Seminar for the Exchange of Experiences and Challenges in Seismic Risk Reduction in the Caribbean Region

Dominican Republic, august 2012

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Contents

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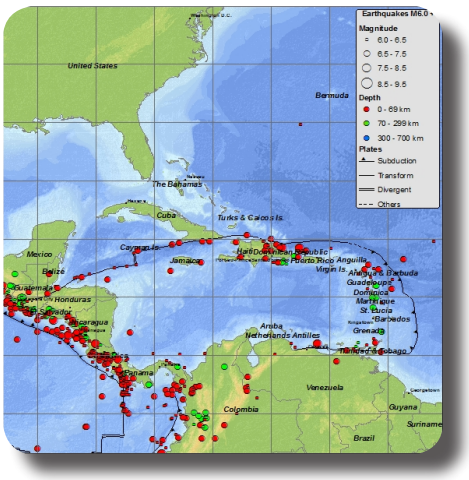
Introduction



The Caribbean is a region where seismicity is a major threat since most of the countries are located near the boundaries of the tectonic plates of North America and the Caribbean. To this you add the fact that, despite the efforts of countries in the region there is a high physical and social vulnerability.

Given this scenario of seismic risk, from The 8th to the 10th of August, 2012, the Seminar for the Exchange of Experiences and Challenges in Seismic Risk Reduction in the Caribbean Region was held in Santo Domingo, Dominican Republic, bringing together more than 120 participants from NGOs, international organizations, UN agencies, national emergency systems of Caribbean countries, international experts and other key actors in the region committed to reducing seismic risk.

The seminar provided an opportunity to exchange scientific and technical knowledge as well as tools among disaster risk reduction actors and decision makers, in order to contribute to disaster risk reduction.

This event, promoted by 14 organizations, was conducted with the support of the Directorate General for Humanitarian Aid and Civil Protection of the European Commission (ECHO), within the framework of the 2011-2012 DIPECHO Action Plan for the Caribbean.

Welcome and opening remarks of the event

For the welcome and opening remarks, the seminar included the distinguished presence of Major General Luis Luna Paulino, Chairman of the National Emergency Commission; Gayle Drakes, Representative for the Caribbean Disaster Emergency Management Agency - CDEMA; Valerie Julliand, United Nations Coordinator and UNDP representative, and Irene Horejs, EU ambassador in the Dominican Republic.

Major General Luna welcomed participants and pointed out that the countries of the Caribbean region must prioritize preparedness due to the seismic risk since, with the exception of the Bahamas and Guyana, all of them are near the limits of two major tectonics plates: the one in North America and the one in the Caribbean.

In turn, Valerie Julliand emphasized that preparedness and capacity building should be considered an investment because when there is a seismic event, a country may lose, in a moment, a large percentage of its gross domestic product. To avoid disaster, action is required in the short, medium and long term and the efforts of all, she said. The disaster risk reduction is a work that is done day by day.

When the seminar was declared open, Ambassador Horejs said that nature and geology are only part of the phenomenon that can make an earthquake destructive, so it is necessary to look at the human components that have to do with population density and location, with building codes, warning systems, with research and

"The European Union is proud of its contribution to sustainable development solidarity. We are very aware of the reciprocal linkbetween disaster and development - more real development equal to less disasters and more disasters equal or less human development. "

Ambassador Irene Horejs

prognosis, with preparation of people, communities, technicians, officials, warning systems and response capacity, with planning, with prevention activities. Horejs said the Caribbean brings together a combination of features that make it highly vulnerable, but that these human factors can be identified and worked.

Methodology

The seminar was divided into three topics: Vulnerability and Seismic risk; the seismic threat; and Capacities. Within each topic, presentations were conducted by the speakers and at the end of the first two days working groups were assembled where participants collaborated in the effort to land examples and special actions with the information received and to generate recommendations. It is worth mentioning that for many of the participants this was a first opportunity to interrelate and exchange information about their work.

Context

The Caribbean has an important history of catastrophic seismic events: earthquakes and volcanic eruptions, as well as the threats that derive from them, such as tsunamis, landslides, fires etc. It was established that the seismic risk management must be maintained as a regional priority.

Gayle Drakes, Representative of the Caribbean Disaster Emergency Management Agency - CDEMA, said that members of the intergovernmental agency have adopted the philosophy of the Comprehensive Disaster Management, CDM; a proactive and comprehensive approach to reduce risks and losses associated with threats to enhance sustainable development in the region

"Seismic Risk management must remain a priority for the region"
CEDEMA

Under this approach, the seismic risk management in the Caribbean has evolved in the last decade, to a multi-threat approach that is more proactive than reactive, which has emphasized the strategic programming based on results.
Monitoring and research and the use of new technologies, such as GIS, Geographic Information System, have been strengthened to support planning and decision-making based on facts.

Also, the key role played by communities and the need to build resilience in these and promote a culture of safety has been acknowledged

Regional seismic risk management

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"It is urgent for the authorities to take seriously the risk reduction, even in cities that have not experienced an earthquake or tsunami, in hundreds of years".
EIRD

Characteristics of seismic vulnerability in the Caribbean

- Rural to urban migration.
- Change in condition and quality of buildings.
- Poverty.
- Old and fraudulent buildings.
- Unplanned urban sites in threatened areas.
- Lack of control over land use.
- Little experience with large seismic events.
- Lack of awareness about earthquakes.
- Low level of preparation.

Reducing uncertainty

"" In the face of any type of disaster, there are range of financial instruments that a country can use, which make up their financial strategy. Investment in prevention, mitigation and preparedness is usually the most cost-efficient option from an economic perspective"

Economist, IADB, Sergio Lacambra

There are significant advances in technical studies that allow reducing the uncertainty that is associated with vulnerability.

Scientists cannot predict when and where earthquakes will occur, however, you can make predictions based on patterns of activity in the region that help shed light on the scope that an earthquake might have and the size of the effects that it could have on a country.

As part of these studies, a tool of the Inter-American Development Bank (IDB) was presented designed with the intention of measuring the potential economic impact of a disaster. The aim of the study is to quantitatively illustrate the risk, in physical and economic terms, which is derived from extreme natural events of low probability and high consequences, like earthquakes. The purpose is for the country to identify and implement resources to improve disaster risk management and reduce future consequences that may arise.

The study works as follows: we estimate the seismic hazard, databases are created to quantify the costs of different types of assets exposed: buildings, urban infrastructure and national infrastructure, vulnerability is qualified and then you get the probable maximum loss and the expected annual loss, according to scenarios of different types of earthquakes.

Finally, as a result of comparing these probable losses with the state's capacity to assume them, you obtain the Disaster Deficit Index (DDI). When it is less than one it means that the state does not have the capacity to respond. Due to this, the IDB is trying to convince ministries to work in risk management, and governments to allocate funds for Disaster Risk Reduction

Structural vulnerability

"Our level of consciousness, without judgment of our practitioners, does not allow us to understand the problem endured when buildings are facing an earthquake in commitment to life"

Ing. Reyes Madera, SODOSISMICA

In the Caribbean there is a large building mass with significant shortcomings, invisible to the untrained eye.

One of the first factors to consider in determining the vulnerability of a building is the soil where it is seated. Therefore, it is vitally important to promote studies in seismic micro zonation. These studies reveal existing soil types in different locations to identify which are safer and which more susceptible, for example, to liquefaction.

These studies provide strategic knowledge to plan urbanization and development, so it can detect vulnerable areas where to avoid construction or strengthen existing construction.

Among the existing building mass is a large proportion of buildings that has elements that make it dangerous in an earthquake, for example, buildings with short columns, without beams, canopies, soft soils etc.
It is considered that, in general, there is insufficient knowledge of earthquake resistant construction practices so the training of architects, engineers and masons

is important since vulnerability starts from the design. Creating inappropriate structures in unsafe locations, contributes to risk construction.

Additionally, it was reported that in some cases there has been a reluctance to learn from the lessons of the past, and it was shown how some schools that collapsed were reconstructed in the same way. Taking actions that make reoccurrence of the risk factor is called reproduction of the risk.

The factors that determine reproduction of risk may be exposure, physical environmental and socioeconomic. This is called the social construction of risk. To reduce risk, management of risk production and reproduction is necessary. It was concluded that there is a need for planning and control of the territory in accordance with the actual danger conditions given by the technical investigations. To achieve this it is imperative to have technical normative elements such as constuction codes. However developing codes is not enough, these must be complied with.

Speakers:
Gayle Drakes. Caribbean Disaster Emergency Management Agency. CDMA
Sandra Amlang. (UNISDR) Panama. Focal point for the Caribbean program resilient cities
Eugenio Polanco. Seismological Institute. University of Santo Domingo, Dominican Republic
Sergio Lacambra. Inter-American Development Bank (IDB)
Sadrac St Fleur. PhD student at the University of Nice
Philip Locuste. Civil Engineer General Council of Martinique
Santiago Muñoz. Director of National Geological Service. Dominican Republic
Leonardo Reyes Madera. Engineer earthquake resistant SODOSISMICA
Alfio Bernardo. International plan ACPP
Alejandro Acevedo. CAOS Interactive Simulator

"Earthquakes don't kill people, buildings do"

Charles Richter, inventor of the Richter scale for earthquake magnitude measurement

Information Systems

Information systems can help to understand and respond to urban vulnerabilities in order to mitigate them. It is important to identify which is the exposed element, what we are going to protect? The population? The infrastructure? This depicts the way in which work should be done in order to create safe cities, safe hospitals, and safe schools.

The experience of the City of Quito was presented, where a territorial vulnerability map was generated representing the risk spatial root and which shows the more sensitive and strategic areas where preventive measures are a priority, that is, where if something happens you can have an impact on larger areas. This allows us to focus on actions, for example, seismic microzonation.

"We can not do anything to avoid an earthquake, but there are very efficient Geographic Information Systems that can help us identify areas of more exposition and vulnerability to reduce the impact of such event on the population."

Hugo Yepes Geophysical Institute of Quito, Ecuador

As another valuable experience, the issue of the creation of SIRAD Resources Information System for Disaster Relief in Lima / Callao was presented. Application of the system generated databases regarding emergency resources such as water, food and fuel supplies and health services among others. Then the maps of vulnerable areas are compared with the maps showing where the resources are. Thus the vulnerability of the land is linked to the crisis management system.

The SIRAD project is continued in Haiti 2010, where a system of resources information and vulnerability in Port au Prince was created, with an approach that allows information production and creates a preventive dynamic through this system.

"The mapping of the places where resources are concentrated, is not the mapping where vulnerabilities are concentrated "

Dr.Robert D'Ercole

Preventive information

Under the theme of preventive information, several monitoring experiences were shared.

"Educating without frightening"
Mario Calderón, Oxfam Ecuador

In the Dominican Republic, the Seismological Institute is the institution responsible for Seismic Monitoring and is responsible for the development and maintenance of the national seismic network and accelerographers, as well as to provide timely information to the authorities if there was to be a major earthquake. Plans to expand the network in the medium and long term were presented

The Puerto Rico Seismic Network has, in turn, the mission to inform in a reliable and timely way about the generation and effects of earthquakes and tsunamis in Puerto Rico and the Virgin Islands.

The network was explained in detail as well as the innovative ways in which this information is transmitted to the authorities such as police, firemen and even through an iPhone application that allows for real-time information.

The Seismic Research Centre (SRC) of the University of the West Indies, based in Trinidad and Tobago, is the leading source of information on geo threats in the English-speaking Eastern Caribbean, giving service to the majority of the Caribbean Eastern Arc: St Kitts and Nevis, Antigua and Barbuda, Montserrat, Dominica, Saint Lucia, Saint Vincent and the Grenadines and Grenada. The monitoring network consisting of 52 instruments between seismometers and accelerometers is the largest in the region. SRC monitors, in addition, 17 of the 19 active volcanoes in the Eastern Caribbean.

The Geological Survey (USGS), meanwhile, shared a quick assessment system for global earthquakes called Prompt Assessment of Global Earthquakes for Response (PAGER). This tool allows you to have, only 30 minutes after the earthquake, data such as: intensity, affected area, population, vulnerabilities specific to the region, estimated human and economic losses and exposed population by city, among others. The purpose of this tool to which you can subscribe, is to improve the quality and speed of response to a seismic event.

Another initiative, in which the USGS is working in collaboration with the private sector, is the creation of the Global Earthquake Model (GEM) with the intention of improving communication and estimates of seismic hazard and risk. The model that will be completed in 2014, will have an intuitive interface for network users and will be open to the public for free. On the other hand, monitoring risk management and disaster prevention experiences on the island of Cuba were presented. The Caribbean seismic research center reported, in turn, that it is involved in the process of establishing a tsunami-warning program.

There were several specific studies on some of the cities most at risk in the Caribbean: In the case of Haiti, it was reiterated that the Enriquillo-Plantain Garden fault has the potential to generate an earthquake of up to 7.6 degrees and it is even closer to Port au Prince than the fault that caused the 2010 earthquake.

Another city at risk in the La Española island is Santiago, Dominican Republic, due to its proximity to the northern fault. According to paleontological studies such failure has enough pressure accumulated to generate an earthquake of about 7.5 degrees on the Richter scale.

On the other hand, Jamaica is located on the boundaries of Gonâve microplate, which in turn is located between the plates in North America and the Caribbean. The country annually detects more than 100 earthquakes, most of them in the region of the Blue Mountains, near the city of Kingston. According to a historical study, most of the earthquakes have hit the country's east, where the capital is located.

Also, most of the country's strategic infrastructure is concentrated there. Due to this, decentralization was recommended.

Communication and information

Once the information is obtained, scientists face the challenge of how to communicate scientific forecasts and warnings on seismic matters to decision makers appropriately. It was felt that the first step is that scientists have a full knowledge of natural phenomena of both, what they know as what they do not know. The need to communicate the uncertainties stood out.

Also, communications must be delivered promptly taking care of how you will convey the message to the various actors, i.e. communication with the authorities cannot be the same as for the general public. It is important to create a long-term link between the scientists in charge of monitoring a threat and the social actors who work with it, as well as directly with the potentially affected population.

The importance of communicating with communities was reiterated: educate without scaring, get people to be informed and increase their capacity to respond but without generating panic, they must learn that a cartography can save their life by showing what areas are risky and which are less risky.

It was also recommended that for early warning systems to be effective they must be defined at the local level and reviewed constantly to adapt to reality.

Speakers:
Hugo Yepes. Geophysical Institute in Quito, Ecuador
Ricardo Peña Herrera. Urban Risk Program, Quito, Ecuador
Dr Rober D´Ercole. IRD (French Institute for Research and Development)
Eugenio Polanco. Seismological Institute. University of Santo Domingo, Dominican Republic
Alberto López. Department of Geology. University of Puerto Rico
Gari Mayberr. USAID / OFDA-USGS
Ryan Gold. USAID / OFDA-USGS
Kathleen Black. Earthquake University of the West Indies, Jamaica
Fernando Guach. CENAIS_CITMA. Cuba
Stacey Edwards. Seismic Research Center of the University of West Indies in Trinidad and Tobago Mario Calderon. OXFAM. Ecuador
Armando Ugarte. Nicaragua National Engineering University

Lessons Learned

The Mayor of Talcahuano, in Chile, shared the experience obtained after the earthquake and tsunami that hit his area and issued a series of recommendations and lessons learned to increase the capacity of institutions and the population in the presence of a seismic event. One of them is the creation of safe spaces in the highlands that serve as places of entertainment but can function as emergency shelters.

In Haiti's case it was said that the experience of 2010 showed that there is a deep structural vulnerability so it is necessary to make an impact on building codes with decision makers and train building professionals and raise awareness of the population on risk and increase their capabilities.

An assessment of existing buildings has been made and the capacity of bricklayers, masons and engineers is being carried out. Also, manuals explaining safe techniques to repair and build homes have been made. These manuals are written in simple language and illustrated graphically demonstrating what to do and what not, recognizing the fact that in most of the cases, the people affected are those who carry out the reconstruction.

Currently, the Haitian government does not have the means to control the construction processes but there are on going experiences where neighbors support each other and groups of engineers work with them to verify the construction processes.

It was reiterated that, for a good reconstruction to happen, there must be a government that can make the necessary decisions and a strategic and legal framework that contains a proper balance between the minimum standards and regulations, calling for the feasibility of its application by the population considering social reality.

"Everyone wants to know when the next big earthquake will hit. There is no way to predict earthquakes. We can look back on past patterns, but future patterns will not be the same. "

Jean Robert Altidor, Bureau of mines and Energy Haiti

Speakers::
Gaston Saavedra. Mayor of Talcahuano
Jean Robert Altidor, Bureau of Mines and Energy Haiti
Ugo Blanco. Head of the recovery unit and UNDP Haiti
Fenella Frost. UNDP Haiti
Demian Riquet UNICEF
Patria Luz Bonilla. General Directorship Territorial Plantation Dominican Republic

In a special block, the Collective Caribbean Risk Cluster shared the work they do in Martinique. It spoke of the initiative that in recent years has worked to train engineers, architects and foremen in seism resistant construction. It also shared specific techniques for enabling retrofitting buildings to 30% of the cost of reconstruction and much faster. Finally a mathematical method to determine whether a particular building needs to be seismically adapted was explained.

Speakers:
Caribbean Risk Cluster
Gladys Christopher. ANCO
Silvano Erliche. Egis Industries
David Bellegarde. General Council Martinique

Safe Hospitals, Safe Schools

A vital issue for risk management is Safe Hospitals, as an initiative that allows a health care establishment to remain accessible and operate at full capacity and in the same facility, immediately after a large-scale disaster or emergency.

More than 67% of the 18,000 hospitals in Latin America and the Caribbean are located in areas with higher risk of disasters. Hospitals are a great investment and account for over 60% of the budget of the Health Ministries.

"In Latin America and the Caribbean 18,000 hospitals are in risk areas … and we have not yet been able to quantify the number of schools and other vital infrastructures that are exposed."
OPS/OMS

The Hospital Safety Index provides a probability that a hospital or health center will continue to function in emergency situations. Through the Security Index grading, countries and decision makers can have a general idea of their ability to respond to emergencies and disasters.

The development of simplified common tools, as the hospital safety index, has enabled more than 50 countries on five continents to evaluate the safety of hundreds of hospitals when a disaster hits, in a short time.

The safety assessment methodology for hospitals has transcended the health sector and is being applied to schools and other public buildings.

For the reduction of seismic risk in health, measures must be implemented to achieve the goal that all new hospitals are built with a level of protection to ensure their disaster operation and to implement appropriate mitigation measures to strengthen the existing health facilities.

Also, having safe schools is a priority, and UNICEF and DIPECHO have systematized the need to know what schools are safe. Due to this, a tool is being developed for diagnosis of the education staff and to establish the minimum components necessary to identify risks that affect the safety conditions in schools.

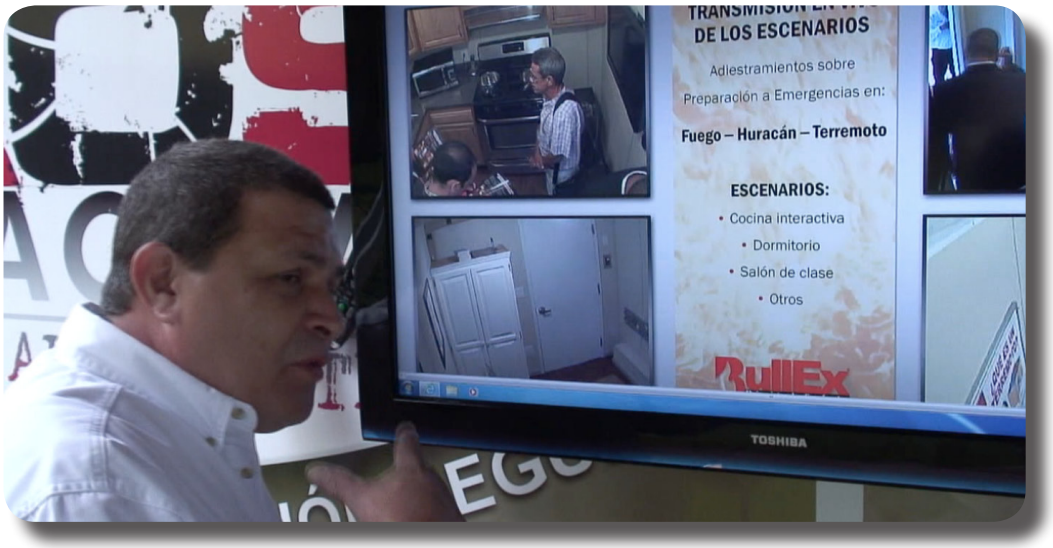
The School Safety Index (SSI), evaluates structural and social factors to determine the level of school safety. This makes it possible to generate maps that allow the more vulnerable schools to be located and to make more timely and effective decisions.

Finally, the experience of using GIS (Geographic Information System) was shared, to make maps aimed at reducing risk in the community, allowing the dissemination and use of information when providing credible, relevant and legitimate maps that allow updates. Additionally, the use of such technology supports the community process of preparation and helps members of the community to identify priority areas for mitigation measures.

Speakers:
Lealou Reballos. PAHO / WHO
Garfield Henderson. Saint Vincent and the Grenadines
Dr. Gregorio A Pérez. Safe Hospitals Program, Dominican Republic
Susana Urbano. Unicef Panamá
Joan Bastide. French Red Cross, Grenada

CAOS Simulator

The Training Center for Hazardous Materials Emergencies (Centro de Adiestramiento a Emergencias con Materiales Peligrosos, CEEMP INC.), a center specialized in providing emergency alert courses with practical strategies, presented the CAOS simulator: a mobile training center where the response of participants to fire scenarios, earthquakes and hurricanes among others, may be practiced.



Guided Tour

At the end of the presentations, SODOSISMICA and Dominican Red Cross led a tour of the area with the highest density of buildings in the most central area of the city of Santo Domingo. The aim of the visit was to identify in a practical way the main aspects of the physical vulnerability of the city, by observing different buildings located in strategic points and of consolidated urban areas in vulnerable areas.

During the visit, Engineer Leonardo Reyes Madera and Architect Gustavo Lara, were in charge of instructing the 75 participants on urban development models, type of construction, physical vulnerability factors, city land use planning, seismic and tsunami threat among other aspects of interest.

Conclusions and Recommendations

Preamble:

- The primary objective of the meeting, which was to exchange experiences and knowledge regionally, was met.
- The seminar offered a space to exchange scientific and technical knowledge as well as tools between different disaster risk reduction actors and decision makers, and as such, it contributed to disaster risk reduction.
- Important technical advances related to hazard mapping and monitoring, as well as scenario design and economic impact, were shared.
- Scientists, international cooperation actors, authorities, and other key stakeholders involved in seismic risk reduction were able to engage with each other and share their views and findings.

At the end of the seminar, participants produced analysis and recommendations on how to move forward. The following must be emphasized:

Conclusions:

- The Caribbean regional has been unanimously recognized as a seismic region; irrefutable evidence was present to demonstrate this point.
- Despite past and ongoing efforts conducted at country level, evidence revealed that in the Caribbean high physical and social vulnerabilities still prevail associated to seismic risk.
- It was proven that earthquakes generate multi-hazard scenarios (tsunami, mudslides, floods chemical accidents, fires etc.) that are not yet systematically integrated.
- There is a great mass of buildings being constructed with invisible deficiencies that do not comply with the necessary seismic safety conditions and that could collapse.
- In Latin America and the Caribbean 18,000 hospitals are in risk areas and we have not yet been able to quantify the number of schools and other vital infrastructure that is exposed.
- Day by day, there is more population exposed to seismic events, especially in urban areas, which is increasing the risk.
- There is insufficient knowledge of seismic resistant construction practices.
- It was also highlighted that in rebuilding processes, there is a tendency to reproduce risk conditions.
- It was emphasized that risk reduction is still being regarded as a cost and not as an investment.
- Learning how to communicate properly about seismic risk, without being alarmist, remains a challenge in making a difference in terms of reducing risk and saving lives.

Recommendations:

- To maintain and promote interchange and coordination in order to reduce seismic risk the Caribbean agenda.
  a) Develop a regional database of technical experts on seismic risk reduction, who will be able to carry out assessments and provide advice on safety of buildings.
  b) The exchange of experiences with the seismic risk must contemplate the other regions such as Central and South America, also the development of joint initiatives between regions.
- Translating the seismic risk reduction (construction tools, other…) into good practices and concrete actions.
  a) Because of this event there is a firm commitment to present evidence of achievements during the regional CDEMA workshop beginning in December.
  b) This lack of studies on seismic hazard in highly populated areas (earthquakes, tsunami, volcanic activity impact) must be gradually reduced.
  c) It is recommended to prioritize the training of masons and / or informal builders in earthquake-resistant basic techniques.
  d) Structural vulnerability of buildings and vital infrastructure must be more systematically assessed.
- Safe hospital and schools, and resilient cities should be a priority that cannot be rescheduled.
- Seismic risk communication starts at community level and associated messages should be adapted to the context.
- Building and or re-building (building back) without integrating the seismic risk concepts is not an option.
- There is a need to see disaster risk reduction as a discipline that moves towards the creation of a safety culture, where production and reproduction of risk becomes unacceptable.

GROUP WORK 1A

STRUCTURAL SEISMIC VULNERABILITY

Group that analyzes **good practices related to seismic codes in the region.**

Code development and implementation: list at least 3 examples of good practices of development and implementation of seismic codes in the region.

Case	Country	Agency or entity that led the process	Concrete actions that influenced this initiative's success	Recommendations
Example 1:	Haiti	Ministry of Public Works, Transportation and Communication	• Legislation exist • Supervision mechanism exist • Training programme for masons, engineers, architects • Construction guide/manual for masons, engineers, architects, also for specific facilities (e.g. schools)	
Example 2:	CUBA	Ministry of Public Works	• Deterministic method to probabilistic method • Change from static analysis to dynamic analysis • Introduction of design by performance • General norms and specific norms (e.g. for hospitals) • Legal base is fundamental! • Not only responsibility of the Ministry of Public Works, but also with the participation of actors (integrated system) • Risk management introduced also thru academia (e.g. at universities to engineer, architects), not just at the Ministerial level • Before any construction started, approval is requested from Ministry of Environment and/or Public Works • Control: Project control approval, supervision and execution of the work, certification of the work	• Hazard mapping, studies • Translate the seismic (risk reduction) codes to good practice, concrete actions • Linking training on building codes / safer building to incentives for contractors (e.g. licensing) • Activities should be on-going • Managed to introduce the topic of risk reduction in the university curricula, engineers and architects. • Figure of community architect overseeing construction locally.
Example 3:	Nicaragua	Ministry of	• Schools/trainings for construction workers and other technical persons (20% trained and still on-going)	• In Central America there is a regional seismic hazard study with statistical information dating back to the Colony, a map was created of Panama and Costa Rica, which has already been collected in codes. Nicaragua is underway. • School for master builders (and median level technicians) to train them to build based on the code. 20% of the master builders have been trained. • There are a number of manuals to build with minimal security, in popular language ECUADOR • Architects are made to swear before a notary that is well built (this does not work)
Example 4:	Ecuador		• No capacity for monitoring and evaluation (construction) • Adherence to code is left to contractors and not to external evaluator	
Common Challenges:	• The informal works being done without following the codes • To practice/implementation of the code			
Common opportunities:	• To advance the process of adhering to required/necessary good practices			

Development by governments

Support to authorities

Understanding who is responsible to build

Work with them formally and informally to make sure these codes are put into practice.

GROUP WORK 1B

STRUCTURAL SEISMIC VULNERABILITY

Group that analyzes **advocacy in relation to respecting seismic codes in the region.**

Advocacy in relation to seismic codes: list at least 3 examples of advocacy targeting builders for them to respect the seismic codes.

Case	Country	Agency or entity that led the process	Concrete actions that influenced this initiative's success	Recommendations
Example 1:	Dominican Republic		• 1979 first time that the country had a seismic code , two factors: motivation and the other was a training programm regarding the codes • 2011 – Revision of the code that authorities had received 2 days before the Haiti Earthquake • Based on Haiti earthquake there were some businessmen that started to have their buildings checked . For example, the Universidad Pontificia made check 10 buildings and has reinforced 2 • The owners of "La Sirena" have reinforced 9 of their buildings • Red Cross advocated to decision makers to have earthquake resistant buildings to ensure that the blood bank is operational in case of disaster.	"Safe Hospitals" and "Resilient Cities" that promote raising awareness in the population so that the population forces the Government to make respect the rules Advocacy campaign highlighting the importance of having critical infrastructure working alter the impact of the earthquake
Example 2:	Martinique		• For public buildings, the "Bureau de Control" monitors that building codes have been implemented as they are compulsory. The monitoring is done by private consultancy companies that make the assessment should be accredited and other company will recheck… • For private houses, a financial incentive is given for people to engage professionals trained on building codes. • Good practice: financial incentive to help home owners pay building proffessionals. • Compulsory buildng control for public buildings and private buildings that receive the public (malls , shops, offices) . Not for private houses • Problem: people have to advance the money and sometimes they do not follow the rules	Financial incentives for people to respect the codes To involve banking and insurance sector in seismic Risk Reduction planning/measures
Example 3:	Haiti	Hotels Association of the Nord	The Hotels Association of the Nord is working together to establish standards for earthquake proof buildings	Advocacy campaigns to the private sector to sensitize about the economic benefits of having earthquake proof buildings
Common Challenges:	Illegal constructions and lack of land use planning. Respect of codes might be lower when the people do not own the house where they live – Coercion is needed. There is not a regional approach to advocate for respect of building codes – each country is dealing with the issue separately. – a regional or a common strategy could be delveloped t advocate for the region. Quality of materials (In Port au Prince, for example, the cement was in many cases not made of silica but of limestone . its important to advocate for the quality of materials they need to use			
Common opportunities:	CARICOM or CDEMA to approach the issue at a high level- CDEMA has a seat in CARICOM and that is the kind of advocacy we need to approach the problem regionally. Countries should have pre-validated building codes. The Greener Initiative could be useful to start advocating in this sense. If there is a particular island that is ahead on the building codes, they should share it and analyze if there is a model we could adapt/implement in the whole Caribbean			

GROUP WORK 1C

STRUCTURAL SEISMIC VULNERABILITY

Group that analyzes **communication to the public about structural vulnerabilities.**

Structural seismic vulnerability: Examples of successful communication with the public about structural vulnerabilities

Case	Country	Agency or entity that led the process	Concrete actions that influenced this initiative's success	Recommendations
Example 1:	Martinique	General council of Martinique	• General council realized 2007 earthquake most population wasn't prepared • Launched awareness campaign for public, fire dept • Training and campaign in schools, community building, sensitization caravan • EQ simulator • Reinforcing some key buildings	
Example 2:	DR	National office for seismic assessments Tech team	• Jan 4 and 5th EQ in S DR M 5, cracks in schools, tech team did quick assessment showed no significant structural damage • Did conference with govt and invited community • Talked to TV to tell communities how to prepare • Risk management in schools plans, hospital safety index, training medical staff for risk management, municipal risk management plans with communities, media campaign discussing seismic risk of DR, virtual courses for vulnerability info. dissemination	• Use teachable moments soon after earthquakes to educate at-risk communications • Have printed material before events available when opportunity arises
Example 3:	Trinidad and Tobago	SRU	• After Haiti EQ establishing building codes, they hosted seminars and workshops for engineers to advocate for local building codes	Advocacy campaigns to the private sector to sensitize about the economic benefits of having earthquake proof buildings
Example 4:	Grenada	Government trough international disaster management agency	• Weekly tv programs to educate communities • School program	Presentations from technical experts to governments on how much it would cost not to take action
Example 5:	St Vincent and the Grenadines	Government	• All hazard approach to cover more that hurricanes after 2007 • With SRU did training with NEMA and media on how to get the word out and fit into local context • Anniversary of Soufriere volcanic eruption have activities for general public led by SRU • They have an activity that is a trip to the volvcano to remind communities that they are at risk • Lectures, tv, radio • School earthquake drills	Multi-hazard, muti-media
Example 6	Grenada	Red cross	• Community-level simulations and drills • Fun days- general public invited with different organizations and booths, flyers, etc… • Safer homes training, TOT program • Family disaster plan campaigns- door to door • Do quick assessment of homes- put into GIS with community members to show which homes are vulnerable • National disaster song competition	More materials being published for children
Common Challenges:	FUNDING Need financial assistance to sustain projects How to educate large populations Ability to go out on the community level and get politicians on board- need to make sure DRR is included in legislation Communicating in a way that non-experts can understand People tamper with equipment because they don't understand how its helping them			
Common	Teachable moments shortly after events have material prepared so info can be distributed while incident is fresh Funding from various donors Have technical experts work with community-level organizations to bring information to the local level			

GROUP WORK 2A

SEISMIC HAZARDS

Group that analyzes **monitoring of the seismic hazard.**

Seismic Threat: list at least three successful and replicable examples of how seismic hazards are effectively monitored in the region.				
Case	**Country**	**Agency or entity that led the process**	**Concrete actions that contributed to success**	**Recommendations**
Replicable Example 1:	Haiti	Bureau of Mines	• Seismic monitoring stations put in place in 7 areas of the country • Technicians have been trained (partnership with Universities) • The information is communicated to the Civil Protection directly in order to set an Emergency Operations Center if needed	• More stations and more trained technicians are needed • The software needs to be update • The stations are not equipped to monitor tsunamis
Replicable Example 2:	St Vincent & Grenadine	National emergency management office (NEMO) Seismic Research Center in Trinidad & Tobago	• After the eruption of 1979 monitoring stations was put in place: the Soufrière Monitoring Unit and one directly in the mountain itself • Volcanic hazards map established • EWS in place triggered by Trinidad	• Public awareness in order to minimize the theft of equipment
Replicable Example 3:	English speaking Petites Antilles	Seismic Research Center in Trinidad & Tobago	• Establishment of a well functioning communication system within the different monitoring units in the region (Centralized in Trinidad) • Scientists and trained staff in place	• Upgrade of automated system to communicate faster • Change behavior of the population
Common Challenges:	Lack of funding, public awareness and political will			
Common opportunities:	Network in place, technical expertise in the region			

GROUP WORK 2B

SEISMIC HAZARDS

Group that analyzes **How to communicate the seismic hazard,**

Seismic Threat: list successful and replicable examples of how seismic hazards are communicated to the public at local, national and regional levels.				
Case	**Country**	**Brief description of the communication mechanism**	**Elements that influenced its success**	**Recommendations**
Local Example 1:	Tobago	Community vulnerability and risk management campaign. GIS hazard maps for high-risk coastal communities. Use of sirens to alert communities with different tones based on the kind of hazard – one system, multiple responses depending on hazard. Link this in to community and family emergency plans. Publicised on TV, radio etc. Evacuation maps on roads and public areas. So far limited to most exposed communities – not yet gone nationwide.	• One system, multiple responses. Use of consistent visual messages across T&T as the population is very mobile.	Links to technology. Make on system useful to many hazards – people will get to know the system better. Collaborate with private sector – eg free text messages.
Local Example 2:	Wherever	CAOS simulator. Communicates to its users – local scale.	• True-to-life – you can imagine your house / school.	Local replication. Incorporate into school curriculum?
National Example:				
Regional Example:	ESC	CDEMA capacity build project 2009. Reg & local components. Development of tools and manuals for schools, private sector etc (template emergency plans etc). Multimedia package with animated publicity inc songs. Later copied by other countries inc Francophone islands. Also short stories for children. Website: www.weready.org Variety of messages using popular music. Different hazards, importance of preparedness and knowing what to do. Cut across ECHO sectors: included sections on developing preparedness kits, "drop, cover, hold on" self-protection techniques. Probably not so much advocacy/institutional coordination sector – messages more from top down. (NB analysis of communication through lens of ECHO subsectors probably not so relevant).	• Multinational, steering committee from many islands. Multicultural and media work done by a Carib company to tap into local tastes, fashions and ways of communicating.	It was only for Anglophone Carib – would have been good to incorporate rest of the region. Consistency of messages through all the media – same slogans, images, colours. Can easily adapt the materials to cultural contexts (eg switch calypso for reggae depending on audiences).
Common Challenges:	• Communicating vulnerability and vulnerability reduction – not just natural hazard (especially when it is a natural hazard we can't influence such as earthquakes). • Slowness of political response. • Some hazards require very specific behaviour messages that do not transfer to other hazards (hurricane vs earthquake). • "Drop, cover, hold on" message based on a philosophy of construction that the building will withstand the tremor – it's a very American message. Can we make a message that is appropriate to the diversity of construction in developing countries and the lower quality of construction that often exists? • People in poverty can't afford safe construction. Self-constructors may not know how to build safely – just the cheapest way that the neighbours have also done. • Apathy – low frequency threat does not generate interest.			
Common	• Technology – penetration of mobile phone in particular. • Private sector knows how to communicate – they are selling! Needs to be incentivised. • Recent hazards – build on the moment of interest. • Communication starts in the community living at risk.			
Ideas	Training for masons with links to public policy (eg certification by ministries for masons). Public opinion should generate pressure on decision-makers.			

GROUP WORK 2C

CAPACITIES

Group that analyzes **Capacities to face a seismic disaster at local national and regional levels.**

Capacities:list the most relevant capacities at local, national and regional levels that should be strengthened and/or be developed.			
Capacities	**Brief description of the capacity that should be further developed**	**Recommendations about which capacities don't exist at all and should be developed**	**Challenges**
At a local level:	Installed capacity (hospitals, blood banks, laboratories, schools) but many of them will not available at the time of the disaster.		Intensify critical infrastructure, perform risk zoning, land use planning to ensure that the installed capacity will be available
At a national level:	Education public policies on risk management.	Apply economic incentives (tax cuts, reducing the cost of insurance policies) for the private sector and families implement risk reduction measures	
At a regional level:	Technical capabilities exist in the region, but there is no mechanism to strengthen the exchange of knowledge and concrete actions.		Promotion of a network of regional experts to facilitate the exchange of knowledge permanently

GROUP WORK 2D

CAPACITIES

Group that analyzes **which institutions have the capacity to offer training related to seismic risk.**

Capacities: list the institutions that have the capacity to offer training in seismic risk			
Name of the Institution or entity	**Brief description of what they offer**	**Target group in which they specialize**	**Opportunities: If we had these circumstances... we would offer these services....**
1) SODOSISMICA	Transmit knowledge to the Dominican society on seismic risk. Development and dissemination of seismic codes. Courses on the implementation of earthquake resistant building code. National and international seminars on prevention.	Professionals. Talks to the general public, not technical.	• Media Training • Through partnerships with other organizations could develop and certify training for small builders and craftsmen.
2) COE	They have technical school training in disaster management. Starting national awareness campaign on the seismic and tsunami risk	Multiplier technicians. Whole society.	• Challenge: impact on prevention. Reaching other nongovernmental institutions as ADME, SODOSISMICA.
3)Universities	INTEC (Dominican Republic), UNIBE, University PUCMM	Technical students (engineering, architecture)	• Opportunity: using diversity as a platform for dissemination and awareness.
4) IDISDEN	Civil engineering, seismic	Professionals and graduate students of Civil Engineering and Architecture.	• Opportunity: using diversity as a platform for dissemination and awareness
5) CRD, ONGs	Training and awareness of basic concepts of risk management, the importance of prevention, the legal framework.	Red Cross community structures and local	• Alliances with other specialized institutions and universities to develop and transmit technical knowledge to local and community levels.
6) CARIB RISK CLUSTER	Training platform seismic risk	All levels of risk management actors	• Collaborations with more institutions in the Caribbean, not only of the Francophone Caribbean. • Provide an official certification.

GROUP WORK 2E

CAPACITIES

Group that analyzes what stock is needed, where it should be placed and the logistics of distribution, taking into account the DIPECHO sub sectors: I) local disaster risk management II) advocacy and inter institutional coordination; III) Information, education and communication; IV) small infrastructures and services / livelihood protection; V) Emergency stock, pre positioning

Capacities: emergency stock pre-positioning

Type of stock that is needed	¿Where should it be placed?	Briefly describe it's storage logistics	Briefly describe distribution logistics	¿How is the material going to be re-stocked once it is used?
1) Fuel & transport (e.g. boats and ATVs)	Accessible but secure (specialist storage), possibly government / central authority organised		• Agreement with national fuel providers for distribution prioritisation	Normal replenishment as fuel not stocked separately and specifically for emergencies, also pre-agreements with suppliers, private companies and national authorities
2) Search & rescue material (saws, ropes, stretchers, shovels, ladders, boots, hardhats telecoms (radios, satellite phones))	Outside the projected area of worst damage but with multiple access possibilities. Proper building that offers protection and security vs. danger of collapse and damaging stock / limiting access. Sub-regional focal points, islands with fragile infrastructure?			Private sector partnerships, humanitarian aid, donor agencies, regional authorities and agencies, partner governments and organisations, donations from general public
3) Medical - earthquake specific injuries	Outside the projected area of worst damage but with multiple access possibilities. Proper building that offers protection and security vs. danger of collapse and damaging stock / limiting access. Sub-regional focal points, islands with fragile infrastructure?	Medical / surgical items - e.g. PAHO preference MoH, central medical storage -> clinics and hospitals. Scattering of first aid / first response vs. centralisation of surgical items and drugs		Private sector partnerships, humanitarian aid, donor agencies, regional authorities and agencies, partner governments and organisations, donations from general public
4) WatSan material (buckets, jerry cans, aquatabs)	Outside the projected area of worst damage but with multiple access possibilities. Proper building that offers protection and security vs. danger of collapse and damaging stock / limiting access. Sub-regional focal points, islands with fragile infrastructure?			Private sector partnerships, humanitarian aid, donor agencies, regional authorities and agencies, partner governments and organisations, donations from general public
5) Tents and mattresses	Outside the projected area of worst damage but with multiple access possibilities. Proper building that offers protection and security vs. danger of collapse and damaging stock / limiting access. Sub-regional focal points, islands with fragile infrastructure?			Private sector partnerships, humanitarian aid, donor agencies, regional authorities and agencies, partner governments and organisations, donations from general public
Common Challenges:	Airport vulnerability • Along the coast • Often only one • Liquefaction of soil (runway) • Access to/from rest of the island • e.g. Guadeloupe now developing earthquake resistant airport structures • (this also applies to other logistics points e.g. ports and other possible points of entry) Access to / from rest of the island to vital supplies and infrastructure			
Common opportunities:	Preparedness, planning, coordination and stockpiling: • 1. CDEMA sub-regional focal points (first phase) • 1. Red Cross societies in the region (first phase) • 2. Regional stocks in Panama (second phase and replenishment) Stock level sharing within organisations and between organisations: e.g. Eastern Caribbean Donor Group (ECDG) has a sharing mechanism in the event of a disaster			


CONCLUSIONES/CONCLUSIONS