

1. Overview
2. Institutional Framework
3. Shaping the Concept
4. Methodology for assessing School Safety

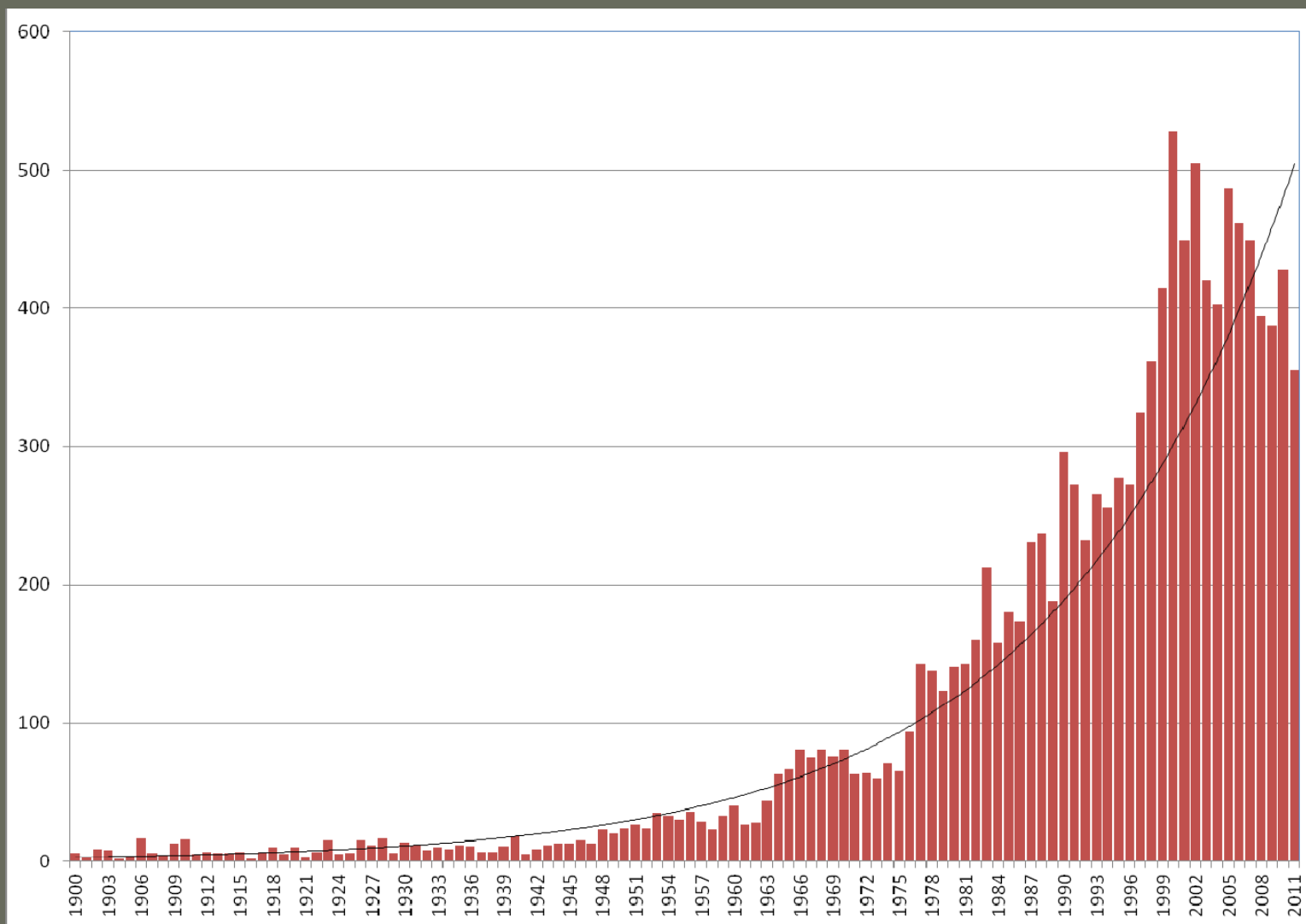


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Natural Disasters reported 1900-2011



EM-DAT: The OFDA/CRED International Disaster Database - www.emdat.be - Université catholique de Louvain - Brussels - Belgium





21st Century & Schools

2012	Thailand	2,600 schools and 700,000 students and teachers were affected by Bangkok's floods. Damage to educational facilities est. \$224m
2011	Japan	733 school students/teachers died or missing, 193 schools were destroyed, 747 schools significantly damaged, 5,064 schools suffered minor damage.
2010	Chile	80% of the 2 million students in the most affected areas resumed school just one week late. School damage estimated at \$2.1 billion
2009	Indonesia	Earthquake struck after then end of the school day. It caused collapse of many schools. 1,100 schools (3,200 classrooms) damaged.
2008	China	An estimated 10,000+ children died in their schools. An estimated 7,000 classrooms were destroyed.





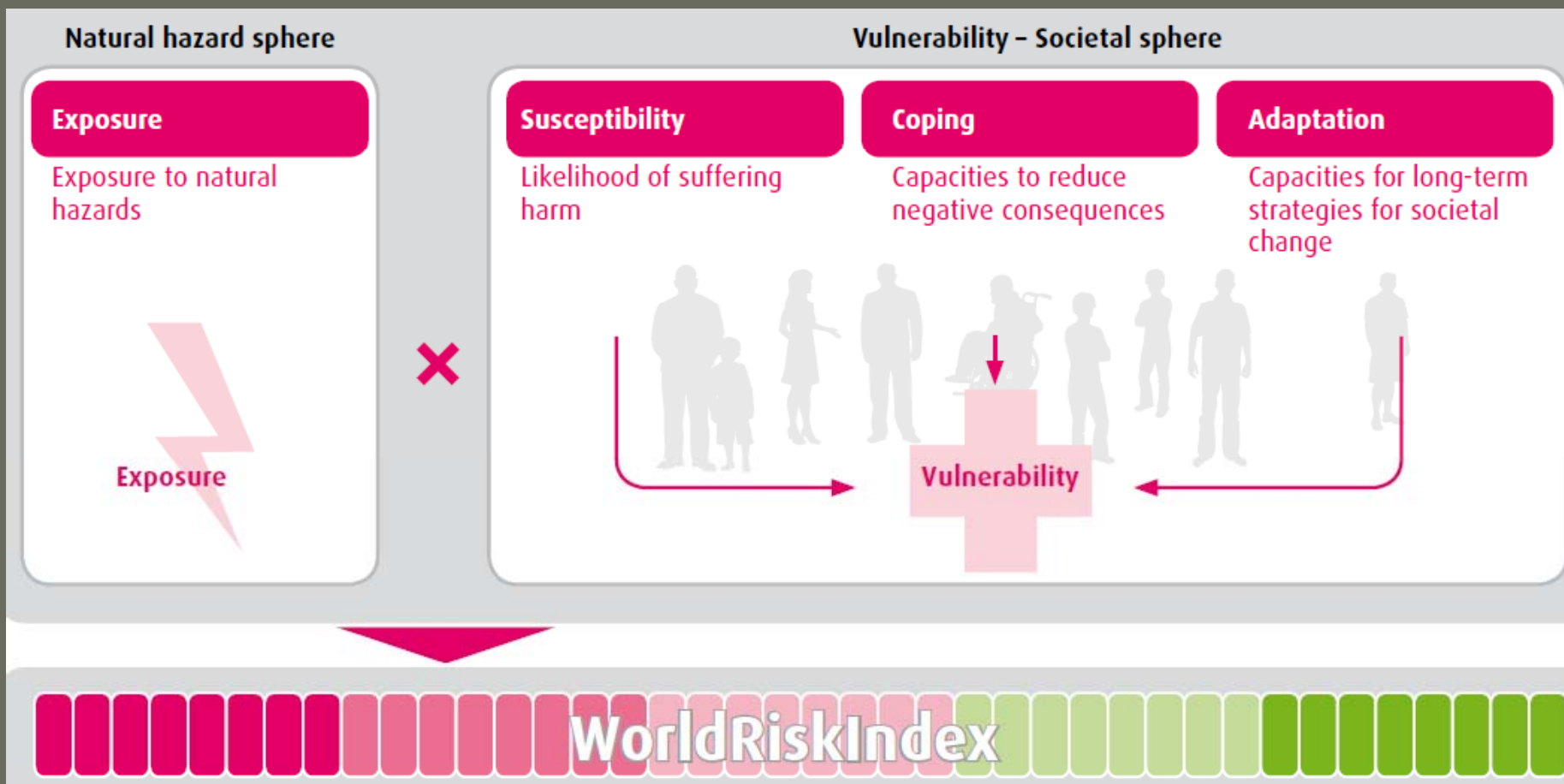
21st Century & Schools

2007	Peru	Earthquake damaged schools not those built to new codes. New codes require combination frames and 3-foot shear walls every 15 feet. These performed very well.
2005	Pakistan	17,000 students and 900 teachers died at school, and 50,000 were seriously injured, many disabled. 10,000 school buildings destroyed. 300,000 children affected. In some districts 80% of schools were destroyed.
2003	Turkey	84 children and teachers die in collapsed school building in a moderate earthquake. 4 schools collapsed. 90% of schools were impacted and education disrupted.
2001	El Salvador	Earthquake struck after then end of the school day. It 85 schools were damaged beyond repair. Replacement and repair cost \$114m. 22 preschoolers and their teacher were killed in an aftershock a month later.
2001	India	971 students and 31 teachers were killed by this earthquake. 1,884 schools collapsed, destroying 5,950 classrooms including 78% of public secondary schools.



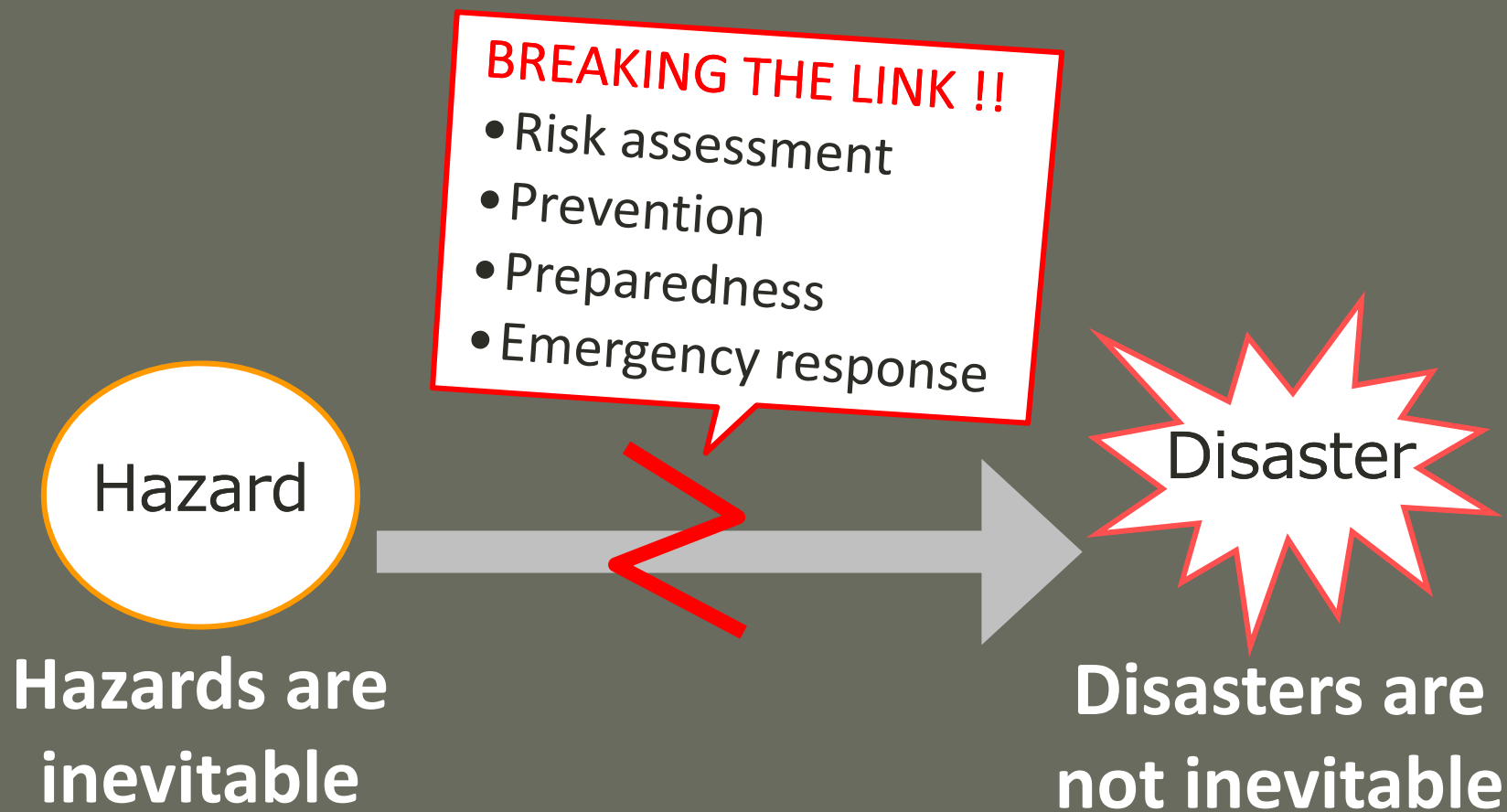


Risk



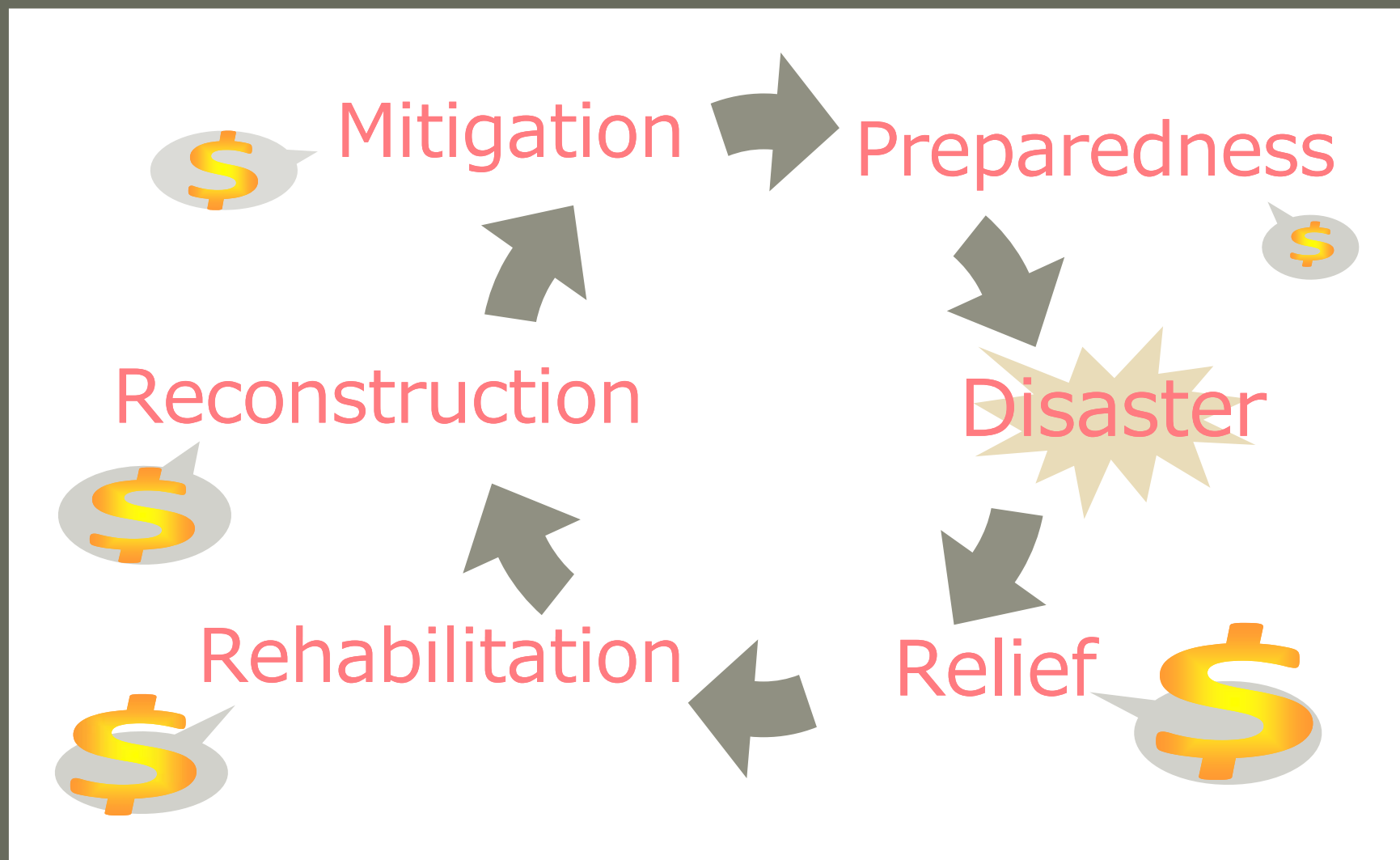


Hazard / Disaster





Need to change the priority!





Why Children and Schools?

- Children are amongst the most vulnerable group
- High capacity of learning and transferring knowledge
- Key role in promoting a culture of safety
- Children are the future
- Schools are used as shelters and relief centers after disasters (even if is not recommended)
- Schools plays a focal point role for gathering the local community



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I nternational Framework

- HFA 2005-2015
- DESD 2005-2014
- UNISDR - Global Platform for Disaster Risk Reduction
- RIO+20



Hyogo Framework for Action Priorities



1. Ensure that DRR is a national and a local priority.
Strong institutional basis
2. Identify, assess and monitor disaster risks and enhance early warning
3. Knowledge, innovation and education to build a culture of safety and resilience
4. Reduce the underlying risk factors
5. Strengthen disaster preparedness for effective response at all levels

Decade of Education for Sustainable Development



- Disasters represent major obstacles to achieving UN Millennium Development Goals (e.g. 1.Poverty)
- Relevance of ESD for Key Sustainable Development Challenges →
Building Disaster-Resilient Societies



UNISDR



Global Platform
for Disaster Risk Reduction

Committed to assess the level of disaster resilience in all schools in disaster-prone countries, and all related government's agencies to develop a national plan for school safety by 2015





“call for disaster risk reduction and building of resilience to disasters to be addressed with a renewed sense of urgency in the context of sustainable development and poverty eradication”



Major Regional Declarations

- Hanoi RCC 5 Statement - 2005
- Delhi Declaration - 2007
- Ahmedabad Action Agenda for School Safety – 2007
- Bangkok Action Agenda – 2007
- Islamabad Declaration on School Safety – 2008
- Panama Declaration - 2011

Ahmedabad Action Agenda for School Safety

"Zero Mortality of Children in Schools from Preventable Disasters by the year 2015"

1. DISASTER RISK REDUCTION EDUCATION IN SCHOOLS

Immediate Priority

Action 1.a: Facilitate disaster risk reduction in the formal curriculum at both primary as well as secondary levels.

Action 1.b: Promote disaster risk reduction through co-curricular activities in schools acknowledging that children in schools' need to develop "survival/skill sets" (i.e., along with "academic inputs").

Action 1.c: Promote inclusive and holistic disaster management and disaster risk reduction, such as drills, fire and training, training on fire safety and other response skills as appropriate (e.g. light, search and rescue, emergency evacuation and emergency sheltering).

By 2011

Action 1.d: Promote inclusive and holistic disaster management and disaster risk reduction in the community. Children in schools must receive at least one day of disaster risk reduction education and training in the community. Children in schools must receive at least one day of disaster risk reduction education and training in the community.

Action 1.e: Ensure effective partnership among schools to share risk reduction education and achieve higher levels of school safety.

Local, National, Regional, Global: Children's/schools' interests must be recognized in short and long term policies on school safety.

2. DISASTER RESISTANT SCHOOL INFRASTRUCTURE

Immediate Priority

Action 2.a: Complete risk assessment and safety measures must be undertaken to ensure zero potential damage to new school buildings.



T P K E

Thematic Platform for Knowledge and Education



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What is school safety?

school safety - Google Scholar - Windows Internet Explorer

http://scholar.google.fr/scholar?q=school+safety&hl=fr&as_sdt=0%2C5&as_vis=1

school safety

Google school safety

Scholar Environ 2 660 000 résultats (0,03 s) Mes citations

Date indifférente
 Depuis 2012
 Depuis 2011
 Depuis 2008
 Période spécifique...

Trier par pertinence
 Trier par date

Rechercher sur le Web
 Rechercher les pages en Français

inclure les brevets
 inclure les citations

Créer l'alerte

Conseil : Recherchez des résultats uniquement en français. Vous pouvez indiquer votre langue de recherche sur la page Paramètres Google Scholar..

[School violence to school safety: Reframing the issue for school psychologists.](#)
 GM Morrison, MJ Furlong... - School Psychology Review, 1994 - psycnet.apa.org
 Abstract 1. Notes that although issues and problems related to school violence (SV) have been indirectly addressed by school psychologists (SPs) through crisis intervention programs, suicide prevention/intervention, and individual programs for antisocial and ...
 Cité 124 fois Autres articles Les 3 versions

[Indicators of School Crime and Safety, 2000.](#)
 P Kaufman, X Chen, SP Choy, SA Ruddy, AK Miller... - 2000 - ERIC
 Abstract: This report contains the most recent available data on school crime and safety drawn from a number of statistical series supported by the federal government. It is organized as a series of indicators, with each indicator presenting data on a different ...
 Cité 81 fois Autres articles Les 7 versions Plus

[Middle school improvement and reform: Development and validation of a school-level assessment of climate, cultural pluralism, and school safety.](#)
 S Brand, R Felner, M Shim, A Seitsinger... - Journal of Educational ... 2003 - psycnet.apa.org
 Abstract 1. The structure of perceived school climate and the relationship of climate dimensions to adaptation were examined in a large-scale multi-year investigation of students who attend middle-grade-level schools. Analyses of the structure, reliability, ...
 Cité 160 fois Autres articles Les 9 versions

[Translating research into effective practice: The effects of a universal staff and student intervention on indicators of discipline and school safety](#) [PDF] à partir de ncjrs.gov
 J Sprague, H Walker, A Golly, K White... - ... and Treatment of ... 2001 - freepatentsonline.com
 Abstract This paper describes a universal intervention package aimed at improving the safety and social behavior of students in elementary and middle schools. Its goals were to assist schools to provide effective educational services, behavioral supports and social- ...
 Cité 108 fois Autres articles Les 4 versions Plus

[Urban adolescents' exposure to community violence: The role of support, school safety, and social constraints in a school-based sample of boys and girls](#)
 EJ Ozer, RS Weinstein - Journal of Clinical Child and Adolescent ... 2004 - Taylor & Francis
 This study examined recent exposure to violence in the community and in other settings, protective factors, and current psychological functioning among 349 young adolescents from 9 urban middle schools. The majority (76%) of adolescents reported witnessing or being ...
 Cité 114 fois Autres articles Les 6 versions

[Bullies and victims in schools. A guide to understanding and management.](#)
 VF Besan - 1989 - ERIC





I ntroduction of School Safety



...nevertheless, school safety is a concept in evolution
(climate change, technology, ESD, etc)



Safe School Facilities



Environment

- Natural hazards
- Man made hazards

Building

- Structural
- Non Structural

Safe School Facilities



- Hazards and vulnerability assessment
- Safe site selection
- Standard disaster-resilient designs
- Building codes and standards
- Construction trades training and supervision for **code compliance**
- Capacity development, funding and procedures for **maintenance**
- Verification, inspection, certification



Safe School Facilities

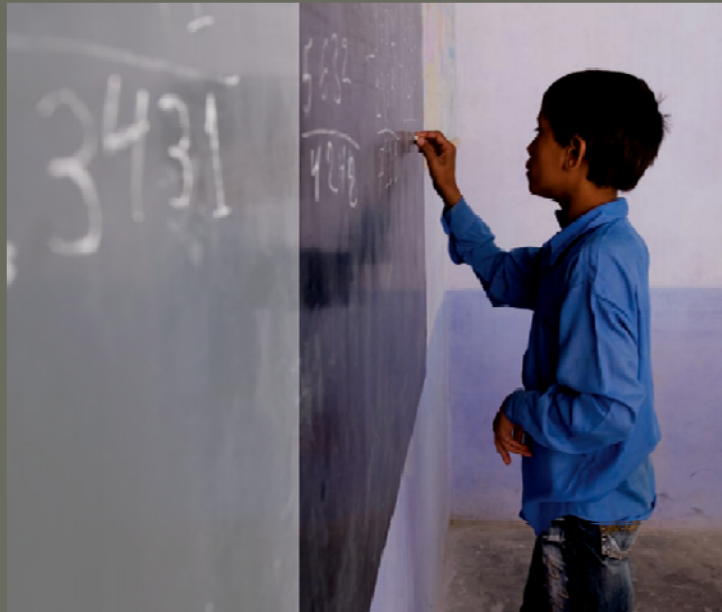


Key Recommendations → Core Commitments

- Every new school **must be** a safe school
- Legacy schools should be prioritized for replacement and retrofit
- Lifeline infrastructure and non-structural safety should be assessed locally and measures taken (eg. roads, H₂O)
- School furnishings and equipment should be well designed and installed



Safe School Facilities



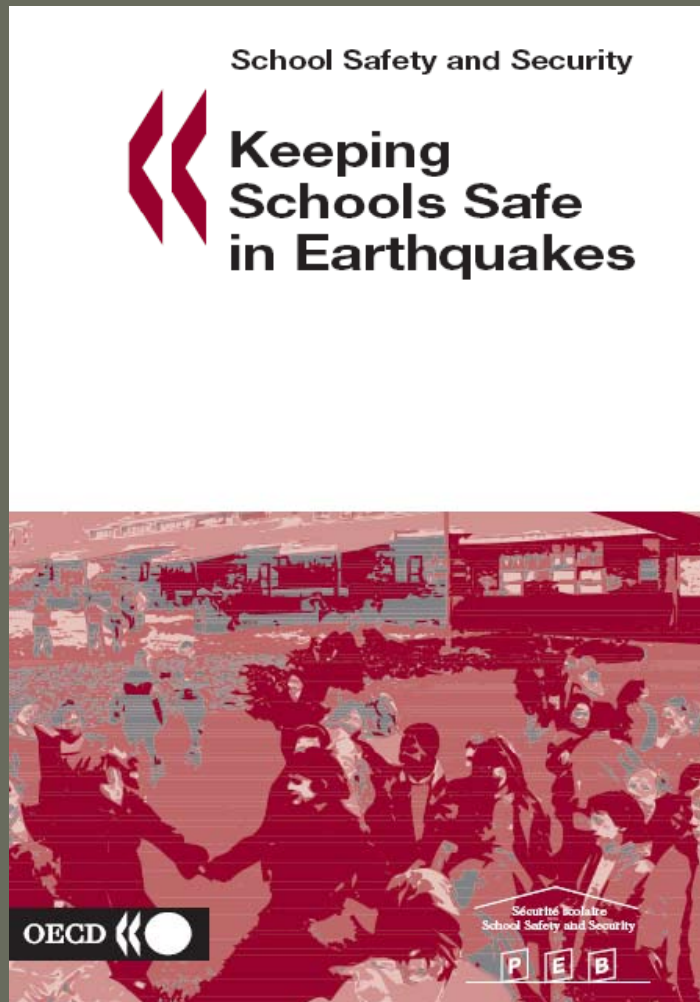
Notes d'orientation pour
**La construction d'écoles
plus sûres**

Dispositif mondial de réduction des
catastrophes et de relèvement (GFDRR)

Minimum Standards for
Education: Preparedness,
Response, Recovery.



Safe School Facilities



- OECD Programme on Educational Building (PEB)



School Disaster Management



Before



After



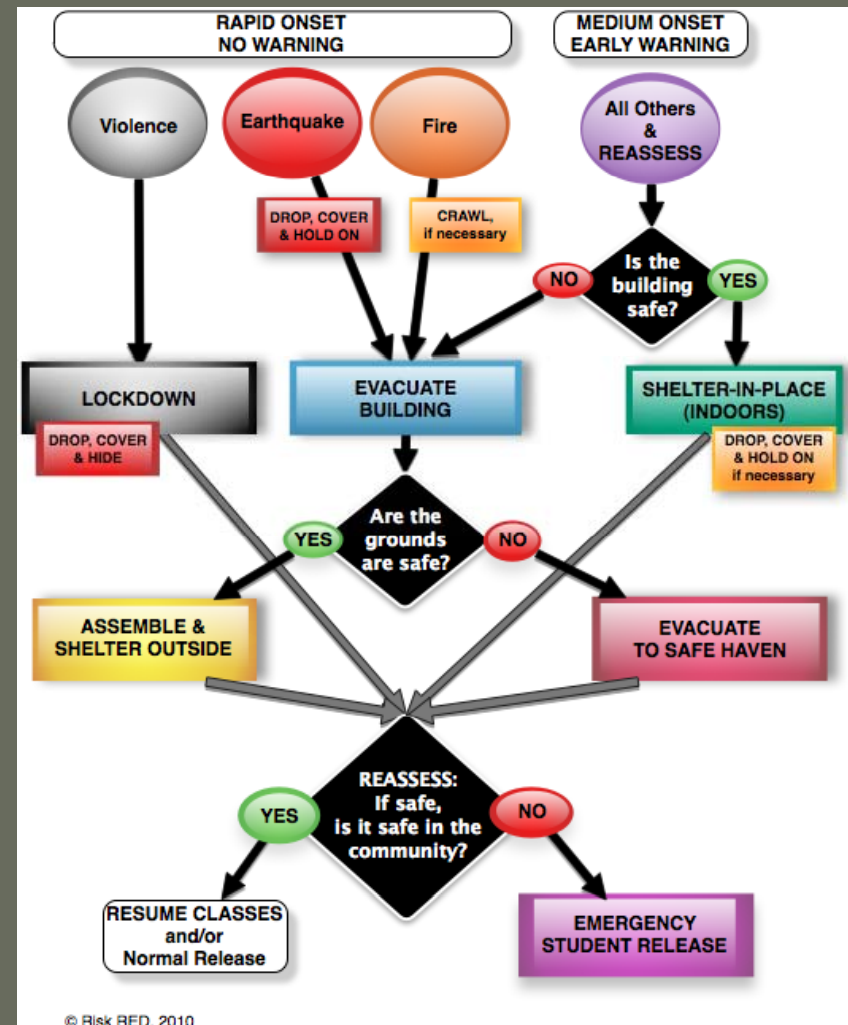
School Disaster Management



- System, policies, guidelines and standard operating procedures
- School-based safety committee
- School based risk reduction and safety plans adapted from guidelines
- Staff capacity development
- School disaster drills
- ---
- School continuity planning



School Disaster Management





School Disaster Management

Key Recommendations → Core Commitments

- Education authorities and schools should have clear Practices, Policies and Procedures
- School disaster management committee must meet regularly
- Responsibility for maintenance (established, financed and executed)
- Develop response skills for school personnel
- Drills should be held at least annually
- Minimum of 3-7 days of provisions
- Education authorities must make continuity plans



Disaster Prevention Education



Formal Education

- Curricula
- Non Curricula or extra-curricula

No Formal Education

Disaster Prevention Education



- Holistic infusion of disaster prevention and risk reduction education into formal school curricula to develop both knowledge and practical experience
- Expansion of regular extra-curricular disaster risk reduction activities to increase school and local community resilience
- Capacity development of teaching staff and teacher training college faculty (Materials, etc)



Disaster Prevention Education



Key Recommendations → Core Commitments

- DRR integrated, holistically and taught as part of school curricula
- DRR should be part of regular co-curricular school activities.
- DRR consensus-based key messages for household and family and organizational: standardized, harmonized, and contextualized.
- Include Non Formal Education
- Education personnel



Disaster Prevention Education DRR integration into curricula



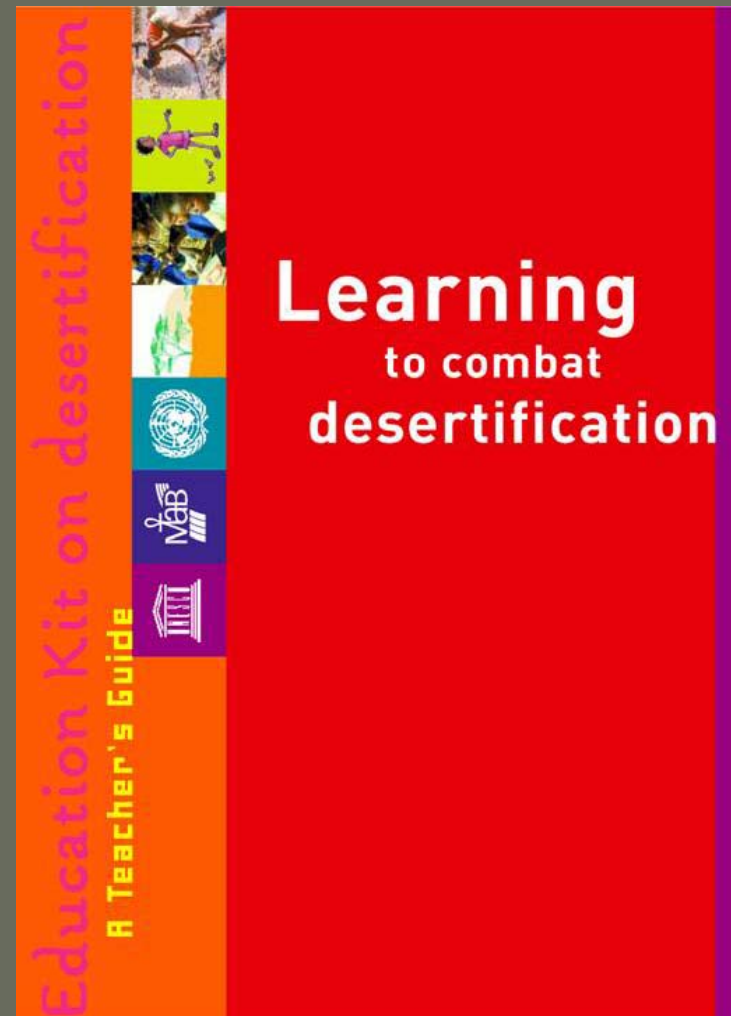
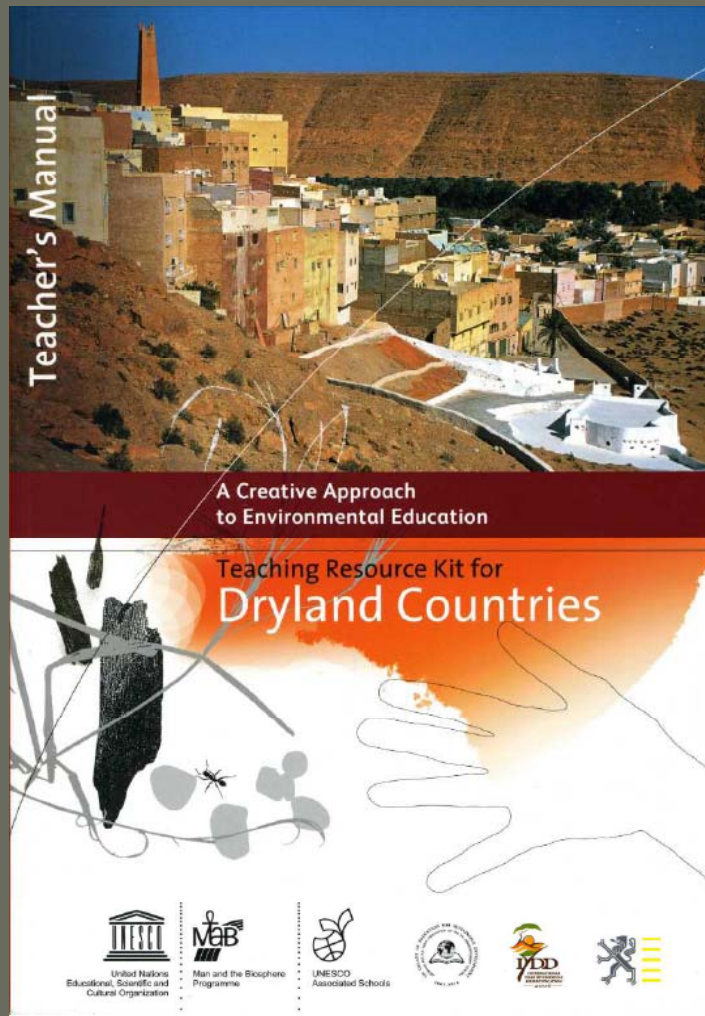
1. A comprehensive mapping that captures key national experiences and good practices with regards to integration of DRR in school curriculum
2. A guidance for governments, ministries and partner agencies and organizations to effectively integrate DRR in curricula. It will draw from previous experiences and further DRR agenda through curriculum enhancement.

NIVEL 1	NIVEL 2	NIVEL 3	NIVEL 4	NIVEL 5	NIVEL 6	NIVEL 7	NIVEL 8	NIVEL 9	NIVEL 10
Reservorio Hiperconcreto 1	Cálculo del Integral de Una Variable	Lección 10 a Integral de Una Variable	Exercicios para la Geometría	Técnicas y Métodos Matemáticos	Biología	Diseño de Estructuras	Resistencia de Materiales 2 (RM2)	Microestructuras y Estrategias (ME)	Geometría Analítica
Comprensión y Prod de Lengua 1	Algebra Lineal	Mediciones Métricas de las Estructuras	Estructuras Diferenciales	Actividades Avanzadas 2	Ingeniería Eléctrica	Microestructuras de Calidad	Simulación de Estructuras	Planes para la Gestión	Proyecto de Investigación (Adm)
Química	Física Básica	Introducción Avanzada 1	Flujo 2	Ergonomía	Plan y Control de Operaciones	Integración y Logística Industrial	Ingeniería de Medio Ambiente	Empresas Internacionales y Centros de Asesoramiento 4	Nuevas Tendencias en Gestión y Tecnología
Matemática Básica	Comprensión y Prod de Lengua 2	Diseño y CAD Avanzado en Ingeniería	Dinámica	Control de Procesos	Introducción para Ingeniería	Distribución de Planta	Tecnología y Automatización Industrial	Proyecto de Investigación Avanzada	Simulación de Sistemas Dinámicos
Proyectos Iniciales de Ingeniería Industrial	Ingeniería Gráfica y CAD Básico	Flujo 1	Diseño del Trabajo	Termodinámica	Operaciones y Procesos Industriales	Tecnología de los Procesos de Manufactura	Seguridad y Salud Organizacional	Gestión de Mantenimiento	Planificación de Marketing
Módulo Introductorio en la UPC	Taller de Creatividad	Análisis Ambiental	Investigación de Operaciones	Ciencia y Tecnología de los Materiales	Plan y Control de Operaciones	Organización y Métodos	Servicio de la Calidad Total		
			Programación para Ingeniería				Controlabilidad y Procesamiento		

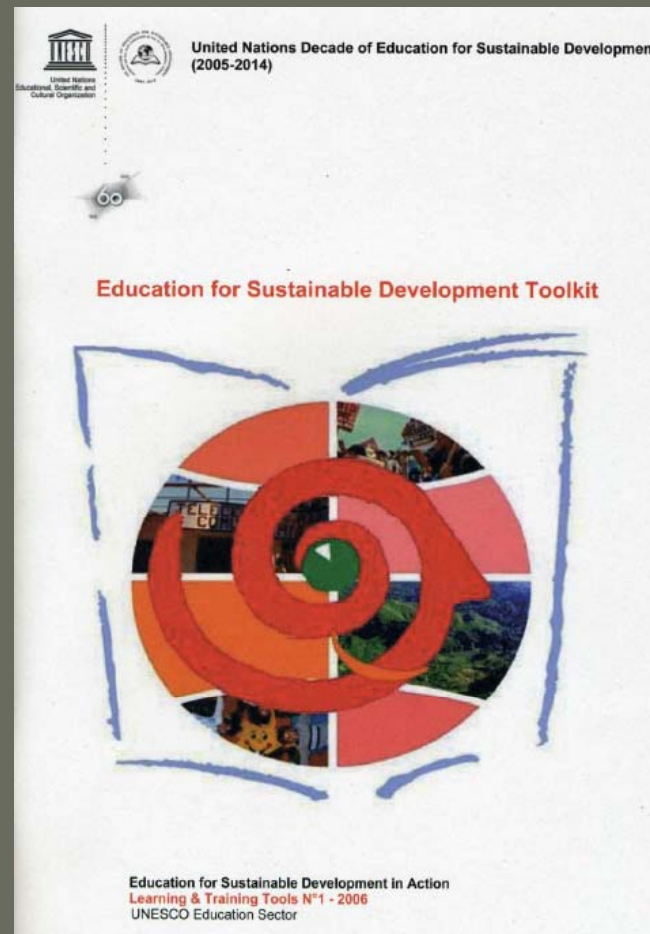
● Humanidades	● Ciencias Básicas	● Ciencias de la Ingeniería
● Matemáticas	● Planeamiento y Control	● Diseño en Ingeniería Industrial
● Gestión	● Informática	● Tesis



Disaster Prevention Education



Disaster Prevention Education



Assessment



Assessment



Types of Assessment

- Macro hazards assessment – (e.g. geophysical, etc)
- Education sector diagnosis
- Geo-spatial inventory of schools
- National or Sub-national Assessment of Vulnerability of School Infrastructure
- Non-Technical School-Site “Sidewalk” Assessment + School Vulnerability and Capacity Assessment
- School Site Technical Risk Assessment or Damage Assessment
- Post Disaster Needs Assessments
- Cost-Benefit Analyses



Assessment



Key Commitments

1. Identification of schools as part of an Education Management Information System
2. School facilities' vulnerability triaged
3. Schools should regularly reassess their vulnerability in relation to new information.



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Methodology for assessing school safety and promoting DRR



- **Working in a holistic approach**
- **Triage assessment to identify most vulnerable regions, areas, schools in each of the components of school safety**
- **Adaptable to local realities**



S

Steps methodology for assessing school safety and promoting DRR

1. National baseline study on activities and regulations
2. Preparation of Unified survey form for integrated risk management in educational institutions
3. Training to trainers and to surveyors
4. Implementation/Execution of the assessment
5. Diagnostic
6. Plan of Action (activities + budget) and Implementation of measures
7. Evaluation and report



S

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Steps methodology for assessing school safety and promoting DRR

Step.1

National baseline study on activities and regulations





S

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Step.2

Preparation of Unified survey form for integrated risk management in national educational institutions

Unified survey form for integrated risk management in educational institutions

Components

- General Information about the school
- Questionary on pertinent information about:

**Disaster
Prevention
Education**

**School
Disaster
Management**

**Safe School
Facilities**

Steps methodology for assessing school safety and promoting DRR

Step.2

Preparation of Unified survey form for integrated risk management in national educational institutions



Some examples...

 **Representación de las Naciones Unidas para la Educación, la Ciencia y la Cultura en Perú**

FICHA UNIFICADA DE GESTION INTEGRAL DEL RIESGO

I- DATOS GENERALES DE LA IE

1.1 Información básica

Nombre de la IE:		Código de inmueble (**):		Código de local:	
DRE:		UGEL ó Supervisión Educ.:		Nivel Educativo:	
Número de RUC:		Teléfono de la IE:		Fax de la IE:	
Correo electrónico de la IE:		Nombre y apellidos del Director (a):		Teléfono del Director (a):	
Correo electrónico del Director (a):					

Tipo de servicio en la IE:	<input type="checkbox"/> Público	<input type="checkbox"/>
	<input type="checkbox"/> Privado	<input type="checkbox"/>

En IE privadas indique el nombre del promotor ó responsable legal:		
En casos de gestión pública con inversión privada: ¿Hay convenios suscritos con el MED?	<input type="checkbox"/> Si	<input type="checkbox"/> No

1.2 Localización geográfica

Región:			Departamento:		
Provincia:	Distrito		Centro de Población:		
Dirección de la IE:	N°		Mz	Lote	
Tipo de zona en que se ubica la IE:	<input type="checkbox"/> Urbana	<input type="checkbox"/> AHM (*)	<input type="checkbox"/> Rural:	<input type="checkbox"/> Frontera:	
Región geográfica					

(*) Asentamiento Humano Marginal (***) Código de inmueble: Este dato se dispone en las oficinas responsables del MED





Step.2

Preparation of Unified survey form for integrated risk management in national educational institutions

Unified survey form for integrated risk management in educational institutions

General Information about the school

- Name, ID, localization
 - Geo-spatial inventory of schools
- Type (primary, secondary, validation, non formal, etc)
- Capacity (#of: students + teacher + staff), journeys (morning, afternoon, night)

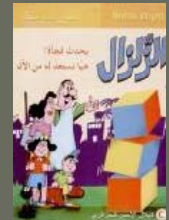


Step.2

Preparation of Unified survey form for integrated risk management in national educational institutions

Disaster Prevention Education

- DRR Implemented during the year?
- support material needed to address the issue of risk management? – (books, videos, games, internet, etc.) – Verify and take note of material.
- ESD is implemented? (recycling)
- Teachers are regularly trained in new methods for teaching DRR?



Steps methodology for assessing school safety and promoting DRR



Step.2

Preparation of Unified survey form for integrated risk management in national educational institutions

School Disaster Management

Ongoing school disaster management or safety committee guides the school disaster management process

- An existing or special group representative of all parts of the school community is tasked with leading school disaster management efforts on an ongoing basis.
- School disaster management has the full support of school leadership.
- School disaster management committee takes lead in ongoing planning for prevention, mitigation, response and recovery.
- School disaster and emergency management plan is reviewed and updated at least annually.

Assessment and planning for disaster mitigation takes place continuously

- Hazards, vulnerabilities, risks, capacities and resources are researched and assessed.
- Mitigation measures are identified and prioritized for action.
- Building evacuation routes and safe assembly areas are identified.
- Area evacuation and safe havens for family reunification are identified, as needed.
- Educational continuity plans are in place for recurring hazards and high impact hazards.

Physical and environmental protection measures are taken to protect students and staff

- School buildings and grounds are maintained (eg. against moisture, termites, fungus) and repaired, for disaster resilience.
- Fire prevention and fire suppression measures are maintained and checked regularly.
- Safety measures related to building non-structural elements, furnishings and equipment are taken to protect students and staff from hazards within the building (especially due to earthquakes, severe weather etc.).
- School infrastructure, including access routes, shelters and safe havens are developed as needed and maintained for safety.
- Crime, vandalism, and bullying prevention measures are maintained and students and staff feel safe and secure on school premises.
- Measures are taken to provide clean drinking water, food security, drought and hazardous materials protection (eg. rainwater harvesting, school gardens, solid waste management, erosion prevention).

Step.2

Preparation of Unified survey form for integrated risk management in national educational institutions



School Disaster Management

Materials

- Fire Extinguishers
- Cylinders with sand
- First aid kit
- Backboard
- Signaling
- Basic equipment for rescue (picks, shovels, ropes, crowbars)
- Flashlights
- Megaphones
- Emergency lights
- Security Tape
- Smoke Detectors
- Alarms (fire, robbery)
- Survivor kit (food, water, etc)
- Others
- Also for students with disabilities



Plan

- Evacuation routes?
- Leaders identified?
- Committees, brigades, etc?
- Safe location identified?
- Mechanism are in place?
- Accessibility?
- Is the school a possible refuge?
- Emergency calls identified? (fireman, hospitals, etc)
- Mitigation plan?
- Prevention plan
- Contingency plan?
- Others



Step.2

Preparation of Unified survey form for integrated risk management in national educational institutions



Safe School Facilities

Structural

- Description of the structure
- General condition of the building
- predominant type of construction
- Architectural/engineering elements' damage
- Geotechnical problems
- Materials
- Foundations
- Previous retrofitting
- Water supply type
- Energy supply type and storage
- Waste system
- Follows national regulation: Building code, ISO, etc?
- Facilities (elevators,

- Land & Foundation
- Topography (valley, riverside, hillside, lake deposit, coastline, flat terrain)
- Soil (soft, intermediary, hard)
- Subsoil (rock, granular,
- Subsoil water level __m?
- Terrain slope __%?
- Distance to lake, river, sea __m?

Non Structural

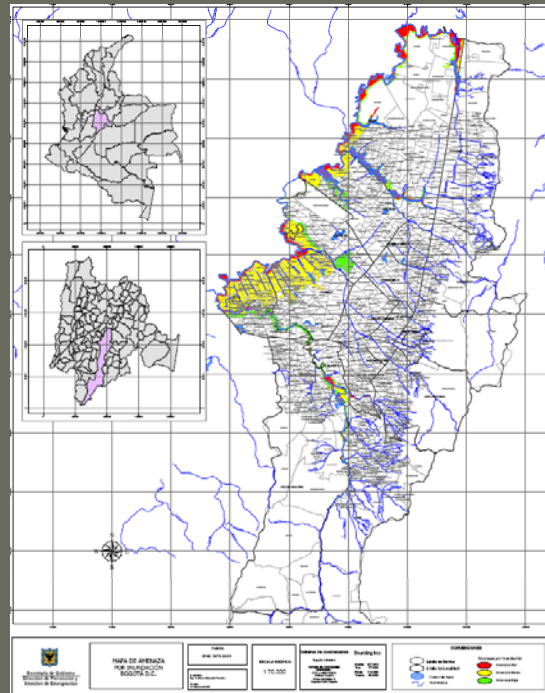
- Rigid components
- Flexible components
- Functionality of components
- Hazardous material storage and disposal



Safe School Facilities

Natural hazards

- Risks maps?
- Earthquake
- Tsunami
- Landslide
- Volcanoes
- Floods
- Pests
- Epidemics
- Pandemics
- Others



Man made hazards

- Industries around
- Explosions
- Military zones / subversion
- Others



Steps methodology for assessing school safety and promoting DRR

Step.2

Preparation of Unified survey form for integrated risk management in national educational institutions



Safe School Facilities

LAND AND FOUNDATION

Topography

- Flat terrain
- Hillside
- Riverside
- Valley
- Lake deposits
- Coastline

Subsoil type

- Very soft clay
- Fine soil (clay / lime)
- Loose granular
- Compact granular
- Rock

SOIL

- Soft
- Intermediate
- Hard

Superficial (sallow)

- Single-column footing
- Continuous strip footing
- Stone footing
- Slab
- Mat foundation

Deep foundation

- Pile _____
- Other _____

subsoil water level: _____ m Terrain slope: _____ % Distance to lake / river / sea: _____ m

STRUCTURE CHARACTERISTICS

No. of stories, n = _____ Construction year: _____
 No. of basements: _____ Rehabilitation year: _____

- Roof appendix (*staircase / elevator*)
- Mezzanine (*intermediate slab*)
- Slab level at middle of type-stories
- External staircase
- Street level at the middle of first basement

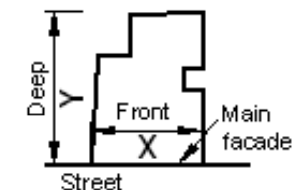
Facilities

- Elevator
- Drinking-water
- Gas
- Electrical
- Waste water
- Other: _____

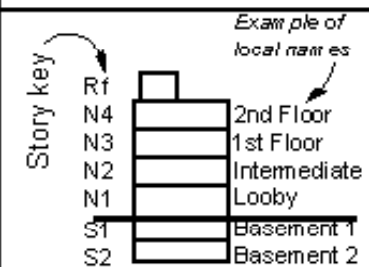
Total property area: _____ m²
 Green area (rain infiltration): _____ %
 Average-story area: _____ m²

General Dimensions:

X = Front: _____ m
 Y = Deep: _____ m
 First story (N1) height: _____ m
 Average-story height: _____ m
 No. of parking places: _____ .
 No. Elevators: _____ .
 No. different staircase: _____ .



PLAN VIEW



SECTION



Steps methodology for assessing school safety and promoting DRR

Step.2

Preparation of Unified survey form for integrated risk management in national educational institutions



Safe School Facilities

STRUCTURAL SYSTEM																																																																																																																																							
<p>Material in walls</p> <input type="checkbox"/> Reinforced concrete (RC) <input type="checkbox"/> Wood <input type="checkbox"/> Precast concrete <input type="checkbox"/> Stone <input type="checkbox"/> Solid concrete block <input type="checkbox"/> Adobe <input type="checkbox"/> Concrete block (20x40cm) <input type="checkbox"/> Bahareque (branches/mud) <input type="checkbox"/> Solid clay brick <input type="checkbox"/> Weak material <input type="checkbox"/> Hollow clay brick <input type="checkbox"/> Metal sheet/cardboard/waste <input type="checkbox"/> Panels covered with mortar <input type="checkbox"/> Other: _____	<p>Shape in predominant elements</p> <table border="1"> <tr> <td>Shape</td> <td>Rectangular</td> <td>Circular</td> <td>Circular pipe</td> <td>H/I Section</td> <td>Box</td> <td>L Section</td> <td>Truss</td> <td>Material</td> <td>Concrete</td> <td>Steel</td> <td>Precast</td> <td>Wood</td> <td>Section</td> </tr> <tr> <td>Columns</td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td>_____</td> </tr> <tr> <td>Main Beams</td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td>_____</td> </tr> <tr> <td>Secondary Beams</td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td>_____</td> </tr> <tr> <td>Bracing (diagonals)</td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td>_____</td> </tr> </table> <p>Example: </p>	Shape	Rectangular	Circular	Circular pipe	H/I Section	Box	L Section	Truss	Material	Concrete	Steel	Precast	Wood	Section	Columns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	Main Beams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	Secondary Beams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	Bracing (diagonals)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____																																																																
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<p>Reinforcement in masonry walls</p> <input type="checkbox"/> Unreinforced (plan) <input type="checkbox"/> Interior reinforced <input type="checkbox"/> Confined masonry <input type="checkbox"/> Other: _____ <input type="checkbox"/> Poorly confined masonry (no reinforced around openings)																																																																																																																																							
<p>MAIN VERTICAL STRUCTURE</p> <table border="1"> <tr> <th rowspan="2"></th> <th colspan="2">First story</th> <th colspan="2">Average story</th> <th rowspan="2">Basement</th> <th rowspan="2">Appendix</th> <th rowspan="2">Vertical access (stairs/elevator)</th> </tr> <tr> <th>X</th> <th>Y</th> <th>X</th> <th>Y</th> </tr> <tr> <td>Frames</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Steel</td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> </tr> <tr> <td>Concrete</td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> </tr> <tr> <td>Precast concrete</td> <td><input 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</tr> <tr> <td>Load bearing, masonry</td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> </tr> <tr> <td>Infill, masonry</td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> </tr> <tr> <td>Concrete walls with coupling beams:</td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> </tr> </table> <p>Frame in typical story Number of frames parallel to: X: _____ to Y: _____ Average span: X = _____ m Y = _____ m Total number of columns: _____ (in the story) Num. of braced spans: at X: _____ at Y: _____ Num. of infill wall spans: at X: _____ at Y: _____</p> <p>Walls in typical story Sum of wall length, and thickness (t): Concrete walls: $\Sigma L_x =$ _____ m, $\Sigma L_y =$ _____ m, t = _____ cm Masonry walls: $\Sigma L_x =$ _____ m, $\Sigma L_y =$ _____ m, t = _____ cm</p>		First story		Average story		Basement	Appendix	Vertical access (stairs/elevator)	X	Y	X	Y	Frames								Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Concrete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Precast concrete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Flat floor & columns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Wood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Braced								Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Concrete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Several stories	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Walls								Load bearing, masonry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Infill, masonry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Concrete walls with coupling beams:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>FLOOR / ROOF SYSTEM</p> <p>Floor System</p> <input type="checkbox"/> Two-way slab <input type="checkbox"/> Flat slab (no beams) <input type="checkbox"/> Beams and floor of wood <input type="checkbox"/> Beams and clay brick deck (Catalan vault) <input type="checkbox"/> Beams, joist (rafter) and deck <input type="checkbox"/> Trusses and deck <input type="checkbox"/> 3D Truss <input type="checkbox"/> Masonry arc Distance between axes of Secondary beams: _____ cm Beams, joists or ribs: _____ cm Rafters/stringers: _____ cm	<p>Reinforced Concrete Slab</p> <input type="checkbox"/> Solid <input type="checkbox"/> Grid slab (two-way joist) <input type="checkbox"/> Precast, concrete system <input type="checkbox"/> Precast joist slab (one-way) <input type="checkbox"/> Composed metal sheet and concrete cover Total slab thickness: _____ cm Solid cover thickness: _____ cm	<p>Trusses</p> <input type="checkbox"/> Steel <input type="checkbox"/> Wood <input type="checkbox"/> Variable depth Span: _____ m, Tot. depth: _____ m Trusses separation: _____ m Shape of cords: _____ shape diagonals: _____
		First story		Average story					Basement	Appendix	Vertical access (stairs/elevator)																																																																																																																												
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Flat floor & columns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																
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Several stories	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																
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	<p>Roof Deck</p> <input type="checkbox"/> Same as floorsystem <input type="checkbox"/> Corrugated metal sheet <input type="checkbox"/> Asbest / plastic sheet <input type="checkbox"/> Cardboard <input type="checkbox"/> Panels <input type="checkbox"/> Wood <input type="checkbox"/> Grass <input type="checkbox"/> Clay tile Fastener type and separation: _____	<p>Deck Geometry</p> <input type="checkbox"/> Flat and horizontal <input type="checkbox"/> Inclined, slope = _____ % <input type="checkbox"/> Cylindric vault $\varnothing =$ _____ m <input type="checkbox"/> Spherical dome $\varnothing =$ _____ m																																																																																																																																					
<p>Plans: <input type="checkbox"/> Architectural <input type="checkbox"/> Structural <input type="checkbox"/> Design documentation <input type="checkbox"/> Self-build (no design) Specify: _____</p>																																																																																																																																							



Steps methodology for assessing school safety and promoting DRR

Step.2

Preparation of Unified survey form for integrated risk management in national educational institutions



Safe School Facilities

VULNERABILITY

Location in block: Corner Middle Aisle

Plan irregularities

- Asymmetric (storey torsion)
- Floor openings > 20 % (*length or area*)
- Concave perimeter line > 20 %
- "L" plan or another irregular shape

Vertical irregularities

- Soft story
- Frames or walls don't reach foundation
- Short columns
- Area reduction in upper floors
- Foundation at different level (in hillside)
- Inclined floor systems
- Higher weights in upper floors
- Random opening pattern in facade

Another vulnerability sources

- Eccentric beam-to-column joint
- Inverted pendulum/only one line of columns
- One element resist more than 35% of EQ
- Weak col-strong beam

Critical next-building

- No. of storeys: _____
- Gap separation : _____ cm
- Use no: : _____
- Frames
 - Walls
 - Other
 - Different slab level
 - No damage
 - Medium damage
 - Severe damage



Steps methodology for assessing school safety and promoting DRR

Step.2

Preparation of Unified survey form for integrated risk management in national educational institutions



Safe School Facilities

Any damage?

Maximum visible damage Give story key (N1, N2, ..., S1...)

Type and characteristics	Columns	Beams	Walls		Bracing	Beam-column Joints
			masonry	concrete		
1- Collapse / general damage						
2- Inclined cracks (<i>shear cracks</i>)						
3- Normal to axis cracks (<i>flexion cracks</i>)						
4- Concrete crushing and exposed reinf.						
5- Fracture of longitudinal reinforcement						
6- Fracture of transversal reinf. (hoops)						
7- Compression bar buckling						
8- Plate buckling						
9- General buckling						
10- Wedge failure						
11- Fasteners failure (screw/ribets)						
12- Steel corrosion						
Reinforcement (for concrete section)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Distance between hoops / stiffeners	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Shape	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Example of data:	bxh / \varnothing	$bxh / dxbr, tr$	$t, h \times b_c$	t	$bxh / dxbr, tr$	bxh

--	--	--	--	--	--	--	--

Roof / floor system	Percentage of damaged elements at critical story		
	Severe	Moderate	Story key
<input type="checkbox"/> Collapse			
Cracks:			
<input type="checkbox"/> around columns			
<input type="checkbox"/> midspan			
<input type="checkbox"/> on beams			
<input type="checkbox"/> slab corners			
thickness: <input type="text"/> mm	<input type="text"/>	<input type="text"/>	<input type="text"/>

	Severe damage		Moderate
	Columns, beams, concrete walls	Masonry	Bracing
Collapse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shear cracks > 2 mm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flexion cracks > 5 mm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General buckling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plate buckling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reinforcement buckling or fracture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shear cracks > 5 mm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inclined cracks in tie-column	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Steps methodology for assessing school safety and promoting DRR



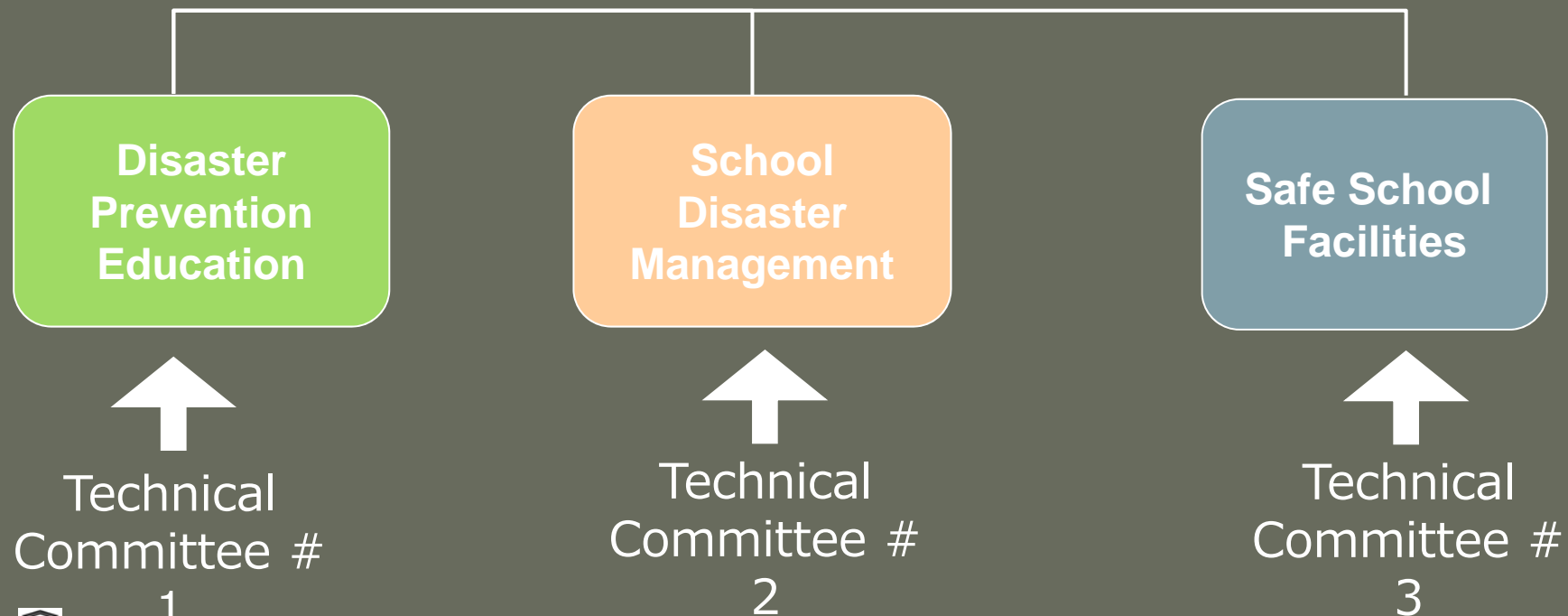
Step.2

Preparation of Unified survey form for integrated risk management in national educational institutions

Who will
prepare the
unified survey
form?

Combined
Committee

Unified tab for integrated
risk management in
educational institutions





Step.2

Preparation of Unified survey form for integrated risk management in national educational institutions

Technical Committees

- Elaborate national baseline study
- Prepare the unified survey form component and the index of evaluation
- Draft the questionnaires and determinate to who the questions are addressed
- Prepare the training of trainers (Determinate No of Teams)
- Participate actively in the conception and preparation of the implementation journeys
- Elaborate the diagnostic
- Elaborate plan of action, measures and calendar
- Evaluate and report the whole process





Step.2

Preparation of Unified survey form for integrated risk management in national educational institutions

Disaster Prevention Education Technical Committee # 1

- National experts on education
 - Ministries (**education**, statistics, etc) and other official institutions in charge of EE and DRR
 - Universities, specialized institutions, academia.
 - NGO's
 - Labor Unions (Teachers)
- International experts on education
 - UN Agencies, funds and platforms – TPKE
 - International NGO's





Step.2

Preparation of Unified survey form for integrated risk management in national educational institutions

School Disaster Management Technical Committee # 2

- National experts on emergency preparedness and plans
 - Ministries (education, first minister, statistics, etc)
 - Universities and Research Institutes
 - NGO's
 - Labor Unions (Teachers)
 - National Defense
 - Fireman
 - National Commission for the Forecast and Prevention of Major Risks
- International experts on emergency preparedness and plans
 - UN Agencies, funds and platforms – TPKE
 - International NGO's





Step.2

Preparation of Unified survey form for integrated risk management in national educational institutions

Safe School Facilities Technical Committee # 3

- National experts on disaster risk reduction
 - Ministries (**Public works**)
 - Universities and Research Institutes
 - National NGO's
 - National Defense
 - National Scientific Institutions, Survey Departments
 - Chartered Surveyors
 - National Commission for the Forecast and Prevention of Major Risks
- International experts on emergency preparedness and plans
 - UN Agencies, funds and platforms – TPKE – GTFBC – IPRED
 - International NGO's
 - IOC Networks
 - RELEMR, RELNAR, RELSAR, and others REL...





Step.2

Preparation of Unified survey form for integrated risk management in national educational institutions

IT Integration on Survey

- web-based form, enabling information to be captured by inspectors directly using laptops or handheld mobile devices, and sent in real-time over a wireless connection.
- Partnership between UNESCO and CISCO, INTEL, ISTE, HP and Microsoft.





Steps methodology for assessing school safety and promoting DRR

1. National baseline study on activities and regulations
2. Preparation of Unified survey form for integrated risk management in educational institutions
3. Training to trainers and to surveyors
4. Implementation/Execution of the assessment
5. Diagnostic
6. Plan of Action (activities + budget) and Implementation of measures
7. Evaluation and report

Step.3

Training to trainers and to surveyors



Training of trainers



Surveyors → last year university' students concerning the area of each component



Step.3

Training to trainers and to surveyors

Disaster Prevention Education
Surveyor's team per school per component

- 1 Leader (University teachers, UNVolunteers, NGO's etc)
- 2 last year university' students on:
 - Educational sciences
 - Sociology
 - Anthropology
 - and other related disciplines

❖ National and International agreements with universities

The survey would be included as a course and will be noted
UNESCO Chairs could be used





Step.3

Training to trainers and to surveyors

School Disaster Management
Surveyor's team per school per component

- 1 Leader (University teachers, UNVolunteers, National Defense, NGO's)
 - 2 last year university' students on:
 - Educational sciences
 - Sociology
 - Anthropology
 - and other related disciplines
- ❖ National and International agreements with universities

The survey would be included as a course and will be noted
UNESCO Chairs could be used





Step.3

Training to trainers and to surveyors

Safe School Facilities
Surveyor's team per school per component

- 1 Leader (University teachers, UNVolunteers, National Defense, NGO's)
- 2 last year university' students on:
 - Engineering
 - Architecture
 - Geology
 - Seismology
 - and other related disciplines

❖ National and International agreements with universities

The survey would be included as a course and will be noted
UNESCO Chairs could be used





S

Steps methodology for assessing school safety and promoting DRR

1. National baseline study on activities and regulations
2. Preparation of Unified survey form for integrated risk management in educational institutions
3. Training to trainers and to surveyors
4. Implementation/Execution of the assessment
5. Diagnostic
6. Plan of Action (activities + budget) and Implementation of measures
7. Evaluation and report



Step.4

Implementation/Execution

Assessment




Information day

- Invite the parents
- Invite the community
- Invite local authorities
- Invite NGO's working on DRR
- Make school exhibitions on DRR and ESD
- Distribute guidelines, papers, posters, etc

School Safety Index





MODELO MATEMATICO

basado en el modelo matemático ISH de la OPS

Indices de Seguridad en Centros Educativos				
MODELO MATEMATICO				
2. Seguridad estructural				
2.1 Antecedentes estructurales del centro educativo	NO APLICABLE O NO DISPONIBLE	Grado de seguridad		
		BAJO	MEDIO	ALTO
1 ¿La estructura ha tenido daños significativos? Verificar si existe(n) dictámen(es) estructural(es) que indiquen el grado de daño estructural que haya sufrido el centro educativo en el sentido de comprometer la seguridad estructural.	○	⊗	○	○
2 ¿El centro educativo ha sido reparado o construido con estándares actuales apropiados? Comprobar documental o visualmente que el inmueble se reparó o se construyó con base en normas de diseño y construcción adecuadas y en qué fecha.	○	○	⊗	○
3 ¿Se ha modificado la estructura por remodelaciones, agregados o remociones de manera que afecten su comportamiento? Verificar si se han realizado modificaciones a la estructura que modifiquen su comportamiento y que se hayan controlado estructuralmente.	○	○	○	⊗
2.2 Estado de la estructura y materiales	NO APLICABLE O NO DISPONIBLE	Grado de seguridad		
4 Estado general de la edificación	○	⊗	○	○
5 Materiales de construcción	○	⊗	○	○
2.3 Configuración estructural	NO APLICABLE O NO DISPONIBLE	Grado de seguridad		
7 Relación longitud / ancho Distribución en planta de los elementos resistentes a carga lateral	○	⊗	○	○
8 Verificar la distribución en planta de los muros y/o columnas	○	⊗	○	○
9 Arriostramiento adecuado en dos direcciones perpendiculares Verificar la presencia de elementos suficientemente rígidos en ambas direcciones	○	⊗	○	○
10 Redundancia estructural	○	⊗	○	○
11 Forma en elevación	○	⊗	○	○
12 Pisos suaves	○	⊗	○	○
13 Flujo de fuerzas	○	⊗	○	○
14 Pisos superiores salientes Concentraciones de masa en el piso superior	○	⊗	○	○
15 Verificar la presencia de tanques o masas concentradas en el nivel superior	○	⊗	○	○
16 Viga fuerte / columna débil	○	⊗	○	○
2.4 Otros aspectos	NO APLICABLE O NO DISPONIBLE	Grado de seguridad		
17 Proximidad entre edificios	○	○	○	⊗
18 Detalles estructurales	○	○	○	⊗
20 Interacción de los elementos no estructurales con la estructura	⊗	○	○	○
INDICE ESTRUCTURAL		27.5		



Step.5

Diagnostic

Diagnostic – e. g. component 3

Safe School Facilities

Structural and non Structural safety
environment hazard (natural + man made)

Structure



- Strong
- Need renovation / Retrofitting
- Very poor structure → Demolish and build a new one (same location)
- Environmental risks are too high → need replacement



S

Steps methodology for assessing school safety and promoting DRR

1. National baseline study on activities and regulations
2. Preparation of Unified survey form for integrated risk management in educational institutions
3. Training to trainers and to surveyors
4. Implementation/Execution of the assessment
5. Diagnostic
6. Plan of Action (activities + budget) and Implementation of measures
7. Evaluation and report



Step.6

Plan of Action (activities + budget)

Implementation of measures

- Soft
 - Low cost
 - Less time
- Hard
 - High cost
 - More time

**Disaster Risk
Reduction
Education**

**Disaster
Management
Education**

**Safe School
Facilities**

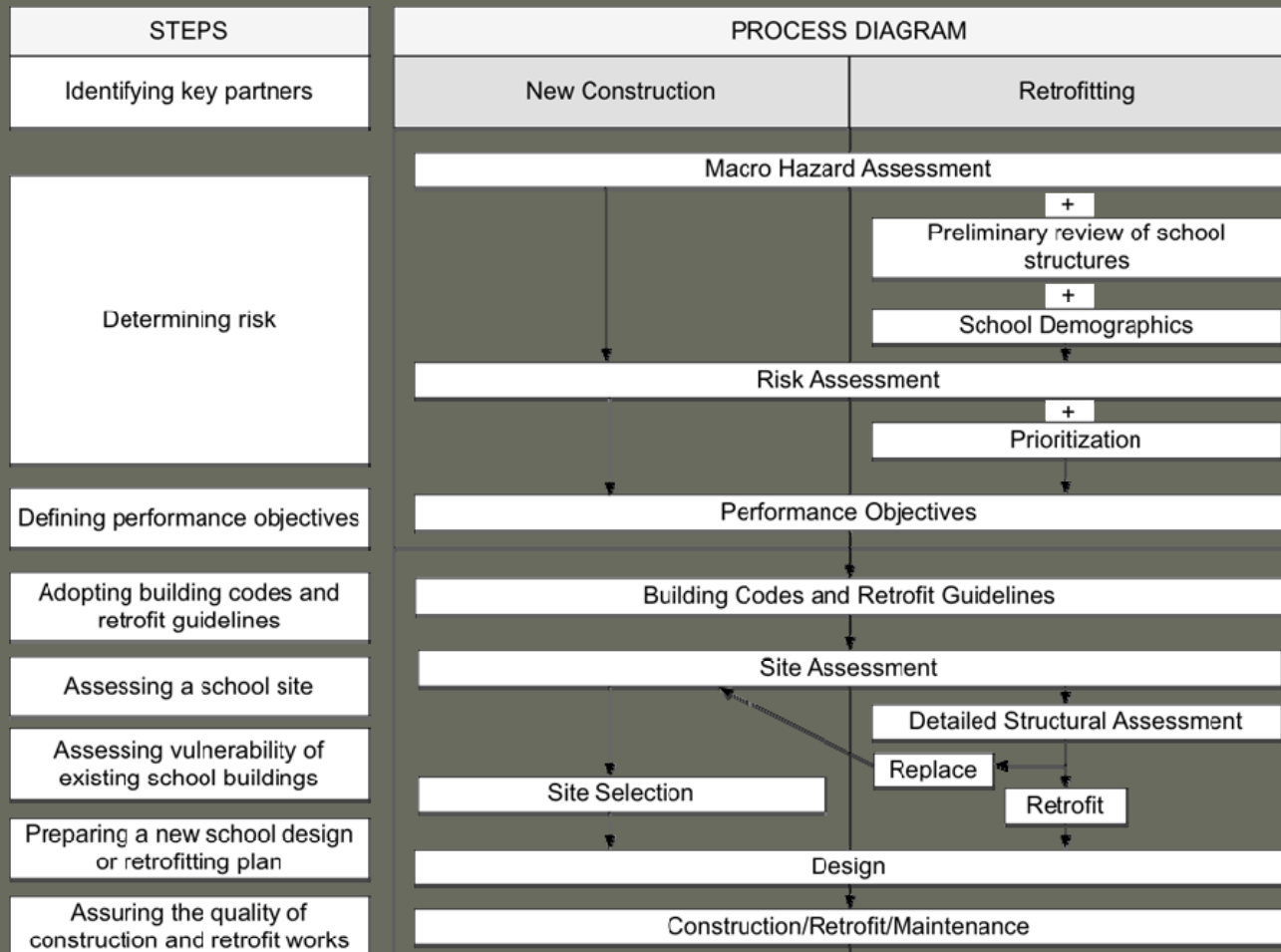




Step.6

Plan of Action (activities + budget)

Safe School Construction and Retrofit Process





M

ethodology for assessing school safety and promoting DRR

To take in consideration!

- Methodology should be adapted to local realities!!!
- Non-formal education should be included
- Data collection as concise as possible
- Methodology needs to be improved with comments and feedback and with further validation by a Experts Committee is essential
- A financial estimation of this methodology should be enclosed
- Cultural issues are very important
- Political commitment from policy maker/decision maker is important!!!

Interdisciplinary Approach





*“...so,
Dear representatives of the major Italian
research centres dealing with seismic risk
mitigations;
Dear researchers from Italian Universities;
Dear technical and political representatives of
national and local institutions,
My safety is in your hands!!!!*

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THANK YOU!

Looking forward
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