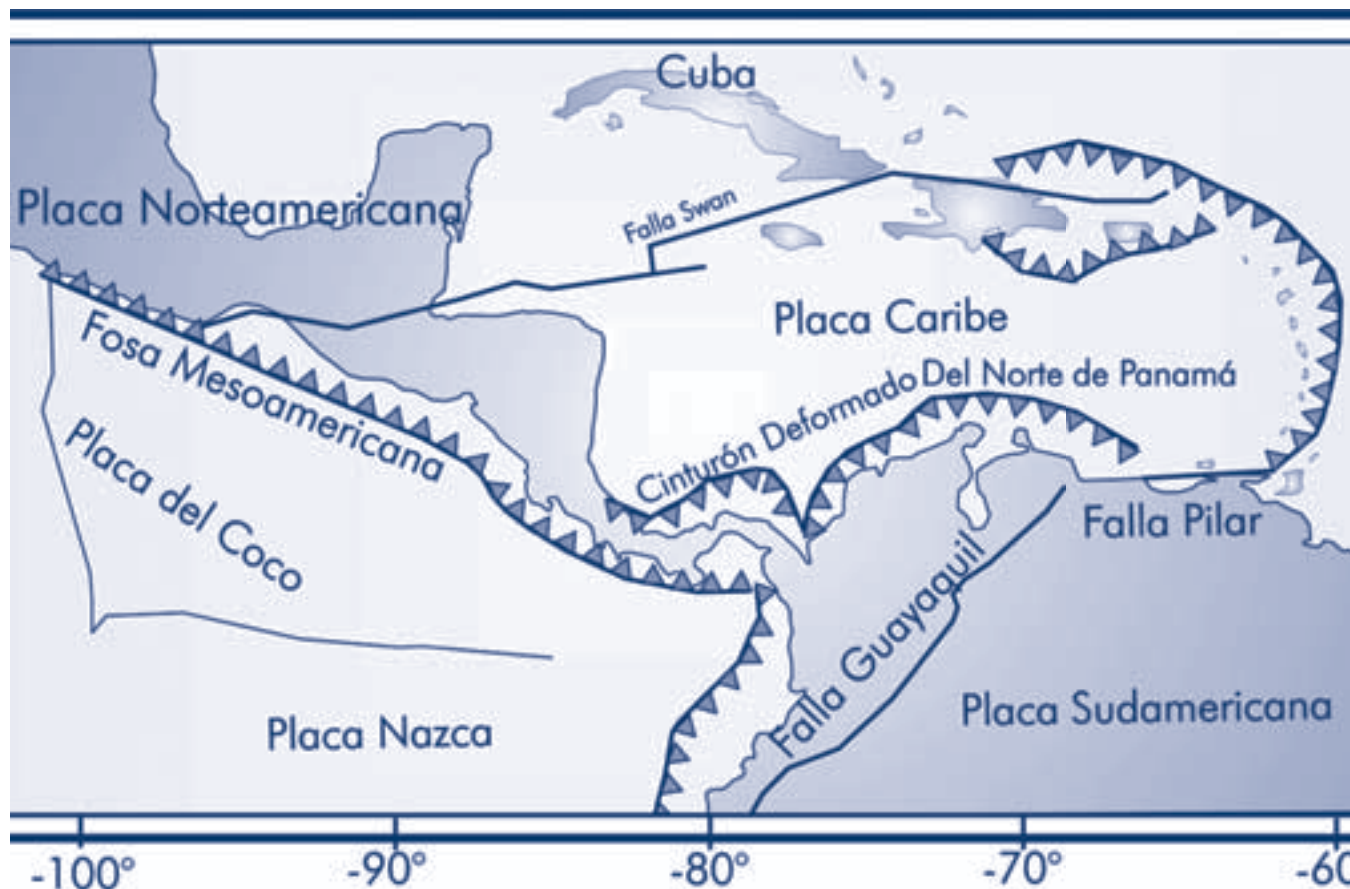


Figure 2. Tectonic tsunamigenic features in the region

Risk reduction

Risk reduction includes prevention and mitigation measures. Prevention begins with doing research about a hazard and identifying the existing vulnerability. The ongoing study of hazards, their effects and the dynamic interactions among these and people's livelihoods and the welfare of societies continue to be a fundamental element of effective disaster risk reduction strategies. Thanks to efforts being made by different programs at the University of Costa Rica (the Geophysics Research Center, the Disaster Research Center, the National Seismological Network—RSN: ICE-UCR), it has been possible to substantially improve knowledge about tsunami-related hazards in the region. Research studies have looked at the historical record of these events, future possibilities of tsunamis occurring, and their potential impact on society, as well as the social, economic and environmental implications of our vulnerability to tsunamis. These studies have confirmed that our two coasts do show a potential hazard and the likelihood of future events. In addition, studies of the ocean floor reveal that the continental shelf is extremely deformed by seamounts subducting underneath the Caribbean plate, which is creating instability that is prime for causing rapid movements of masses of water that could result in tsunamis.

With regard to prevention, serious, active efforts are being made in the areas of education and outreach. Recognizing that the region is exposed to tsunami-related hazards, the issue needs

to be addressed through regional, national and local institutional efforts. In this context, education is taking on importance as a means for disseminating information, increasing knowledge, changing attitudes and fostering good practices in the medium and long term. This was the motivation for the design and implementation of the project titled **School Outreach in the Face of Tsunami Hazards in Puntarenas' Central District, Costa Rica**, a joint effort of the National Emergency Committee, the Ministry of Public Education, the San José Municipal Government, the Japanese International Cooperation Agency (JICA), and the University of Costa Rica. This project marks the start of a process that includes information and knowledge about good practices, as well as training, prevention and response activities.

The social impact of the project will stem from 230 teachers, who will receive basic information that they will then teach to their students. Children will also be provided with appropriate educational materials, so that they can teach their families about tsunamis. This is a pilot project that will be replicated in all the coastal areas of the country.

Closely tied to education is the installation of signs on beaches. This effort has already begun in Costa Rica, with the sponsorship of private companies. The first of these warning signs was installed by the Marriott Los Sueños Hotel. Two signs were put up, one in Spanish and one in English, keeping tourists in mind. A sign was also put up at Bejuco Beach, near the University of Costa Rica. As part of the Puntarenas tsunami risk project, more signs will be put on the beaches of this province.



Figure 3. Community-based training, Quebrada Ganado School in Garabito, Puntarenas

Photo: © CARIARI



Photo: © CARIARI

Figure 4. Tsunami warning sign at Bejuco Beach in Parrita, Costa Rica

Regarding mitigation, which is more related to construction methods, it is important to point out that buildings near the beach should be strong enough to withstand being hit by the mass of water from a tsunami. Some buildings could partially collapse if hit by a huge mass of water. Tourist developments should be built on higher grounds to reduce the risk of being inundated.

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Towards a “Citizen Effort” For the Mitigation of Underlying Risk Factors



Photo: © Gustavo Wilches-Chaux

Those beautiful cities of stained walls or endless windowpanes. Cities with their constant smell of dampness or sepia tones. Cities embraced by the sea or traversed by a river. Cities where a thousand pilgrim epics have been born and died. Urban areas, which are ever growing and at times progress. It is in such cities where a host of hazards intersects with their vulnerabilities.

Let us recall the Global Report on Human Settlements 2007, “Enhancing Human Safety and Security” presented by UN-Habitat, which states that *“The number of major disasters in the world grew from under 100 in 1975 to almost 550 in 2000... Each of the three years with the highest number of recorded disasters has been during the current decade, with 801 disasters in 2000, 786 in 2002 and 744 in 2005 ... During the last decade alone, disasters caused damage worth US\$ 67 billion per year, on average... It is important to note that 98 per cent of the 211 million people affected by natural disasters annually from 1991 to 2000 were living in developing countries. In Bogota, Colombia 60 per cent of the population live on steep slopes subject to landslides.”*

In every city, residential areas, government buildings, offices, schools and universities, parks and playgrounds, shopping centers, hotels and restaurants, pedestrian and automobile

routes, billboards, landlines and mobile telephone antennas are all part of the everyday landscape that reflects a unique lifestyle. Those who were born and live in this landscape often do not realize that a “conglomerate of vulnerabilities” can harm thousands of lives in once single second, if nothing is done to reduce it.

Genuine “**citizen effort**” in defense of lives and property requires a commitment on the part of the government, the community, and the different sectors involved, bringing together experts, technical professionals and neighbors who are the “keepers of memories” to identify the **underlying risks**, factors and root causes, and to work together towards disaster risk reduction and a better quality of urban life with sustainable development.

Let us use our memories and imaginations to conjure, for a moment, those feudal fortresses—epoch cities—assailed by their own disasters despite fearsome moats, crossbows and catapults, despite their impenetrable stone walls (which are now appreciated around the world as historical monuments), and despite their belief that their defenses could surmount any risk. Many of them were lost in the web of history, destroyed by some natural event or by the conflicts and power plays in those civilizations. Let us also remember that Rome burned while Nero fiddled.

An interdisciplinary team conducted the study titled "Prevention and Mitigation of Technological Risk based on Strategic Communication", from 2000 to 2004 at the National University of Cuyo, in Mendoza, Argentina. The study initially focused on the city of Mendoza, with particular emphasis in the sector presenting the highest array of vulnerabilities: the microcenter. We used potential disaster scenarios, in order to design a methodology based on a "window on citizen risk," which in turn enabled us to create a **communications strategy** to facilitate public dissemination of underlying risks in the city. The idea was that the risks would be recognized by the public, accepted, and therefore, reduced. This strategy design can be adapted to other cities in the region, taking into account their unique identities, the confluence of existing risks, the existing institutional and community capacity, and their perception of hazards. Since 2005, this participatory strategy has drawn on the HFA and the MDGs. The findings and conclusions of our study confirm that, if it is to be effective and efficient in terms of prevention, a DRR planning process must include **strategic communication as a crosscutting issue**.

In terms of contemporary equivalents to feudal constructions, today "the defense fortress" would not revolve around the "rampart" or the response of highly trained warriors whose military actions were considered an "art form." Clearly, we do not have the same concept of "fortress" today as in medieval times, although the growing trend of barricading ourselves in "closed communities" bears a resemblance to those medieval cities.

The difference lies in the fact that the complicated and complex city of the 21st century requires other actions from us. These actions are more focused on the ongoing observation of precarious conditions and latent disasters that emerge due to the logical deterioration of a metropolis beset by rapid, and usually disorderly, spontaneous and unplanned growth. We must add to this the broad repertoire of new man-made and technological hazards that combine with natural and socio-natural risks.

Mitigation efforts, interwoven with improved organization of activities, ongoing infrastructure inspections, urban development planning, and contributions by formal education, proactive attitudes and behaviors, and more effective communication about risks, will help raise public awareness about prevention from the standpoint of protecting lives.

All of these aspects will form part of the contemporary "fortresses" that we require for our development. This will not be done by raising walls but, as aptly stated in the Hyogo Framework for Action, through "**resilience at all levels**." This means living in a **more dignified habitat** in which human beings, men and women, permanent or transitory citizens, can pursue their individual and collective life projects with the appropriate preparedness and enhanced security.

All cities should be a space for living together in peace, where squares, streets, sidewalks, buildings, offices, clusters of

pedestrians on the move, and other components conduct us towards an eclectic harmony that ushers in the calibrated concert of a new multicultural "urban race" in prevention. Cities where the trills and tender flight of each bird inhabit the air of the small, medium and large cosmopolitan areas of the 21st century.

Our own wonderful writer, Jorge Luis Borges, has bestowed on us the gift of a poem reflecting his feelings about our capital city:

"BUENOS AIRES"

And the city now is like a map
of my humiliations and failures.
From this door, I have seen the twilights
and at this marble pillar I have waited in vain.

Here the uncertain past and different present
have furnished me with the common cases
of all human fortune; and here my steps
plot its indecipherable labyrinth.

Here the ashen afternoon awaits
the fruit owed to it by dawn;
here my shadow in the no less vain
final shadow will be lost, fleeting.
We are not joined by love but fear,
perhaps that is why I love her dear.

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Hospital Safety is Everyone's Job

"Natural phenomena will always occur, and they will always have an impact on people's wellbeing, health and lives, especially the most disadvantaged among us."

Starting in the 1980s: In 1988, the Coordination Center for Natural Disaster Prevention in Central America (CEPREDENAC) was created as an agency to promote regional cooperation on disaster prevention in the countries of Central America. At the time, the Strategic Framework of the Regional Disaster Reduction Plan had the following guiding principles: 1. Promote an integrated approach to vulnerability reduction as an indispensable component of development processes, involving a systemic approach for national institutions, promoting it among sectors and at national and regional levels; and adapting the existing regulatory framework. 2. Broaden participation to include other institutional sectors and civil society. 3. Build local risk reduction capacity. 4. Build local, national and regional disaster response capacity.

In 1989, during its 42nd session, the United Nations General Assembly referred to the need to build response capacities, particularly in developing countries.

The UN designated the 1990s as the "International Decade for Natural Disaster Reduction." Many countries and governments promoted prevention work and technical cooperation, and it was already clear that vulnerability to disaster is associated with poverty levels: those who are the most affected are always the most disadvantaged groups of the population.

In late 2003, the Andean Community of Nations (CAN), through the Andean Committee for Disaster Prevention and Relief (CAPRADE), implemented the "Project to Support Disaster Prevention in the

Andean Community" (PREDECAN), which has five lines of action:

1. Strengthening of Andean national and subregional systems and policies.
2. Risk information, assessment, and monitoring systems.
3. Incorporation of risk management into land-use, sectoral and development planning.
4. Education and awareness-raising on risk management.
5. Pilot projects to strengthen broad-based participation in local risk management.

In January 2005, during the World Conference on Disaster Reduction in Kobe, Hyogo, Japan, 168 governments adopted a 10-year plan (2005-2015) for achieving a safer world regarding natural hazards. The Hyogo Framework for Action (HFA) 2005-2015 is based on five priorities: 1. Ensure that disaster risk reduction is a priority. 2. Identify and assess risks and take action. 3. Develop greater understanding and awareness. 4. Reduce risk. 5. Be prepared and ready to act.

The priority of the International Strategy for Disaster Reduction (ISDR), chaired by the United Nations Under-Secretary-General for Humanitarian Affairs, is to ensure the effective promotion, coordination, and orientation of disaster reduction at the international level. The ISDR system has been developing global disaster reduction campaigns based on the Hyogo Framework for Action.

"The World Disaster Reduction Campaign looks at how we cope with hazards, serving to raise awareness among decision-makers and the public that there is much we can do to reduce the impacts of hazards." Sálvano Briceño ISDR 2003.



Photo: © OPS-OMS/J. Jenkins

The global campaign to make “hospitals safe from disasters”

“Integrate disaster risk reduction planning into the health sector; promote the goal of ‘hospitals safe from disaster’ by ensuring that all new hospitals are built with a level of resilience that strengthens their capacity to remain functional in disaster situations and implement mitigation measures to reinforce existing health facilities, particularly those providing primary health care.” **Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters.**

In 2008 and 2009, the World Health Organization (WHO) and the Pan-American Health Organization (PAHO) will work jointly on the World Disaster Reduction Campaign titled “Hospitals Safe from Disasters.” The campaign focuses on the structural safety of hospitals and health facilities to ensure that they can function during and in the aftermath of disasters, and on preparing health workers to deal with natural hazards.

“International recognition now exists that efforts toward disaster risk reduction must go hand-in-hand with plans, policies, and programs aimed at achieving sustainable development, poverty reduction, good governance, and the creation of strategic alliances.” Dr. Dave Paul Zervaas, UNISDR 2008.

A wide range of activities will be carried out together by the UNISDR secretariat, WHO, and their respective regional offices within the framework of the campaign. Other ISDR system partners will be involved, in particular the World Bank, several UN agencies, the Red Cross, and the various ISDR networks of NGOs, the private sector, academic institutions, parliamentarians, and local authorities.

“All health facilities – large or small, urban or rural – are the target of this campaign. Hospitals safe from disasters are about more than just protecting physical structures. Hospitals are safe from disasters when health services are accessible and functioning, at maximum capacity, immediately after a disaster or an emergency. A safe hospital will not collapse in disasters, killing patients and staff; can continue to function and provide its services as a critical community facility when it is most needed; and is organized, with contingency plans in place and the health workforce trained to keep the network operational.” WHO/PAHO 2008.

Safe hospitals are everyone’s job

Everyone who works in a hospital, regardless of his or her occupation or position in the hierarchy, is indispensable when it comes to ensuring safety during a disaster.

A poorly run hospital will directly affect the population, whether it is large or small, urban or rural. This is why education and ongoing training on the appropriate management of disaster response and, in particular, the goal of raising awareness of the importance of adopting prevention measures, are key to making a hospital’s response to a disaster timely, efficient, and above all, automatic, without forethought, since the lives of the workers and patients in the facility are at risk.

For this purpose, the job of getting a multidisciplinary workforce (physicians, nurses, technical staff, administrators, etc.) interested and involved in voluntarily organizing to participate in disaster prevention with a common goal, and to train them in aspects that are not necessarily related to their jobs, is indispensable for responding to a large-magnitude impact that will affect the health



Photo: © UNISDR



Photo: © OPS-OMS/J. Jenkins

facility and the patients' lives.

Recent disasters in the Americas and in the rest of the world—including Hurricane Mitch, the landslides in Venezuela, the earthquakes in El Salvador, Hurricane Isidore, the earthquake in Peru, the earthquake in China, and others—have provided valuable lessons about damage to health facilities but also about potential solutions that could reduce the impact of disasters on vital infrastructure. More than anything, we have learned once more that in managing an emergency or a disaster, the human factor in the response to an impact is pivotal for saving lives.

In health centers, the lack of resources, planning, prevention, training, supplies, overall and psychological preparedness, and, above all, the lack of interest, stir up overwhelming feelings of impotence and hopelessness.

If on top of this, the hospital lacks a safety and warning system, and disaster response plans and protocols, such an event will have a catastrophic impact on the population.

All the people involved in a health system should be diligently involved in preparing for a disaster beforehand, at the professional and, especially, at the personal level.

Education and training through drills and simulation exercises provide an excellent means for preparing for a disaster in a hospital, if they are conducted in an organized, planned manner and are held regularly (four to five times a year). These practices are an exceptional way to raise awareness among individuals and groups about disasters, which can also prevent widespread panic from breaking out.

When people have rehearsed situations thoroughly, they deal with them naturally, and feel highly competent and confident when a hazard strikes. At the same time, practice helps to psychologically desensitize people and increases their confidence in their capacity

to act and to cope with the situation. This also decreases the occurrence and extent of negative psychological reactions, such as denial, panic and shock.

During disaster preparedness, response strategies should focus on training and on activities that are similar to real-life situations. This is aimed at decreasing the level of denial, so that workers can mobilize and protect themselves on their own.

Maintaining acceptable safety levels in hospitals is one of the most complex issues regarding safety in so-called public places. A hospital is a small city but with a higher population density, with all its dangers, risks and hazards. In addition, it is inhabited by sick people and visited by others who are unfamiliar with the place.

Perhaps this complexity, in many cases, contributes to keeping the classic problems in these health facilities from being resolved. There is still the need to conduct a rigorous risk assessment, to keep safety plans and protocols in place, to find technical and structural solutions for buildings, and to provide comprehensive maintenance of the facilities. However, what is needed, above all, is to foster social awareness and strengthen information and a culture of prevention.

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Perceptions of Risk



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For many years, risks have been seen as something objective and even quantifiable: the potential damage caused by a disaster. The assumption was that information about risks was something for disaster specialists to deal with, and many studies were conducted to try to estimate such risks. In most cases, however, the studies were limited to analyzing hazards or harm, and determining the urban areas that would be more or less affected by earthquakes, floods, mudslides or landslides.

At the time, information about risks was used to calculate “prevention” needs—but it was a type of “prevention” that had to be supported by what specialists knew about destructive “natural” phenomena and their possible effects on urban populations. Based on this information, warning systems or embankments to shore up riverbanks could be designed.

“Risk zoning” was related to the need to have tools that would guide the way in which urban spaces were to be used, but this idea was not very widespread at first, and had only limited application later due to weaknesses in urban planning.

Risk studies drawn up by specialists have been disseminated (with some limitations) among local authorities so that their recommendations can be implemented (which has rarely happened), but they have not been distributed to community leaders and to the population in general.

Institutions specializing in emergencies have chosen to transmit messages that attempt to raise awareness among the population, and recommendations have been given about what should be done before, during, and after a destructive event. But these recommendations usually grew out of the assumption that it would be impossible to reduce risk significantly in the face of an imminent hazard, and that the only thing the population could do would be to try to mitigate the effects of the event, especially the physical harm to people and to their most valuable possessions.

The “top-down” approach vs. a rights approach

What is described above is an approach primarily centered on external assistance in emergency situations, which also implies that actions taken by the population are only necessary while this assistance arrived.

This approach began to be used in the 1970s and was based on a top-down relationship between the authorities and the population. This kind of relationship has persisted, in spite of the changes that have taken place in our societies—changes that imply a new vision of development associated with citizen rights. Some researchers emphasize that new rights-based development approaches are **the result of a confluence of a new international legal framework** expressed in various UN conventions that countries have signed, the actions of social movements who are demanding their rights, especially those of women, indigenous, and landless people; and the historic tendency of clientelism to evolve towards the concept of citizenship.

But while societies have slowly begun to leave behind direct assistance strategies in favor of new relationships between citizens and governments, humanitarian assistance in the case of disasters continues to be perceived as something that the government and donors provide. Often, the population has only been able to do what others decide and recommend.

This kind of inertia in times of democratization has had to be questioned in light of its limited effectiveness in emergencies: disasters have been causing increasing damage (a fact that led to the declaration of the 1990s as the International Decade for Natural Disaster Reduction), and many mistakes have been made during the humanitarian crises of the world.

In the mid-1990s, humanitarian crises led many organizations to reformulate their work strategies. This also led to the development of the codes used by the International Federation of Red Cross and Red Crescent Societies, as well as minimum standards for humanitarian aid that introduce a more integrated, rights-focused approach to emergency management. These documents are examples of the fact that most humanitarian institutions have now agreed on the need to introduce a rights-based approach into disaster management.

This approach starts by recognizing that people are born with rights and that the realization of these rights is what undergirds the idea of citizenship, and therefore democracy. The government must guarantee certain economic, political, and social rights, and society as a whole must preserve them. Disaster risks do not lie outside of this rights framework, as it can be seen when one analyzes the relationship between poverty and the resulting loss of housing, health, information, and education. Risks arise directly from the **insufficient realization of those rights inherent to people.**

In order to ensure that people are able to exercise their rights, it is essential for them to participate in decisions that affect their lives, and the State must guarantee the mechanisms to make this possible. One way of doing this would be, for example, to ensure that budgeting planning and related processes are participatory.

The basic assumption of broad-based participation is that people are able to express themselves, discuss important issues, and be involved in decision-making processes. But participation is not possible unless there is organization, and it presupposes dialogue. It is necessary, therefore, to take into account the different and

changing opinions and perceptions of people in order to make that dialogue possible. In the case of disaster risks, we cannot take into account only the perceptions of specialists and experts. We must also include the views of the population. Risk perceptions are differentiated visions that exist about risks and the measures necessary to cope with them. Risk perceptions have always existed, but they have changed over the years among the specialists and the population.

The risk perceptions of specialists

The concept of “disaster risk” was defined by specialists in the 1980s as the possibility that certain damage would occur, given the interaction between the probability of a destructive phenomena (hazard) and the level of exposure of people and property to such a phenomenon (vulnerability). But hazards and vulnerability were defined primarily as **unsafe conditions, not as changing processes.**

This distinction turns out to be significant because if we base our work on the idea of unsafe conditions, we might address them but we may not be able to prevent the same conditions from being generated again and again. On the other hand, if we also are looking for the causes of the unsafe conditions, we will be able to prevent or avoid future risks.

The causes are associated with poverty, but also with gender and age discrimination, as revealed during the International Decade for Natural Disaster Reduction. The Yokohama International Conference made public the idea that roles attributed to and imposed on children have limited their ability to reduce their vulnerabilities. It also became apparent that when disasters did occur, and given existing humanitarian aid strategies, conditions arose for greater oppression of women, because they are usually the ones who carry water when drinking water systems collapse. They are also the ones who bear the greatest burden for assuring the construction of temporary or permanent housing, and they are the ones who are most involved in rehabilitation and reconstruction processes, in exchange for food or money. Finally, the lack of knowledge about, and indifference to, the specific needs of girls, disabled persons, and women in disaster response must be highlighted.

Risk perceptions in the communities

In the last few years, Doctors of the World in Bolivia, and ITDG in Peru, have conducted studies about risk perceptions in highland Andean communities (Potosí and Ancash), in the jungle (San Martín), and among the peasant farmers on the coast (Piura).

Among other things, these studies made it possible to address disaster risk situations in a different way, since these reviews sought to find out not only whether people knew about risks, but also to what extent they had different interpretations and assessments of risks, as well as the mechanisms to learn about and confront them.

Among the most important findings, it is worth highlighting the use of biological indicators as early warning systems and current difficulties in obtaining accurate forecasts; different assessments about the things that need protection (production assets are prioritized over housing, and even over physical safety in the case

of the highland Andean populations, and forest protection is a priority for indigenous communities who live in the jungle, etc.); and the importance of spontaneous protection strategies (traditional medicine) and adaptation to extreme climate variability.

Another relevant finding is the existence of different risk perceptions even among communities who live near the same watershed or in similar cultural and territorial environments. Communities that have directly experienced the effects of floods for decades have different perceptions and attitudes than do those who have not been affected. Communities who have experienced disasters have more critical awareness, for example, about how people have been located in certain areas by public policies: disperse populations have been concentrated in smaller areas by installing basic service networks (but these populations tend to be located in areas of lower elevation that are more exposed to landslides).

In sum, there are different perceptions and attitudes that require different strategies on the part of institutions. These strategies should be built on dialogue with the communities themselves and not simply based, as they have been, on the perceptions of "specialists."

Risk perception among populations is often based on their own experience, and this is a necessary complement to the knowledge of specialists. But, above all, the population will instill a greater sense of ownership for any strategy, if they are taken into account when these are formulated. By considering and studying perception risks of the population, we will open up possibilities to be more proactive in education and training process around risk and disaster-related issues.

The importance of information about risks in formal and non-formal educational processes

In many schools, teaching people about risks has not exactly been a priority. If it occurs, it has often been limited to identifying unsafe conditions in order to respond in case of an emergency. It has usually been left up to technicians and experts to identify what conditions might be unsafe in an emergency. Teachers and students have not been involved.

In contrast, there are three types of formal and non-formal education initiatives that recognize the importance of risk perceptions. The

first was developed by PREDES in 1987 and seeks to validate risk studies in communities. It looks at risk zoning and other measures proposed by engineers in the target communities for risk assessment. The result has been truly surprising: elders, women, and even children were able to make critical contributions to the proposals and the engineers could learn from them.

The second is related to participatory risk assessment and was implemented in the framework of some DIPECHO projects in Peru (Ankash and San Martin). In this case, community leaders and technical experts walked together through the places where landslides start and through vulnerable populated areas. Drawing on this exercise, they began to hold dialogues about risks and adaptation measures. Some important variables have been recorded by developing risk maps with the participation of community leaders, youth brigades, promoters, and technicians. In all cases, the basic idea is not to regulate or plan the use of the territory, but rather, to learn about the risks, considering the perceptions of the people.

The third experience was more associated with the need to evaluate existing knowledge about risks, by talking and interacting with teachers in Central America, the Caribbean, and Peru. Vulnerability analyses conducted in schools should include an assessment of what people know about risks, and we now have some instruments and tools available to do this.

The big challenge in these three types of initiatives has been that of recognizing—as teachers do in the classes that address environmental issues—that there are many ways of relating to nature, and that this diversity depends a great deal on people's perceptions and the conclusions they draw from them. If we do not take these perceptions into account, we will be able to do very little to change risk conditions.

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