United Nations Educational, Scientific and Cultural Organization

UNESCO Chair on Intersectoral Safety for Disaster Risk Reduction and Resilience SPRINT-Lab, University of Udine, Italy

UNIVERSITY OF UDINE

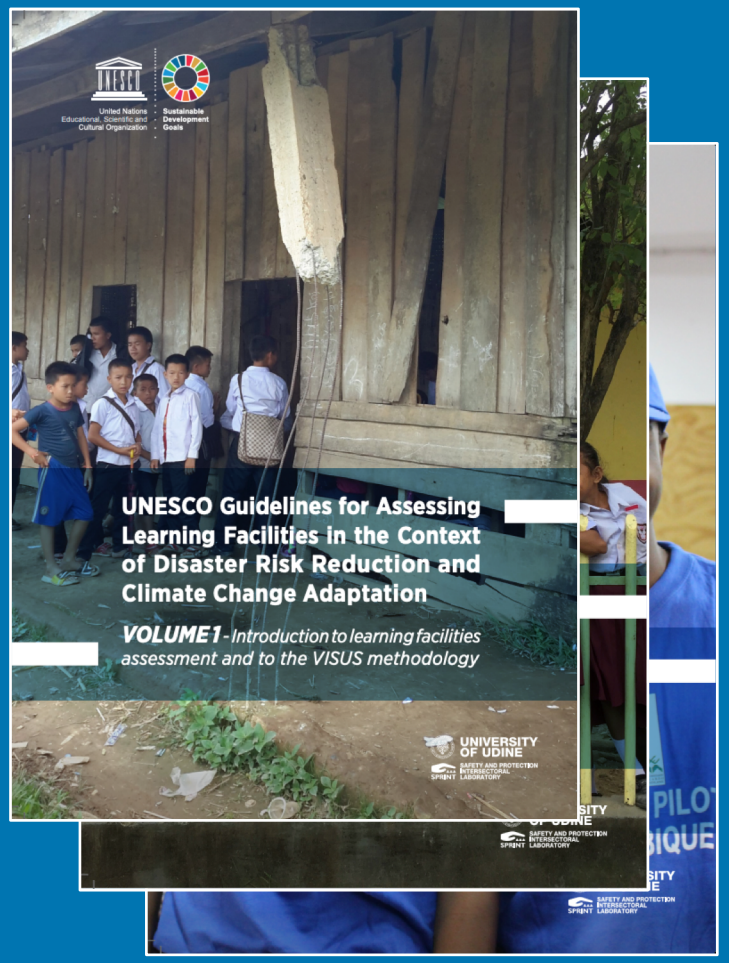
SAFETY AND PROTECTION INTERSECTORAL LABORATORY SPRINT

Sustainable Development Goals

Planning, Financing and Implementing Resilience Capacity Building Programs facing Extreme Events

Resilient schools

Grimaz S., Malisan P., Torres J., Anglès L.



UNESCO "Metropolitan ECO-RISE R2020" Colloquium,

7 November, 2019

SCHOOL SAFETY COMMITTMENTS

Sustainable development goals

SDG 4, 4a

SDG 11

DRR Sendai framework

Target D.

Critical infrastructure

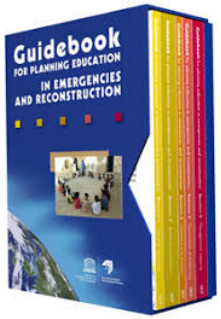
Paris Climate Agreement

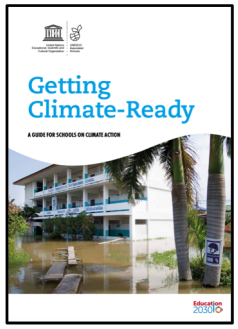
Assess the impact of climate variability

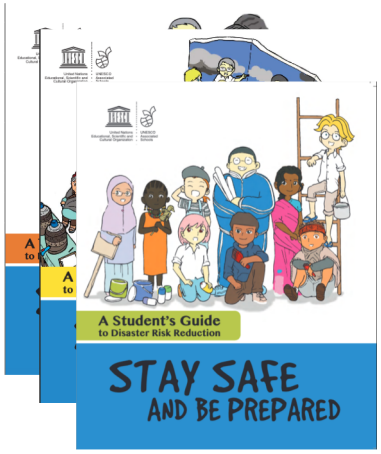
Art. 7, 8, 11

WISS for Safe Schools

COMPREHENSIVE SCHOOL SAFETY







Education Sector Policies and Plans

Aligned to national, subnational and local disaster management plans

- Safe site selection
- Building codes
- Performance standards
- Disaster resilient design

Pillar 1. Safe Learning Facilities

- Builder training
- Construction supervision
- Quality control
- Remodelling
- Retrofit

- Building maintenance
- Non-structural mitigation
- Fire safety

- Structural safety education
- Construction as educational opportunity

- Assessment & Planning
- Physical & Environmental Protection
- Response Skills & Provisions

Pillar 2. School Disaster Management

- Representative/participatory SDM committee
- Educational continuity plan
- Standard operating procedures
- Contingency planning

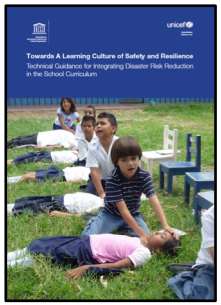
- Household disaster plan
- Family reunification plan
- School drills

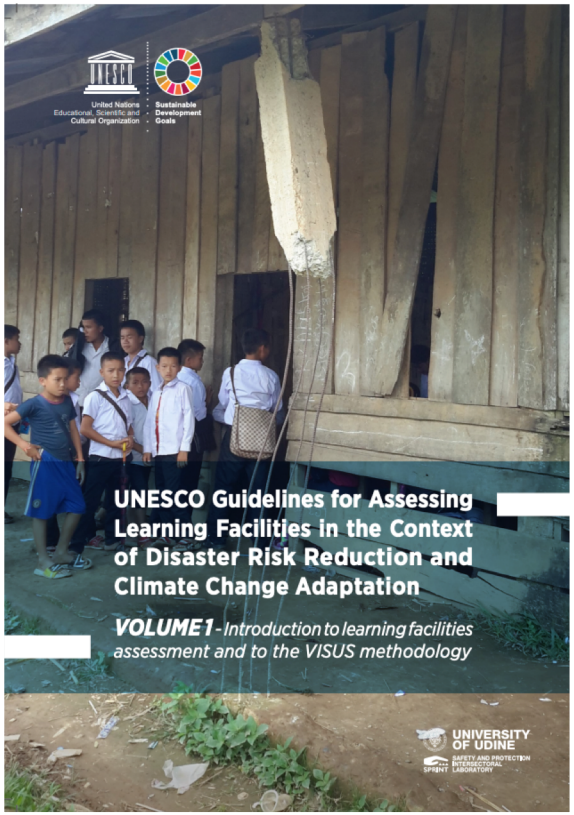
- Formal curriculum integrations & infusion
- Teacher training & staff development

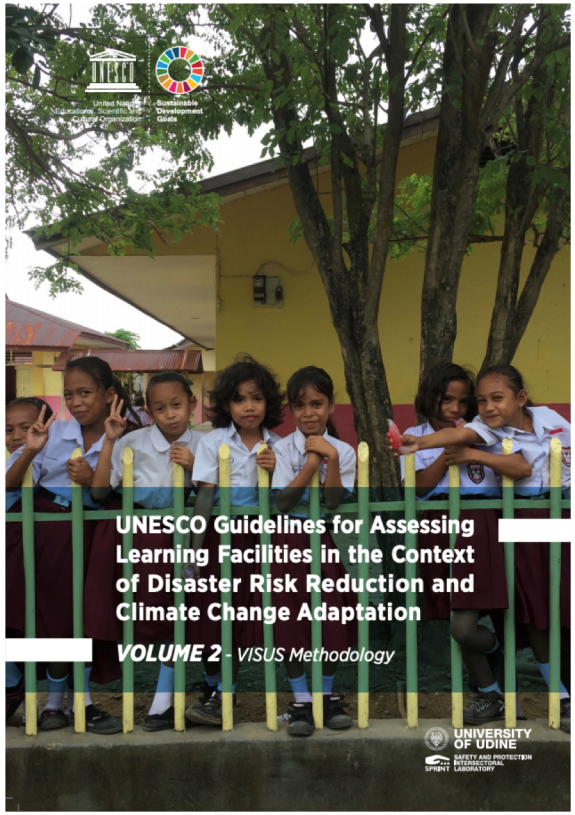
Pillar 3. Risk Reduction and Resilience Education

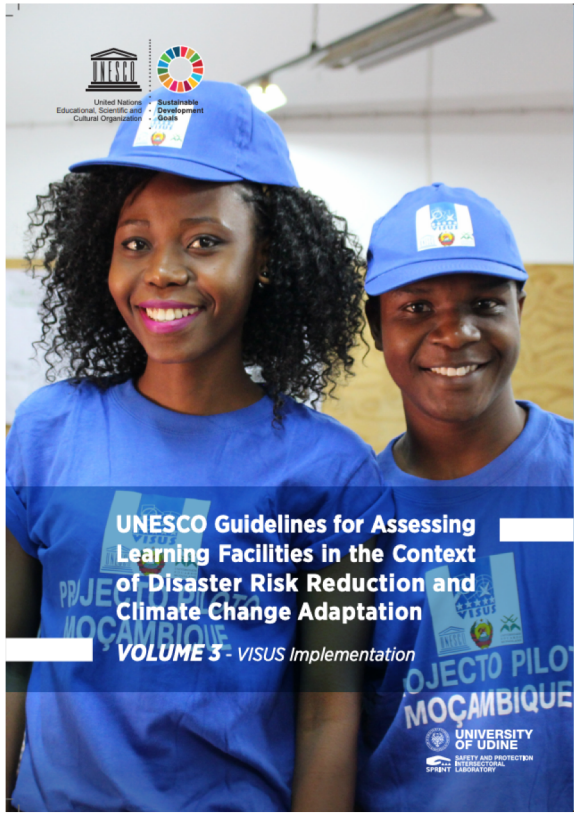
- Consensus-based key messages
- Extracurricular & community-based informal education

- multi-hazard risk assessment
- education sector analysis
- child-centred assessment & planning







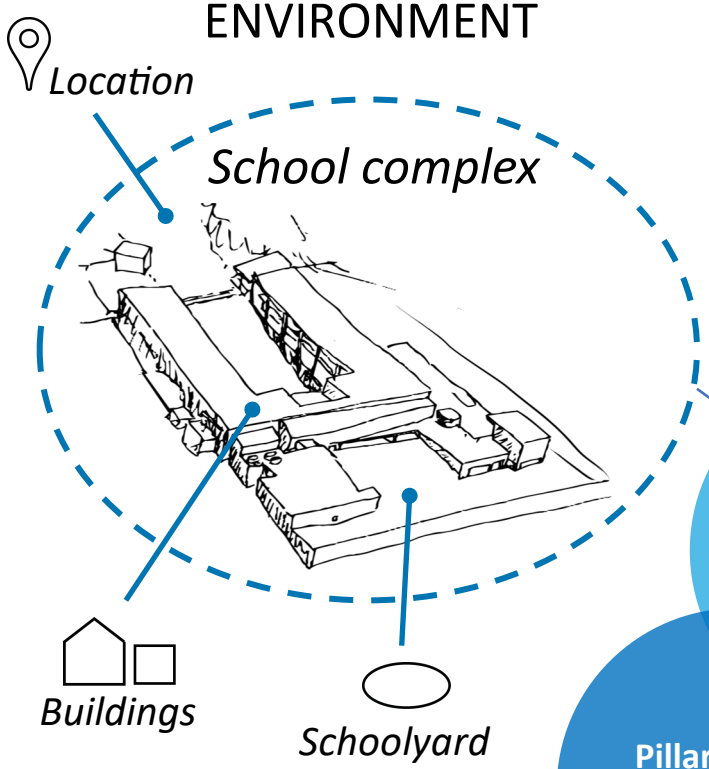


UNESCO Guidelines for Assessing Learning Facilities in the Context of Disaster Risk Reduction and Climate Change Adaptation

Visual Inspection for defining Safety Upgrading Strategies
VISUS

ASSESSING LEARNING FACILITIES

PHYSICAL ENVIRONMENT



WHY?

HOW?

WHAT?

Pillar 1
Safe Learning Facilities

Pillar 2
School Disaster Management

Pillar 3
Risk reduction and Resilience Education

Comprehensive School Safety framework

UNESCO Guidelines

United Nations Educational, Scientific and Cultural Organiz ation

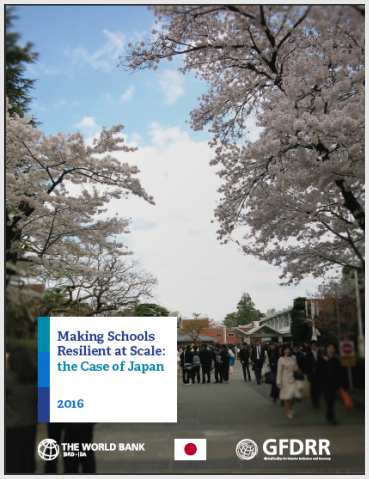
Sustainable Development Goals

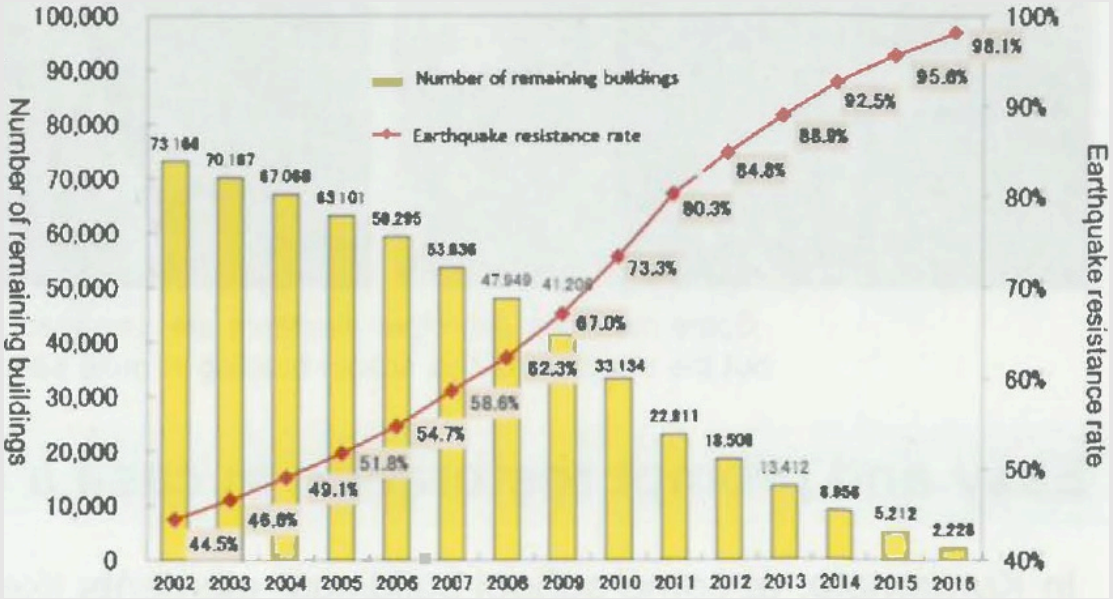
When the number of schools is large…
DECISION-MAKERS CONCERNS:

DECISION-MAKERS

- what is the **SAFETY SITUATION** of each learning facility?
- **WHICH** schools need **PRIORITY INTERVENTIONS** and **WHY**?
- what types of **INTERVENTIONS** are needed?
- how much would the interventions **COST**?
- how can the level of risk be **COMMUNICATED** to the educational community?
- how to define an effective safety upgrading **ACTION PLAN** for a **large number of schools**?

1. **Seismic diagnosis and vulnerability assessment should prioritize schools** with the poorest seismic capacity for earthquake-resistant activities.
2. Seismic diagnosis should be prompt and should use the standards appropriate for the construction type.
3. Municipal governments should disclose results of the seismic diagnosis and progress under the program to stakeholders, including teachers, parents, and communities.





"Guidelines for Promotion of Earthquake-Resistance School Building" (MEXT 2003b).

4. **Nonstructural elements of school facilities should be inspected** and necessary measures taken to ensure their earthquake resistance.

5. **General improvements** in the quality of school facilities should be carried out at the same time as earthquake-resistance improvements.

6. The earthquake-resistance promotion plan should be formulated promptly by local governments.

Haiti case study

Before 2010 Earthquake

- Development investments without DRR perspective

2010 Earthquake

- From now on investments on school infrastructure focused on seismic resistance
- International aid not harmonized

2016 Hurricane Matthew

- 50% of the new “seismic” resistant schools damaged

Lessons Learnt

- Need to provide policy makers with decision-making information concerning school facilities: inventory, location, exposure, physical vulnerabilities, etc.
- Need to approach the challenge in a multi-hazard perspective.
- Countries with low capacities (financial, human resources, etc) urge to potentialize their existing limited capacities.

HOW?

Science-based
Multi-hazard
Multi-aspects
Integrated in the CSS framework
Objective

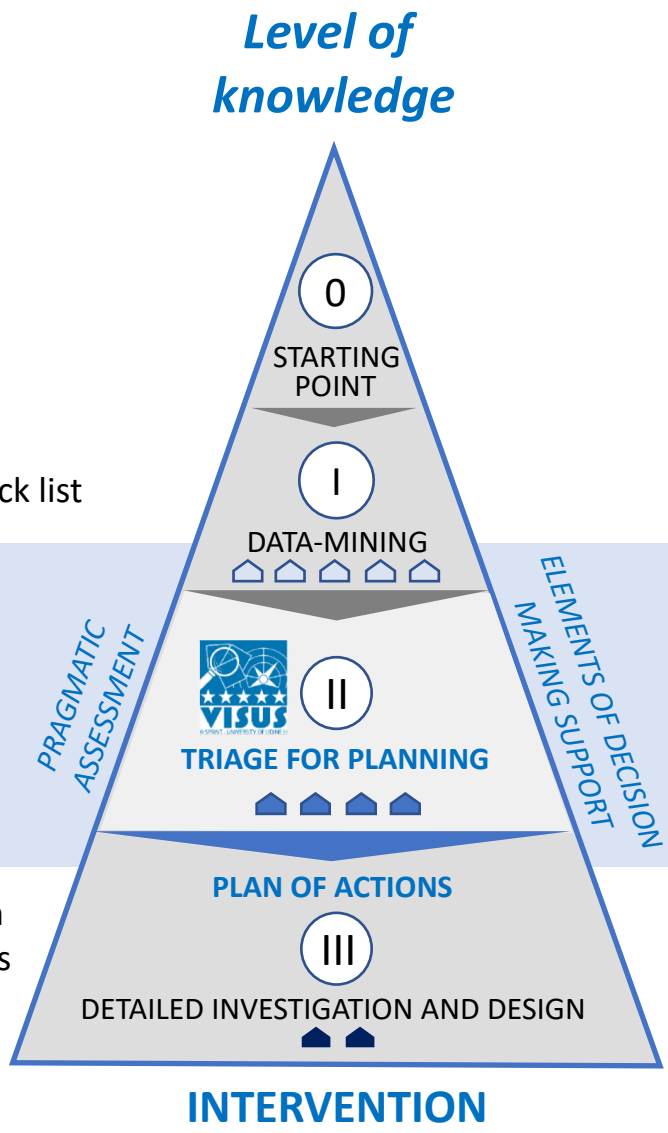
Adaptable to different contexts

VISUS METHODOLOGY

Visual
Inspection for defining
Safety
Upgrading
Strategies

TRIAGE FOR PLANNING

Dealing with many schools!!!



INPUT
data-approach

- Desk analysis of available documentation

- Collection data
- Questionnaire/form/check list

- *Visual inspection by trained surveyors*

- Detailed data acquisition and quantitative analyses

OUTPUT
decision making information

- Preliminary classification

- Class or index of risk
- Priority ranking for deepening/intervention

- *Safety-weaknesses characterization*
- *Intervention-needs identification*
- *Budget allocation estimation*
- *Decision support for multicriteria definition of intervention strategies*

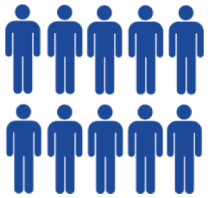
- In-depth/specific assessment
- Safety design
- Detailed cost quantification

HOW?

How assessing a large number of learning facilities
for characterizing the situation and defining the priorities of intervention

THE ANALOGY

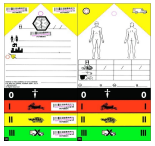
large number of patients

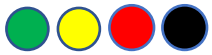


rapid assessment situation

nurse
(trained for medical triage)

situation/priority





treatment rooting

T1 T2 T3 T4 Tn

Who first?
Why?
What?
How many?

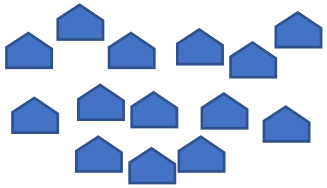
TRIAGE

pragmatic assessment

prioritization

treatment actions

large number of schools



rapid assessment situation

surveyor
(trained for technical triage)

main issues

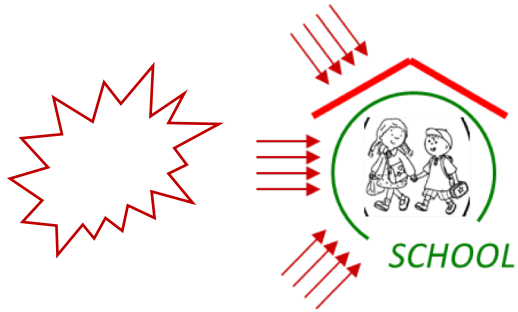
situation/priority

treatment rooting

A1 A2 A3 A4 An

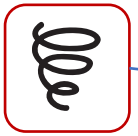
SAFETY: HAZARD OR HAZARDS?

HAZARD

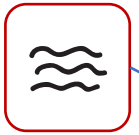


EARTH

WIND



WATER



FIRE

ORDINARY USE

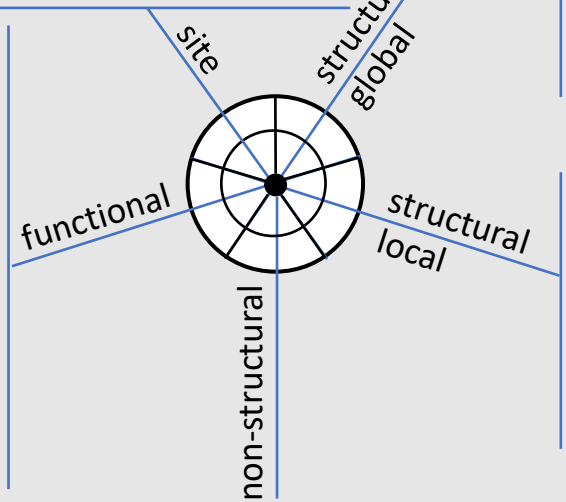
MULTI-DIMENSIONAL PROBLEM

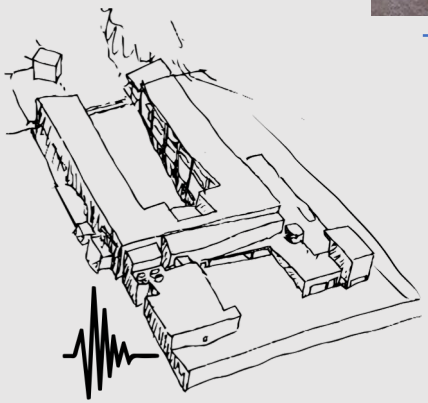
Main issues

HOW?

Main aspects to investigate and to assess

Site
Buildings
Facilities
Schoolyard





THE PHASES

Preparation

Steering committee

UNESCO

SPRINT-UNIUD

Local committee

Focal points (MoE and Academy)

Local experts

UNESCO field office

ADAPTATION
to local specificities

ADAPTATION FORMS

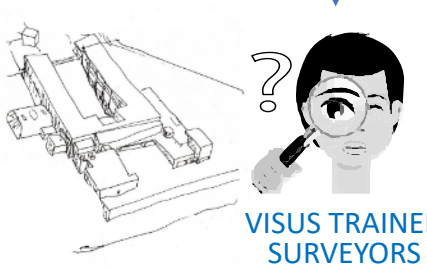
Training

TRANSFER OF KNOWLEDGE AND TECHNOLOGY

Training of local surveyors (university students, technicians…)

Survey

SELF-MANAGED



VISUS TRAINED SURVEYORS

SURVEY SUPPORT TOOL

Graphical language

3A7b.N POTENTIAL FALLS OF TREES OR POLES

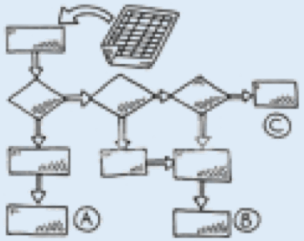
INPUT

Elaboration

AUTOMATED

VISUS 'blue-box' software

pre-codified expert reasoning for assessing the situation



OUTPUT

Outcomes

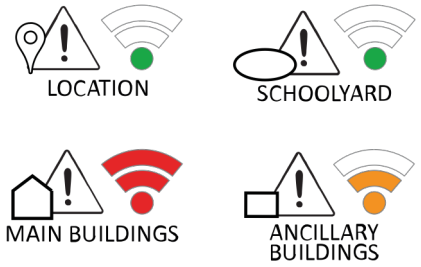
GRAPHICAL INDICATORS

INFORMATION FOR DECISION

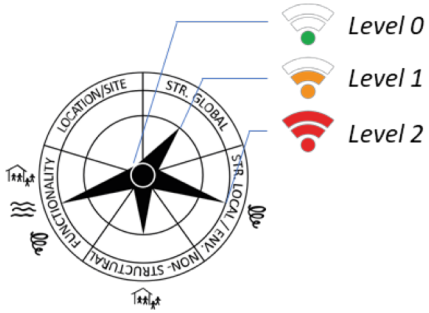
OUTCOMES

Safety situation

WHERE
Warning levels



WHAT (issue and cause)
Rose of intervention needs



FOR EACH BUILDING AND SCHOOLYARD

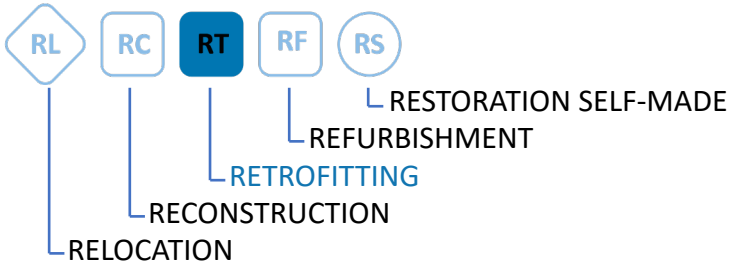
OVERALL MULTI-HAZARD SAFETY JUDGEMENT

FOR EACH HAZARD

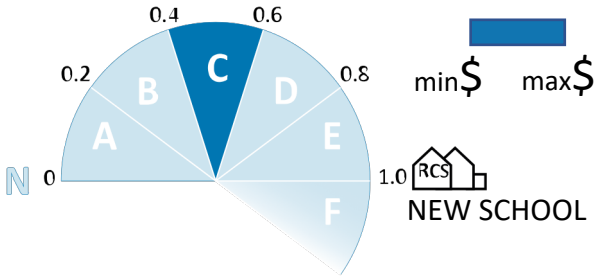
FOR THE SCHOOL COMPLEX

Safety upgrading needs

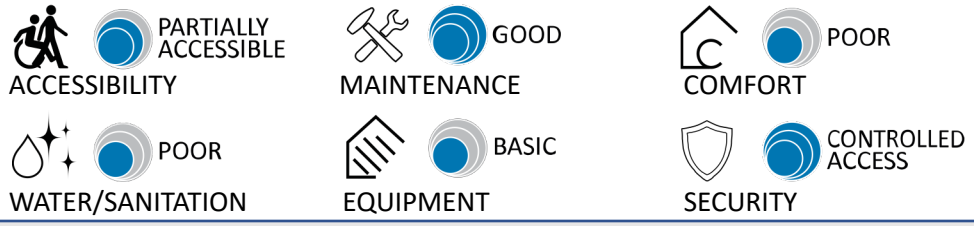
HOW (SUGGESTED)
Safety upgrading actions



HOW MUCH (PRELIMINARY ESTIMATION)
Budget allocation



Status

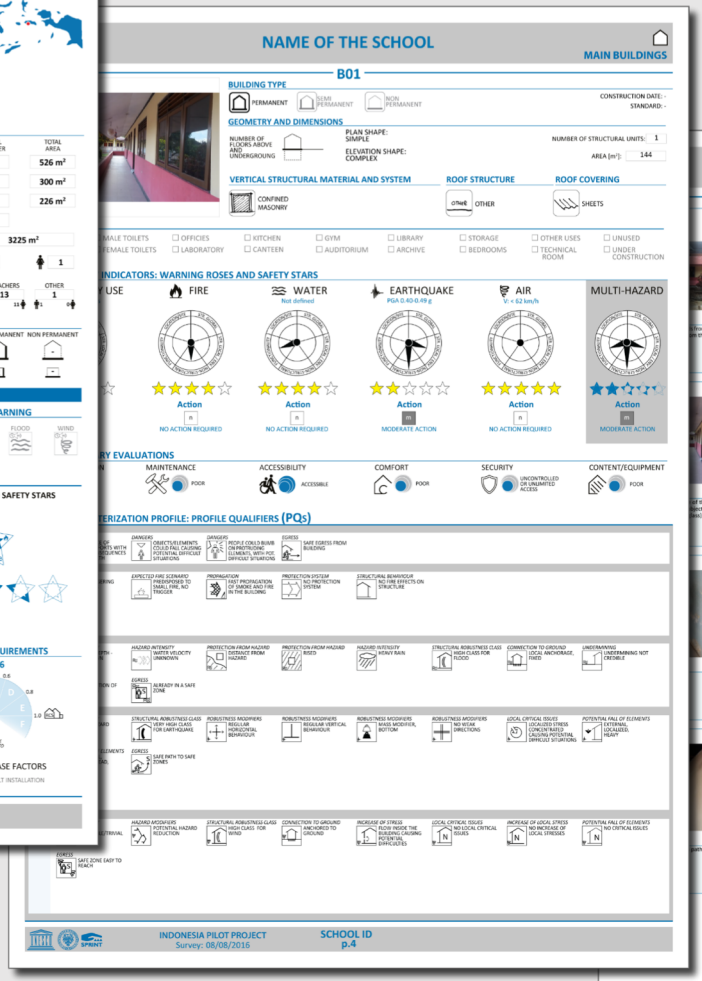


INFORMATION FOR

INDIVIDUAL REPORTS

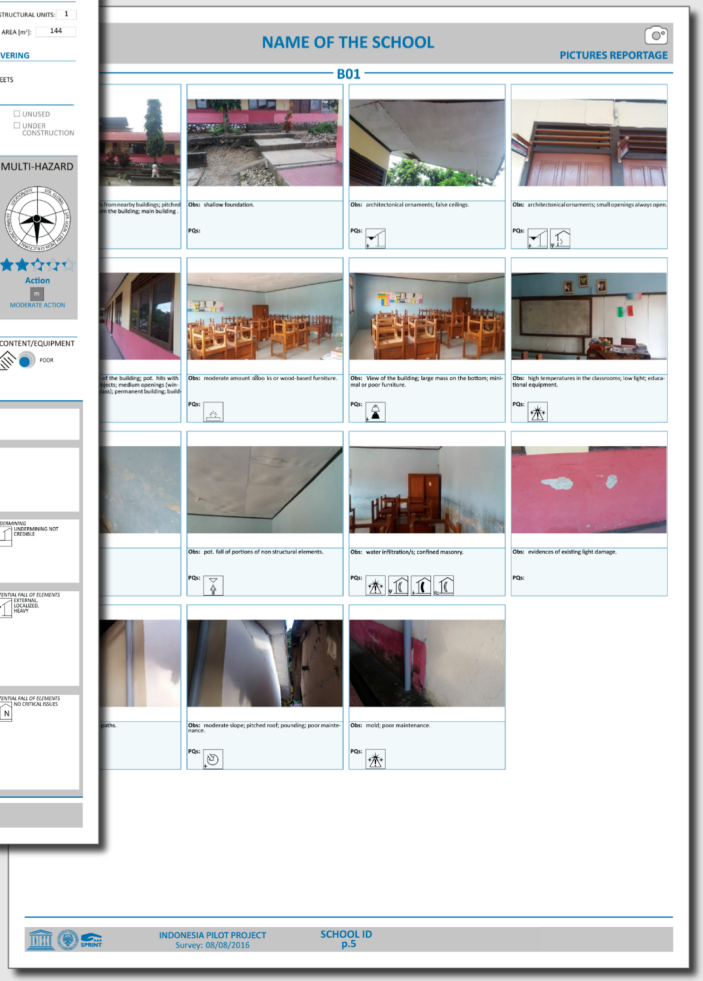
SPECIFIC DETAILS

School characteristics
Summary of evaluations



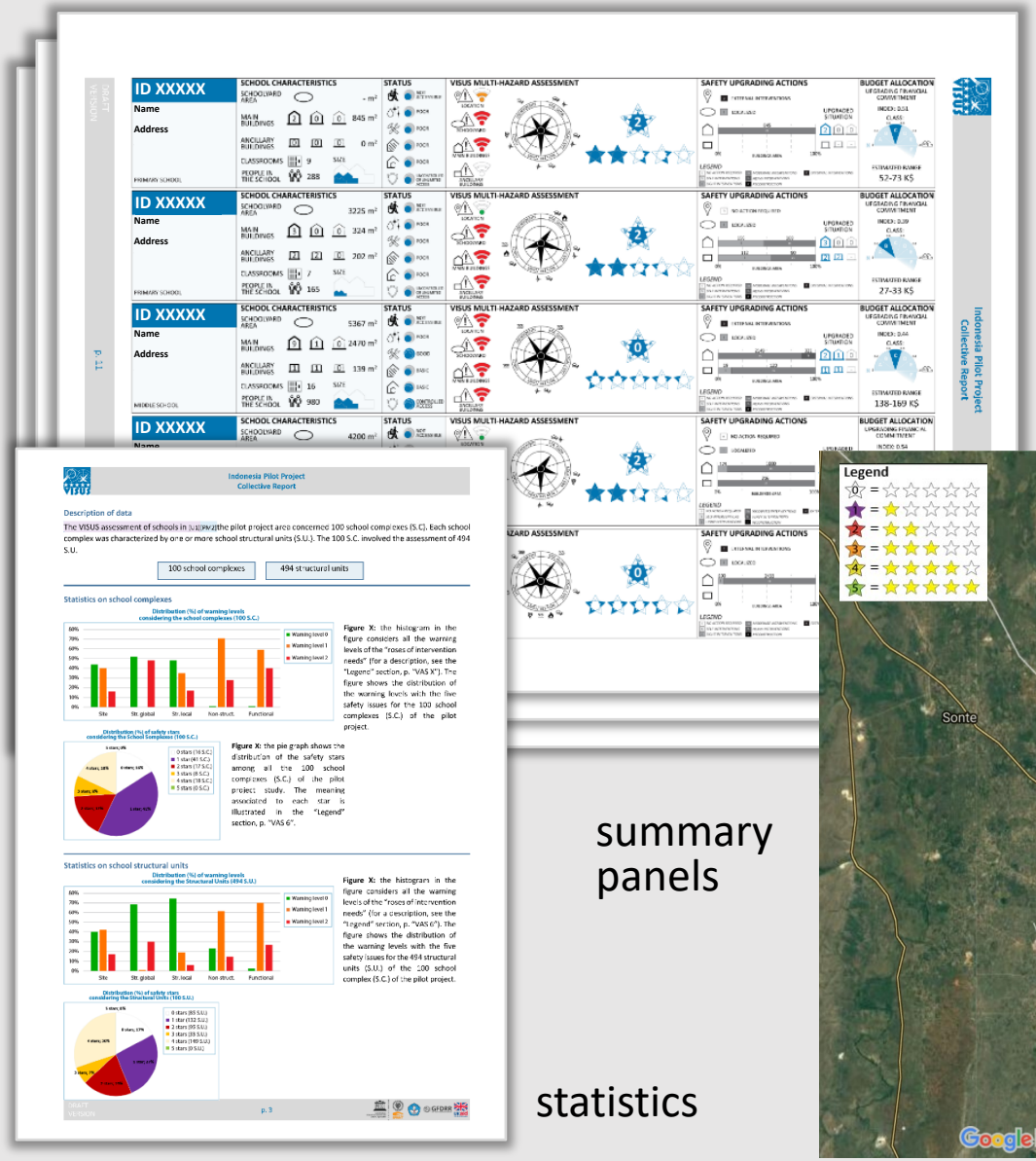
Specific evaluations

Photo reportage
Critical situations



COLLECTIVE REPORTS

OVERALL RESULTS



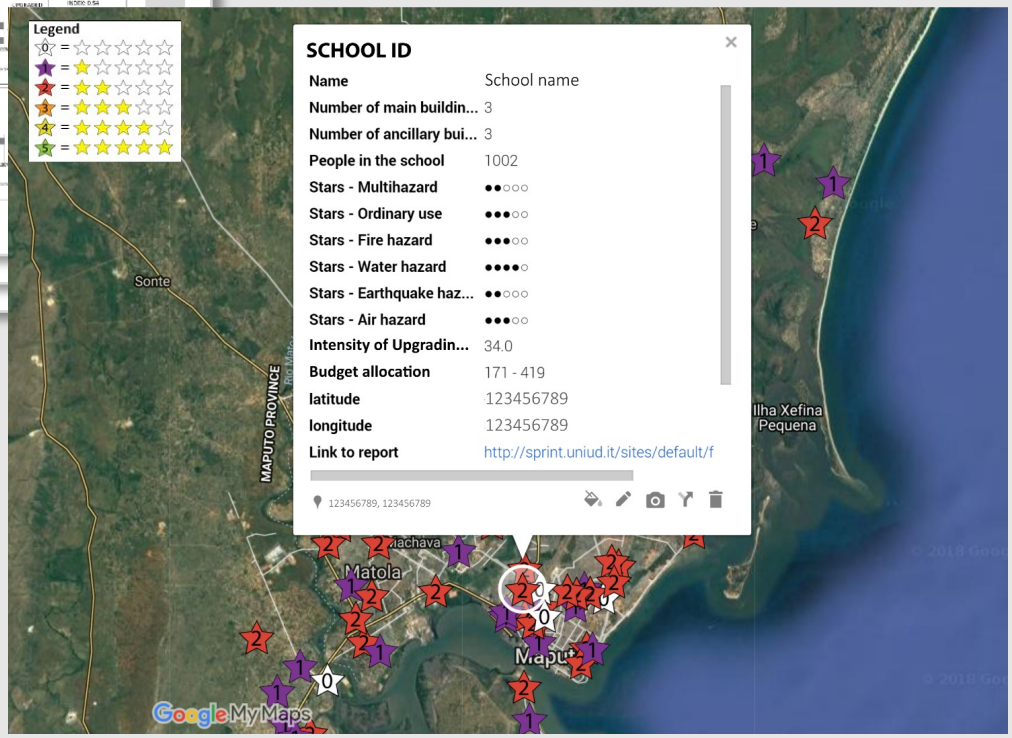
summary panels

statistics

DATABASE

MAPS (WEB MAPS)

with the geolocation of each school and a summary of the outcomes

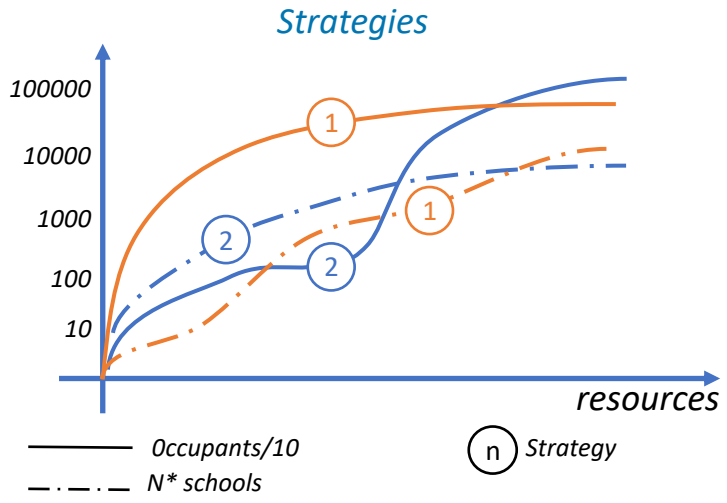


TO DEFINE THE STRATEGIES

The **OUTCOMES OF UNESCO-VISUS** methodology enable decision-makers to **DEVELOP VARIOUS SAFETY UPGRADING STRATEGIES**, such as:

- prioritization by **exposure to a specific hazard** or multiple hazards (considering also the ordinary use)
- prioritization by **physical vulnerability**
- prioritization by **number of occupants**
- prioritization by **type of critical issue** identified (e.g. structural critical issue, non-structural critical issue, problems of location)
- …

Multicriteria planning

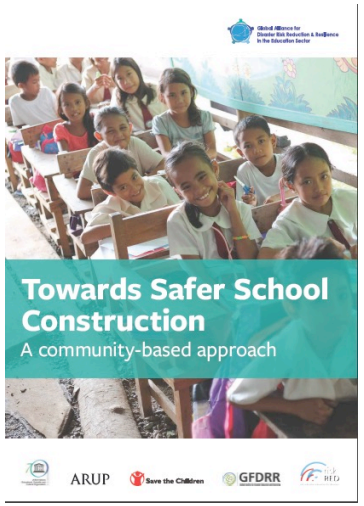


New Objectives

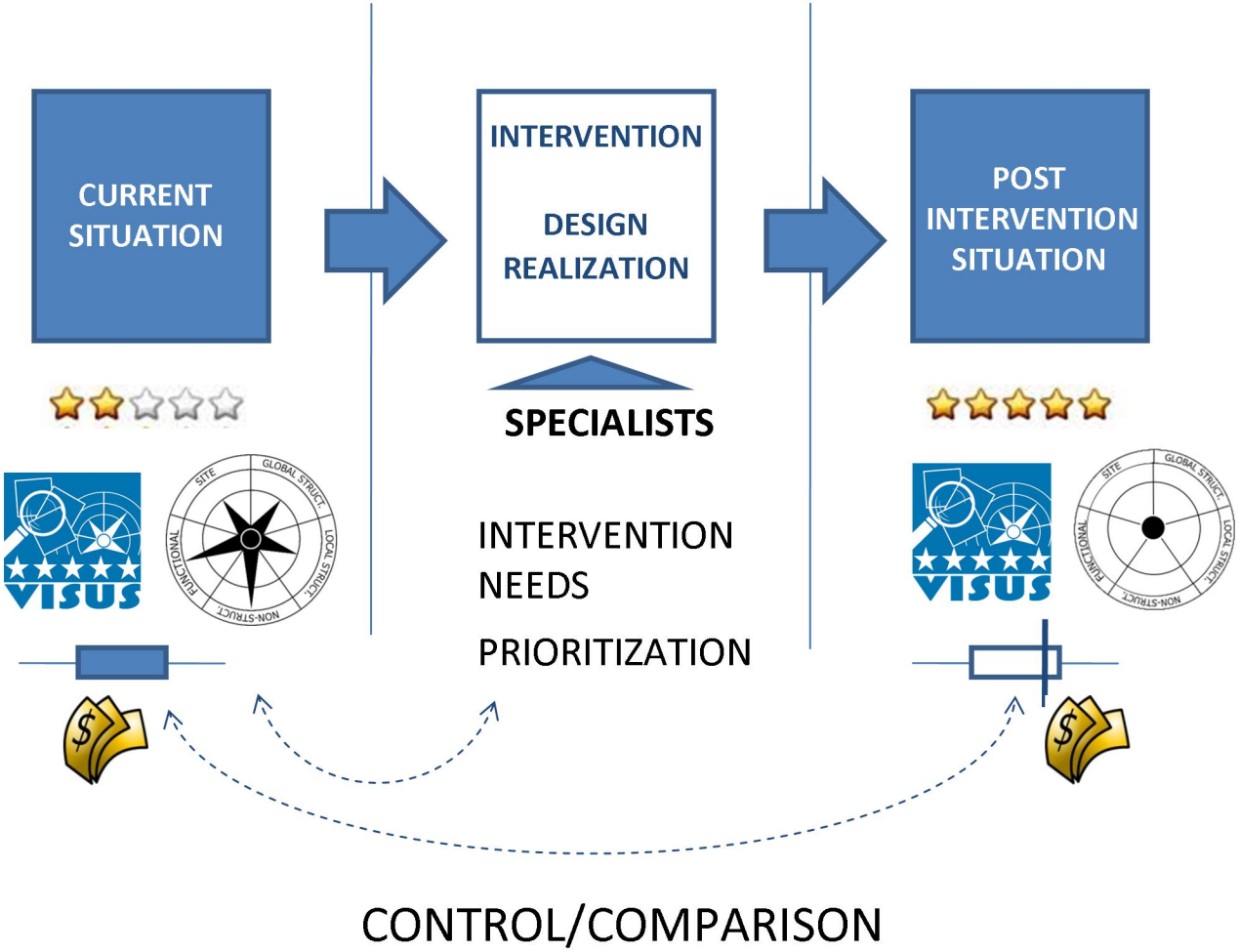
R

Rehabilitate
Remodeling
Retrofitting
Reconstruction
Relocation

1. Resilient construction (applying seismic, wind and other hazard related construction codes)
2. Sustainability (energy maximization, construction materials, water consumption etc.)
3. Learning spaces that maximize quality Education
4. Linkage between the development of the local community and the school

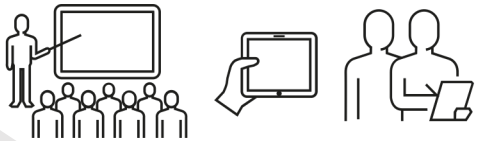


VISUS: A TOOL FOR INDIVIDUATING, MANAGING AND CONTROLLING THE PROCESS OF ACTIONS OF RISK MITIGATION



A CAPACITY BUILDING PROCESS

VISUS implementation is based on
CAPACITY BUILDING



involvement of
NATIONAL & LOCAL UNIVERSITIES
and Authorities from different Ministries

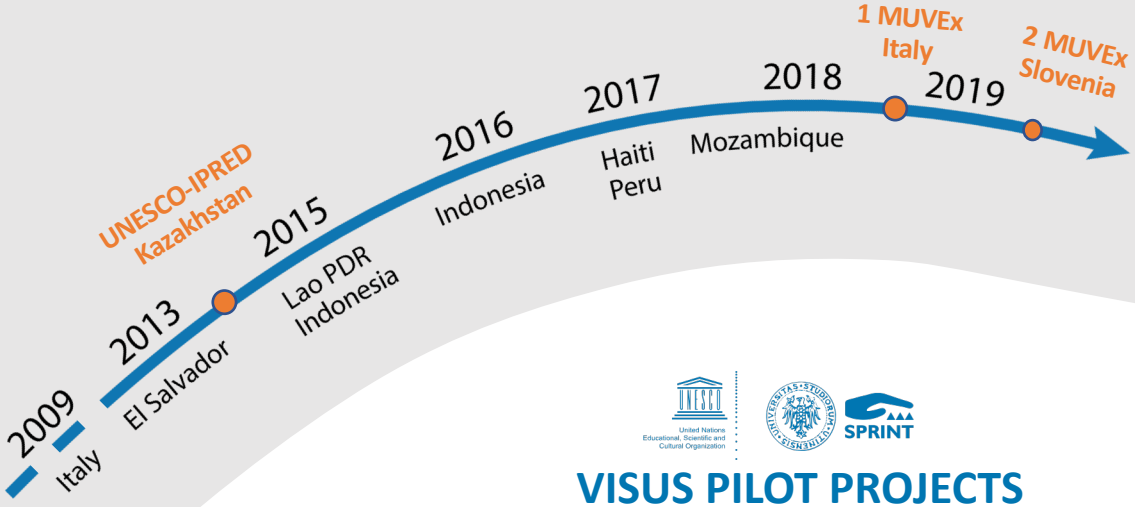
KNOWLEDGE & TECHNOLOGICAL TRANSFER
to local personnel

VISUS
© SPRINT - UNIVERSITY OF UDINE (I)
Visual
Inspection for defining
Safety
Upgrading
Strategies

creation and/or **STRENGTHENING OF COMPETENCIES**
facilitating the project's deployment at the national scale

creation of **KNOW-HOW FOR SELF-MANAGEMENT** *of projects*

GUIDELINES: the result of worldwide pilot projects and scientific revisions



VISUS PILOT PROJECTS

Seismic

Italy
El Salvador

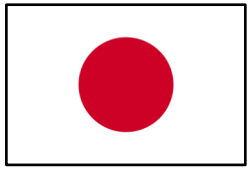
Multi-hazard

Indonesia
Laos
Peru
Haiti
Mozambique

Worldwide institutions involved on the revision and improvement of the methodology

Bandung Institute of Technology – Indonesia
Beijing Jiaotong University – China
Building Research Institute – Japan
Catholic University of Chile – Chile
Eduardo Mondlane University – Mozambique
Institute of Seismology – Kazakhstan
International Institute of Seismology and Earthquake Engineering – Japan
Istanbul Technical University – Turkey
Japan International Cooperation Agency – Japan
Japan-Peru Center for Earthquake Engineering and Disaster Mitigation – Peru
King Abdulaziz University – Kingdom of Saudi Arabia
Kyoto University – Japan
National Center for Disaster Prevention – Mexico
National Fire Corps of Italy – Italy
National Research Institute of Astronomy and Geophysics – Egypt
Research Institute for Human Settlement – Indonesia
Technical University of Civil Engineering – Romania
Technological University of Havana José Antonio Echeverría – Cuba
Tokyo Polytechnic University – Japan
University of El Salvador – El Salvador
University of Tokyo – Japan
University of Trieste – Italy
University of Ljubljana – Slovenia
UNESCO-IICBA – Ethiopia
UNESCO-IIPE – France
UNESCO-IHE – The Netherlands
United Nations Environment Programme – UNEP
United Nations Office for the Coordination of Humanitarian Affairs – OCHA
UNICEF
Save the Children

THANKS TO OUR SUPPORTERS



(In the framework of the UNESCO-IPRED Platform)

United Nations
Educational, Scientific and
Cultural Organization

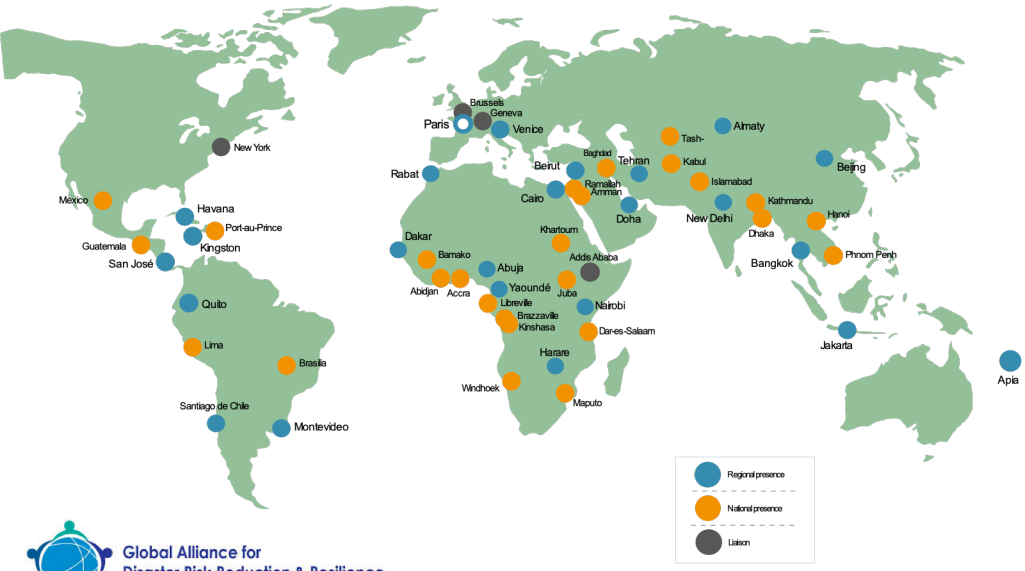
Indonesian
Fund-in-Trust

Enabel

Humanitarian Aid
and Civil Protection

THE WAY FORWARD

UNESCO field offices network



Global Alliance for Disaster Risk Reduction & Resilience in the Education Sector

with the scientific support of:

UNIVERSITY OF UDINE
SAFETY AND PROTECTION INTERSECTORAL LABORATORY
SPRINT

21,581

Learning facilities to be assessed worldwide prioritizing those belonging to and located:

- *Associated Schools Network (ASPnet)*
- *UNESCO's Biosphere Reserves,*
- *Global Geoparks*
- *World Heritage Sites*

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national and local universities and vocational institutes to be involved

- DEVELOPMENT OF A PLATFORM FOR AUTOMATIC REPORTING
- CONTINUES IMPROVEMENT OF THE METHODOLOGY THROUGH MUVEx AND COUNTRY IMPLEMENTATION
- GLOBAL REPORT ON THE STATUS OF LEARNING FACILITIES WORLDWIDE

THANK YOU!

We look forward to receiving your comments

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