



United Nations
Educational, Scientific and
Cultural Organization



UNIVERSITY
OF UDINE



SAFETY AND PROTECTION
INTERSECTORAL
LABORATORY



United Nations
Educational, Scientific and
Cultural Organization



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

VISUS Methodology Webinar

TORRES *Jair*
GRIMAZ *Stefano*
MALISAN *Petra*

9th March 2020



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



1 Introduction

Jair Torres

2 Learn about VISUS - why how what

Stefano Grimaz

3 How VISUS works

Petra Malisan

4 Overview of worldwide VISUS pilot projects

Jair Torres



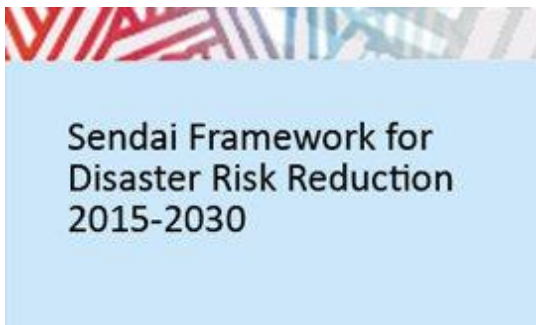
1

Introduction



● Sustainable development goals

SDG 4
SDG 11



● DRR Sendai framework

Strategic infrastructures
Schools



● Paris Climate Agreement

Art. 7, 8, 11



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



United Nations
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UNDRR

UN Office for Disaster Risk Reduction



GFDRR

Global Facility for Disaster Reduction and Recovery



Save the Children



United Nations
Educational, Scientific and
Cultural Organization



International Institute
for Educational Planning



**Inter-agency Network for
Education in Emergencies**



risk reduction education for disasters



ARUP

Worldwide Initiative for Safe Schools



Global commitment
to school safety

Education Sector Policies and Plans

Aligned to national, subnational and local disaster management plans

Pillar 1. Safe Learning Facilities

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

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

- Building maintenance
- Non-structural mitigation
- Fire safety

- Structural safety education
- Construction as educational opportunity

Pillar 2. School Disaster Management

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

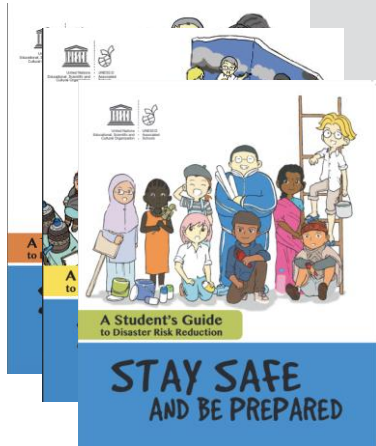
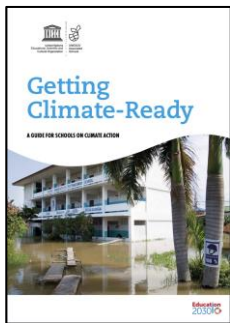
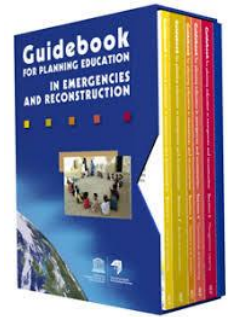
- Representative/participatory SDM committee
- Educational continuity plan
- Standard operating procedures
- Contingency planning

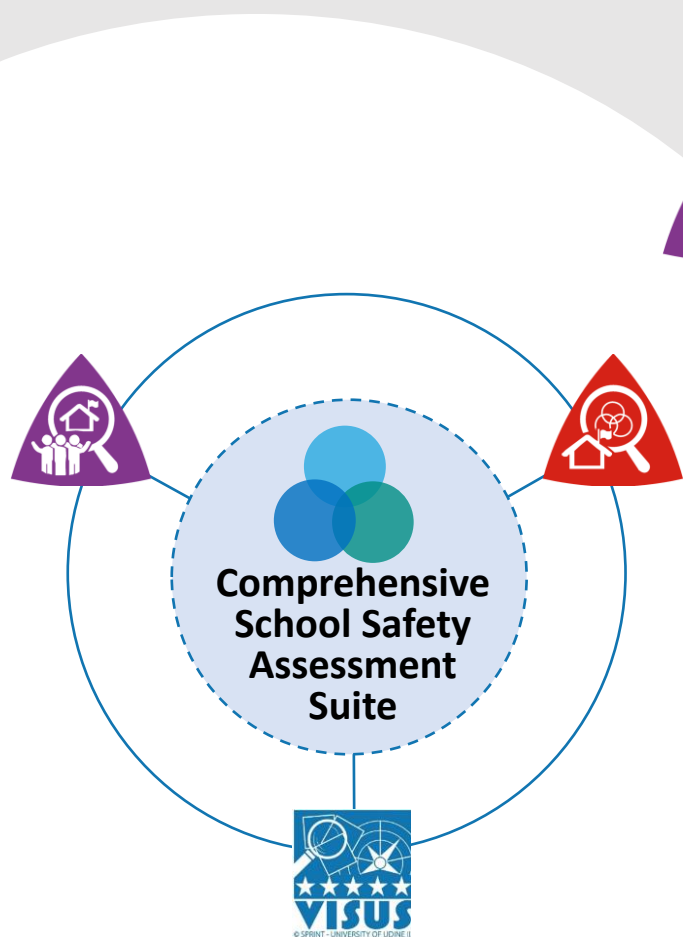
Pillar 3. Risk Reduction and Resilience Education

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

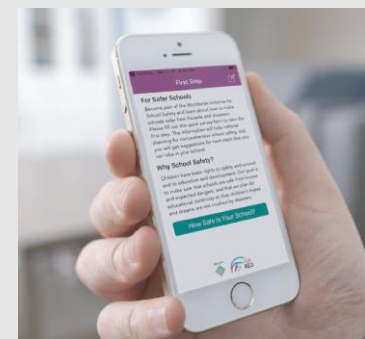
- Consensus-based key messages
- Extracurricular & community-based informal education

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

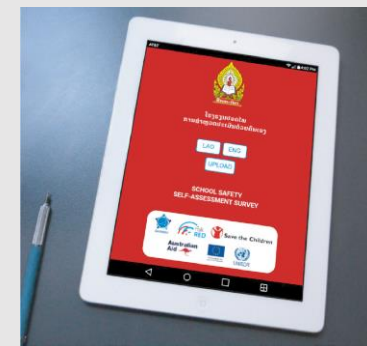




CSS First Step
Community Awareness



CSS School Self-Assessment
Internal Assessment
(Pillars 1, 2,3 quick survey)



VISUS CSS
Visual Inspection
for defining Safety
Upgrading Strategies



TOOL	INPUTS	FROM	OUTPUTS	TO
1. CSS First Step: Community Awareness	Hazard/Risk maps Desk review of available data Crowd-sourced & other views	Public records Students Community members	Crowd-sourced perception data: E-mail to responder Online visualisation	School community Local education administrators Advocacy Awareness Interest Salience
2. CSS School Self-Assessment: Internal Assessment (Pillars 1, 2,3)	Pillars 1, 2, 3 quick survey Photographic reportage EMIS & geo-informatics	School safety committees Visiting education administrators	School-based self-assessment School report District report Online visualisation Searchable database	School management National & district education administrators Local input Program development Capacity-building Flagging for technical Pillar 1 inspection
3. VISUS CSS: Visual Inspection for defining Safety Upgrading Strategies (Pillar 1)	Visual inspection/detailed data Application of criteria Quantitative and qualitative analysis Photographic reportage EMIS & geo-information	External trained survey teams: Technical inspectors from Ministry of Education Surveyors from local Universities or vocational schools	Capacities for technical assessment created in the country Individual school report Collective report (including budget estimations) Online visualisation Searchable database	School management National & district education administrators Characterisation Recommendations Cost-estimate – funding allocation Prioritisation
4. Detailed investigation and design	Deep technical investigation Quantitative analysis	Trained structural engineers	Detailed investigation and design	In-depth assessment for design and delivery of retrofit or replacement

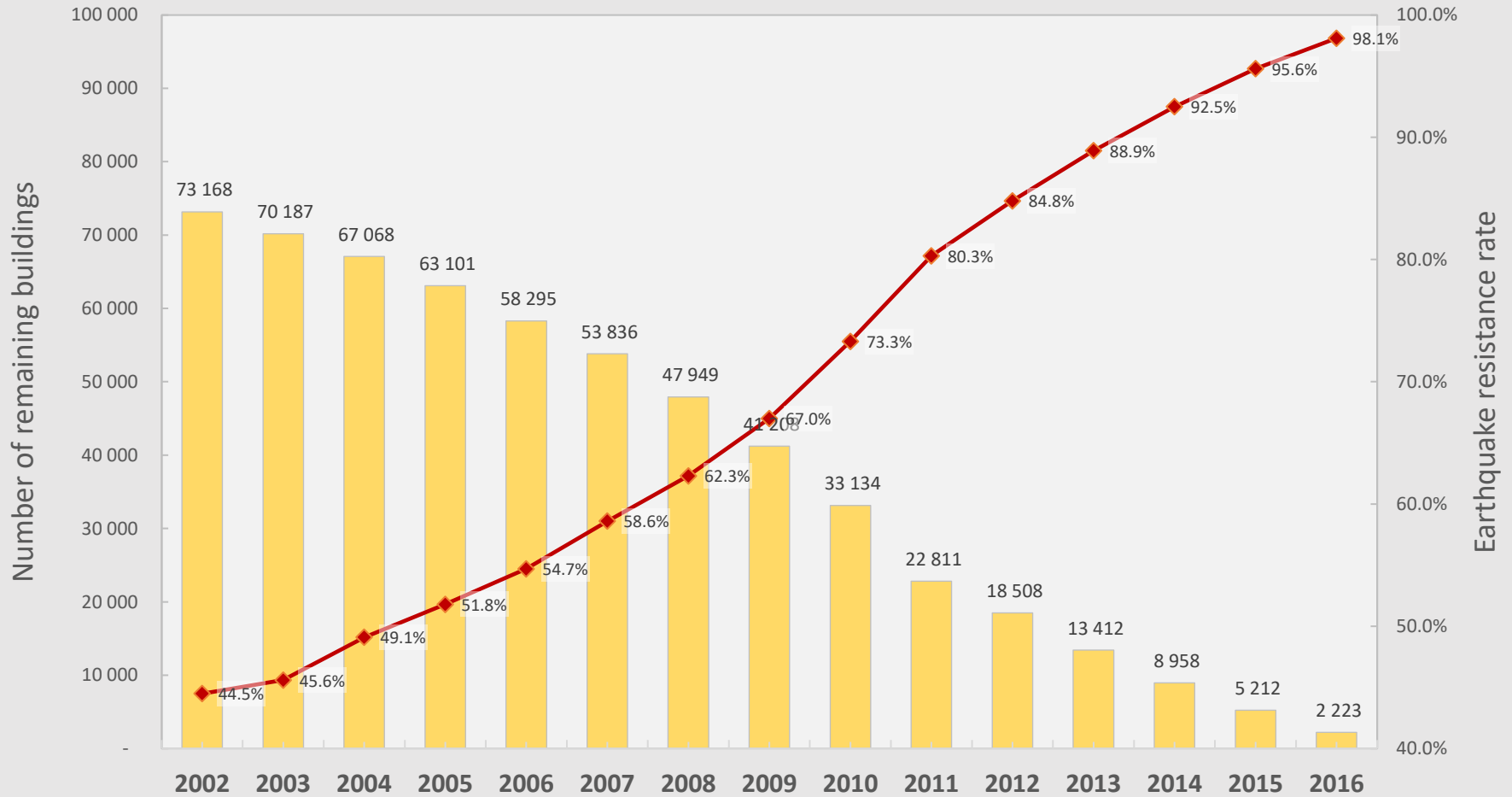


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SAFETY AND PROTECTION
INTERSECTORAL
LABORATORY





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

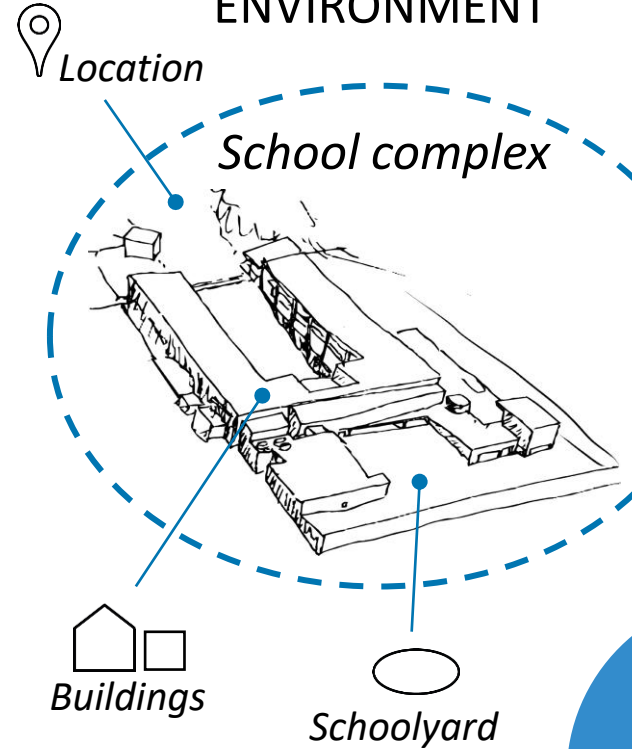
- 50% of the new “seismic” resistant schools damaged



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.

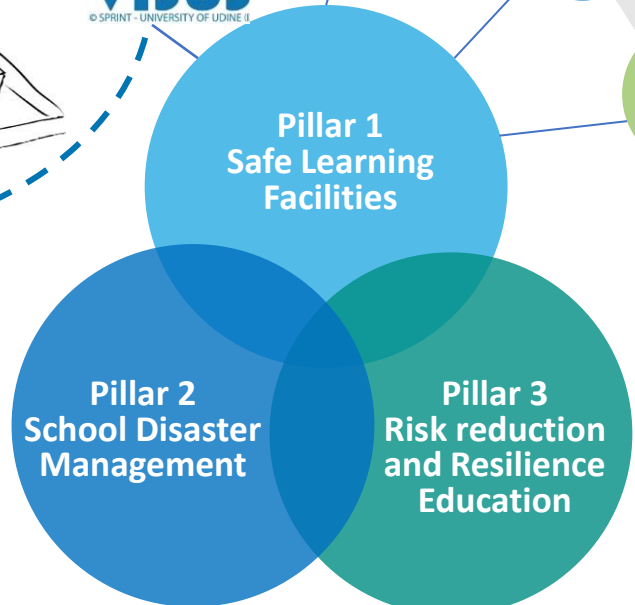
PHYSICAL ENVIRONMENT



WHY?

HOW?

WHAT?



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



LIFE SAFETY
(CHILDREN)

CONTINUITY
(EDUCATION ACTIVITIES)

LOSS PREVENTION
(SAFEGUARD OF INVESTMENTS)



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

Comprehensive School Safety framework

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

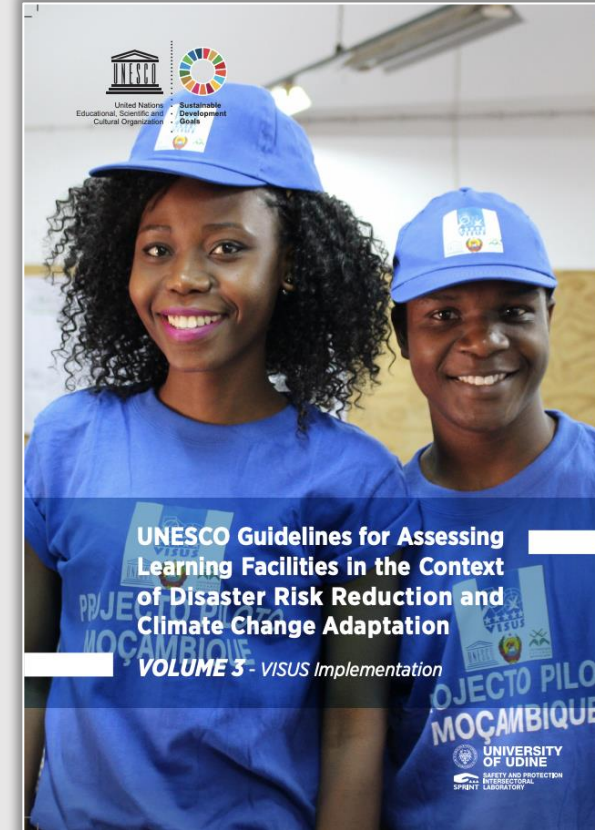
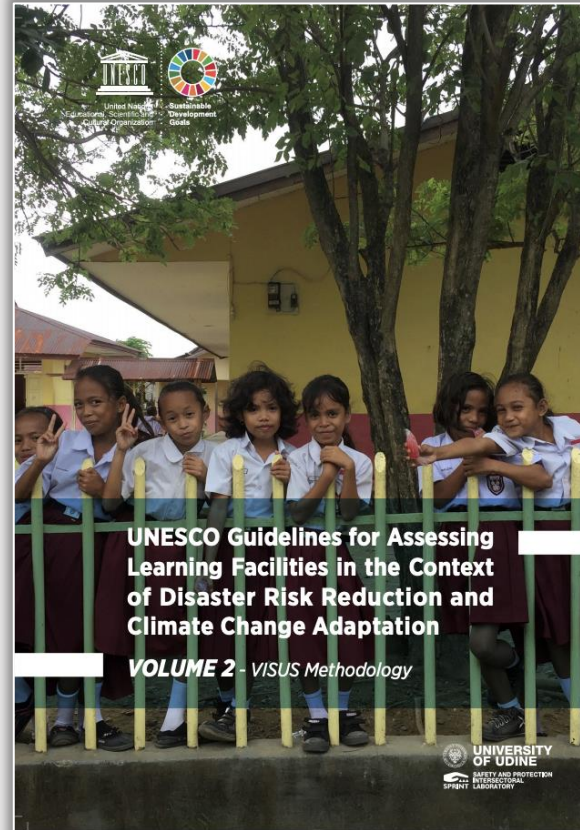
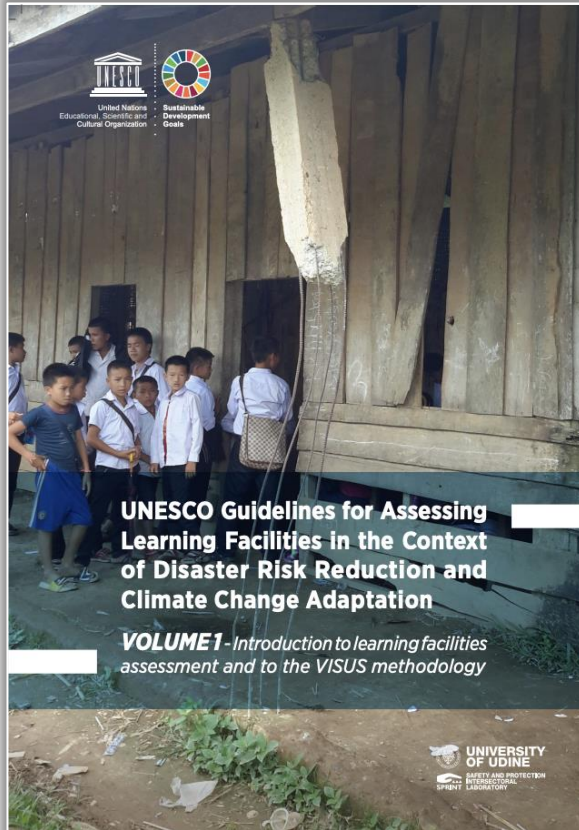


WHY?

DECISION-MAKERS

- what is the **SAFETY SITUATION** of each learning facilities?
- **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**?

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





2

Learn about VISUS

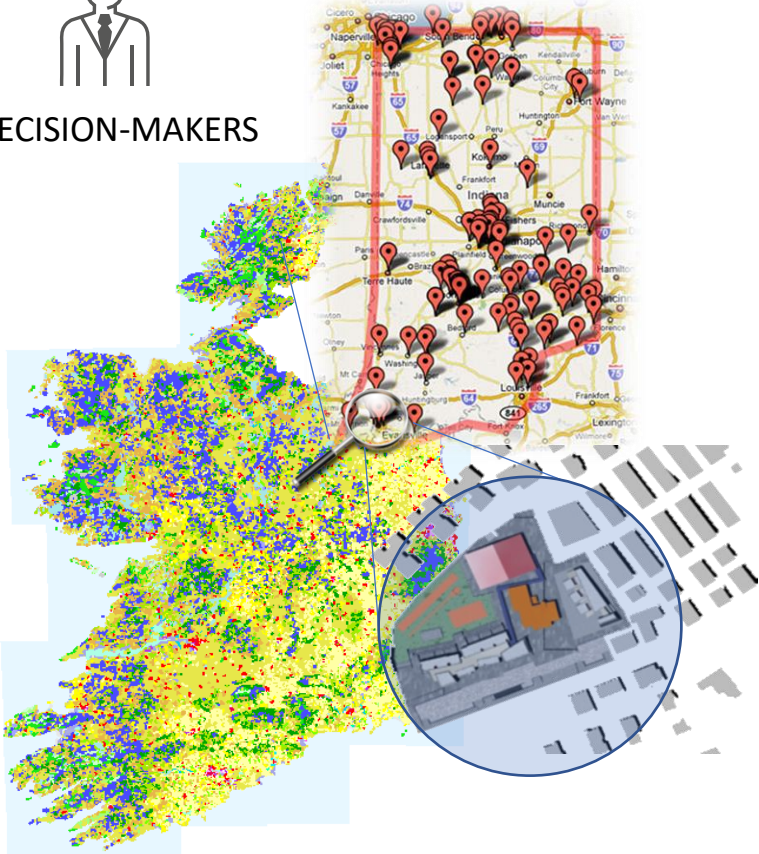


Why
How
What

AT TERRITORIAL LEVEL



DECISION-MAKERS



CONCERNS OF DECISION-MAKERS

WHAT IS THE ACTUAL SAFETY SITUATION?

WHICH SCHOOL SHOULD BE PRIORITIZED?

WHY?

WHAT INTERVENTIONS ARE NECESSARY?

HOW MUCH WOULD RETROFITTING COST?

HOW MANY INTERVENTIONS ARE FEASIBLE GIVE THE AVAILABLE RESOURCES?

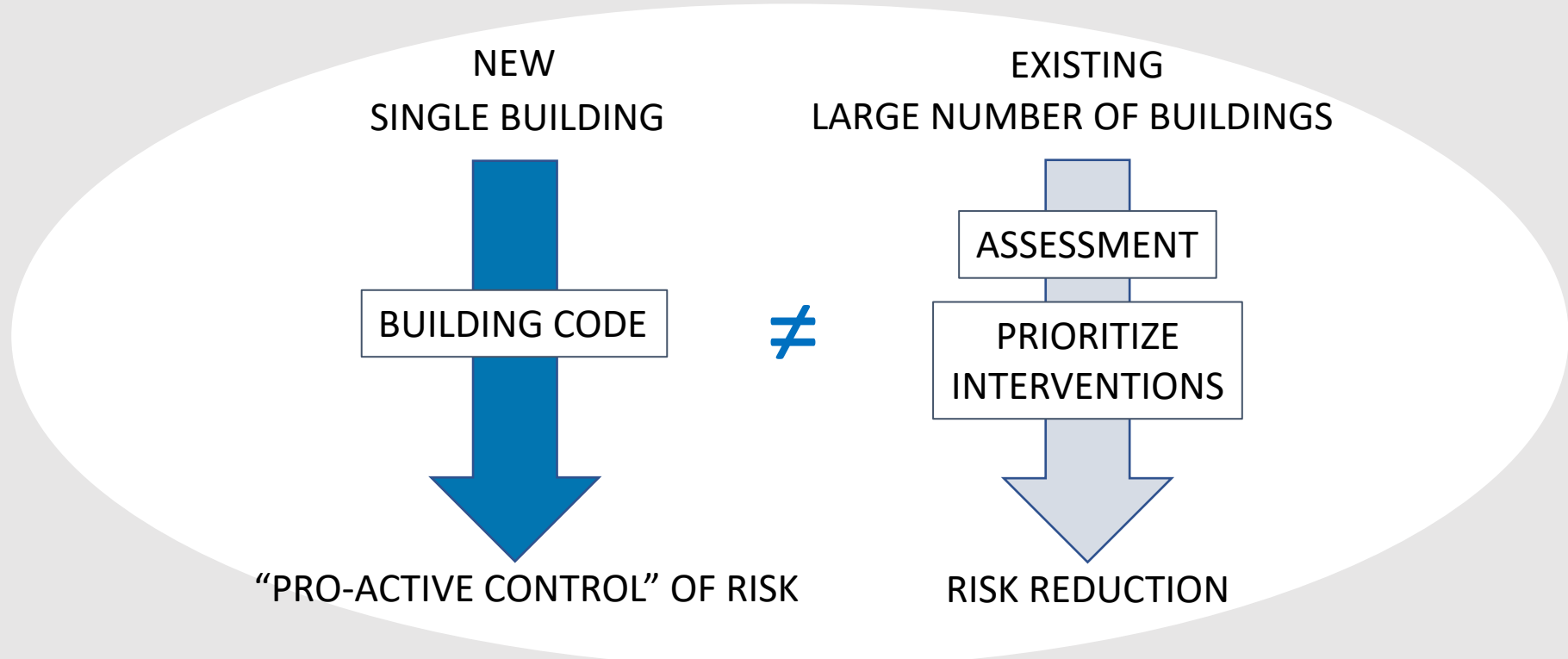
HOW SHOULD WE COMMUNICATE THE RISK LEVEL TO THE COMMUNITY?

MANAGEMENT

- WHICH SCHOOL FIRST
- WHY AND WHAT IS NEEDED
- HOW TO DEFINE THE STRATEGIES FOR COST-EFFECTIVE INTERVENTIONS

- PRIORITIES
- INTERVENTIONS
- COSTS
- ACTION PLAN

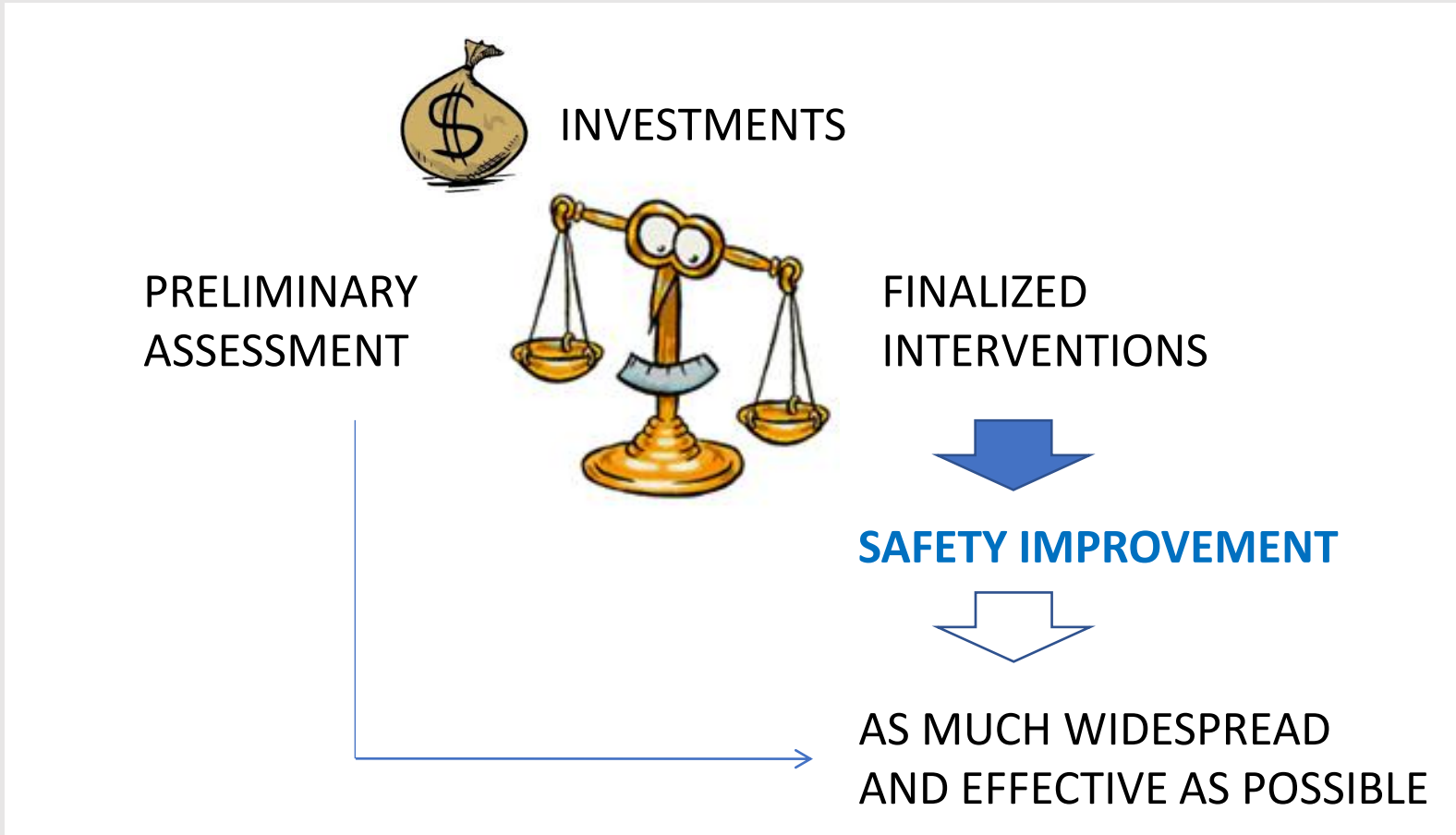
TWO DIFFERENT PROBLEMS



CAN WE TRANSFER THE APPROACH “TOUT COURT”?



WE NEED CRITERIA AND METHODS FOR ASSESSING SITUATIONS AND DEFINING “WHICH ONE FIRST, WHY AND HOW”



HOW TO ASSESS, AND “HOW MUCH IS ENOUGH” TO KNOW FOR DEFINING WHAT IS OPPORTUNE TO DO?

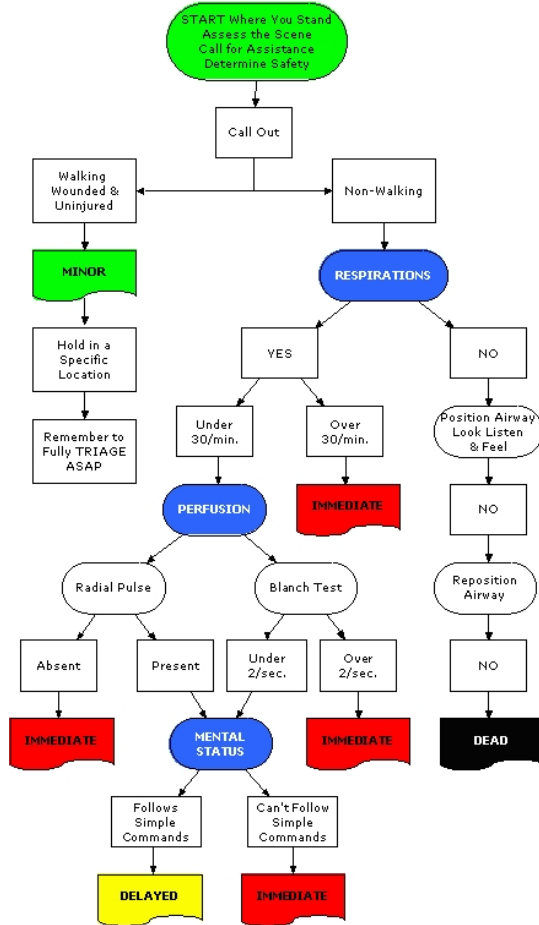


PRIORITIZATION OF THE TREATMENTS FOR A COST-EFFECTIVE ALLOCATION OF RESOURCES

DISASTER MEDICINE

PLANNING

START - Simple Triage And Rapid Treatment



<http://mymedicaldiary.blogspot.it>

TRIAGE FOR RAPID MEDICAL TREATMENT



PRAGMATIC CHARACTERIZATION AND EVALUATION

TRIAGE FOR SAFETY UPGRADING

PRAGMATIC CHARACTERIZATION AND EVALUATION

PATIENTS



TREATMENTS

PRIORITY CONVENIENCE

BUILDINGS



INTERVENTION NEEDS

PRIORITY CONVENIENCE

PRIORITY 0	DECEASED/EXPECTANT	PRIORITY 1	DECEASED/EXPECTANT	PRIORITY 2	DECEASED/EXPECTANT
PRIORITY 1	IMMEDIATE	PRIORITY 2	IMMEDIATE	PRIORITY 3	IMMEDIATE
PRIORITY 2	DELAYED	PRIORITY 3	DELAYED	PRIORITY 4	DELAYED
PRIORITY 3	MINOR INVOLVED	PRIORITY 4	MINOR INVOLVED	PRIORITY 0	MINOR INVOLVED
PRIORITY 4	BUT NO APPARENT INJURIES	PRIORITY 0	BUT NO APPARENT INJURIES	PRIORITY 1	BUT NO APPARENT INJURIES

<http://www.mcitrailers.com>



INPUT

data-approach

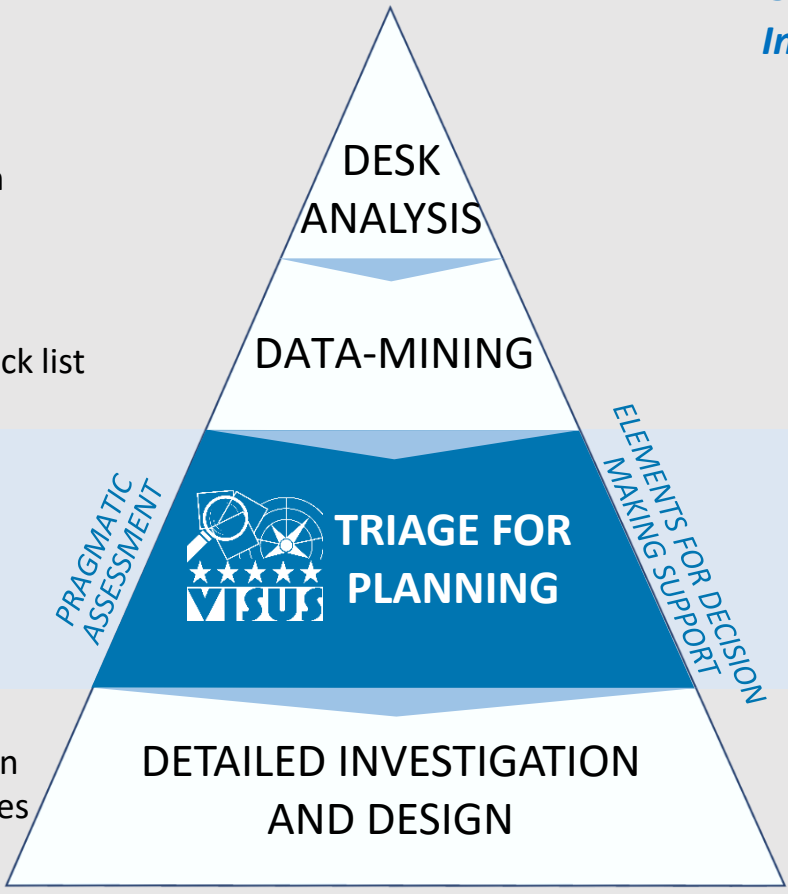
Desk analysis of available documentation

Collection data
Questionnaire/form/check list

Visual inspection by trained surveyors

Detailed data acquisition and quantitative analyses

DEPTH OF ASSESSMENT



OUTPUT

Information for decision making

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

INTERVENTION

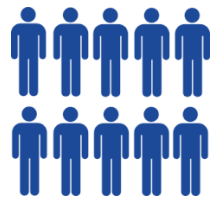


HOW?

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

THE ANALOGY

large number of patients

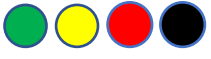
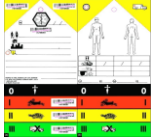


rapid assessment situation



nurse
(trained for medical triage)

situation/priority



treatment routing



Who first?
Why?
What?
How many?

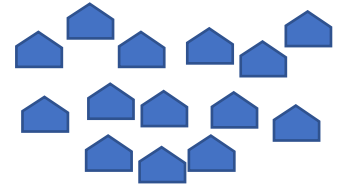
TRIAGE

pragmatic assessment

prioritization

treatment actions

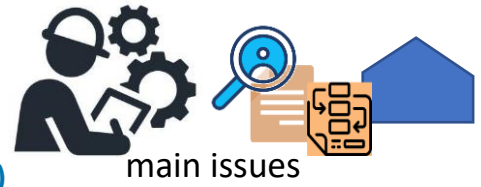
large number of schools



rapid assessment situation



surveyor
(trained for technical triage)



situation/priority



treatment routing



80-20 Rule

The Pareto Principle



VISUS experts

- FACTOR 1
- FACTOR 2
- FACTOR 3
- FACTOR 4
- FACTOR 5
- FACTOR 6
- FACTOR 7
- FACTOR 8
- FACTOR 9
- FACTOR 10

20

STOP

CONSEQUENCES

80

20% of the input
(time, resources, effort)

accounts for 80% of the output
(results, rewards)

HOW

How to define an assessment procedure pragmatic and effective?

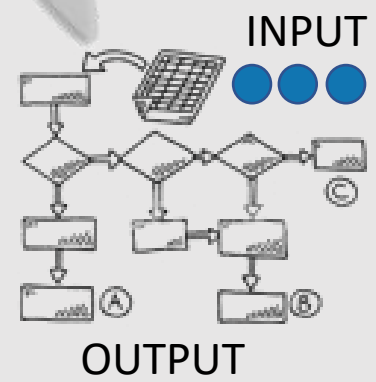
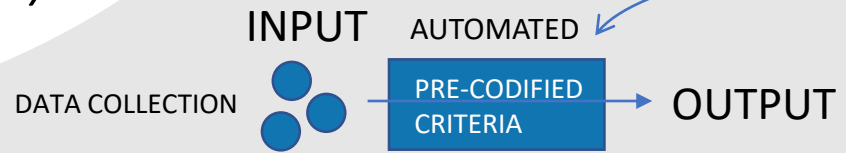
Elicitation of expert's knowledge

for identifying the main factors
pre-codified evaluation criteria

ELICITATION PROCESS



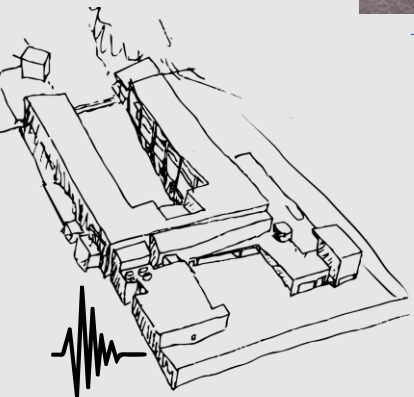
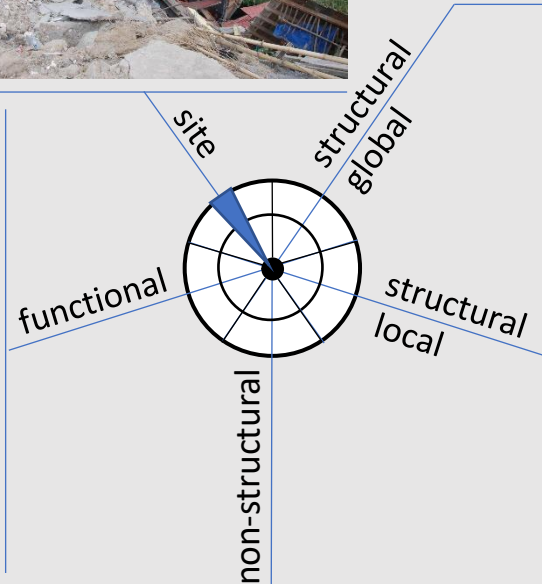
PRE-CODIFICATION OF EXPERT REASONING

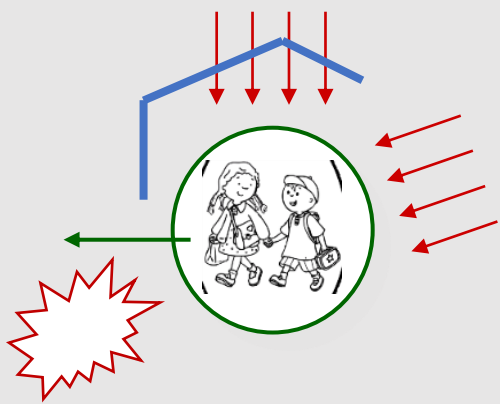


HOW?

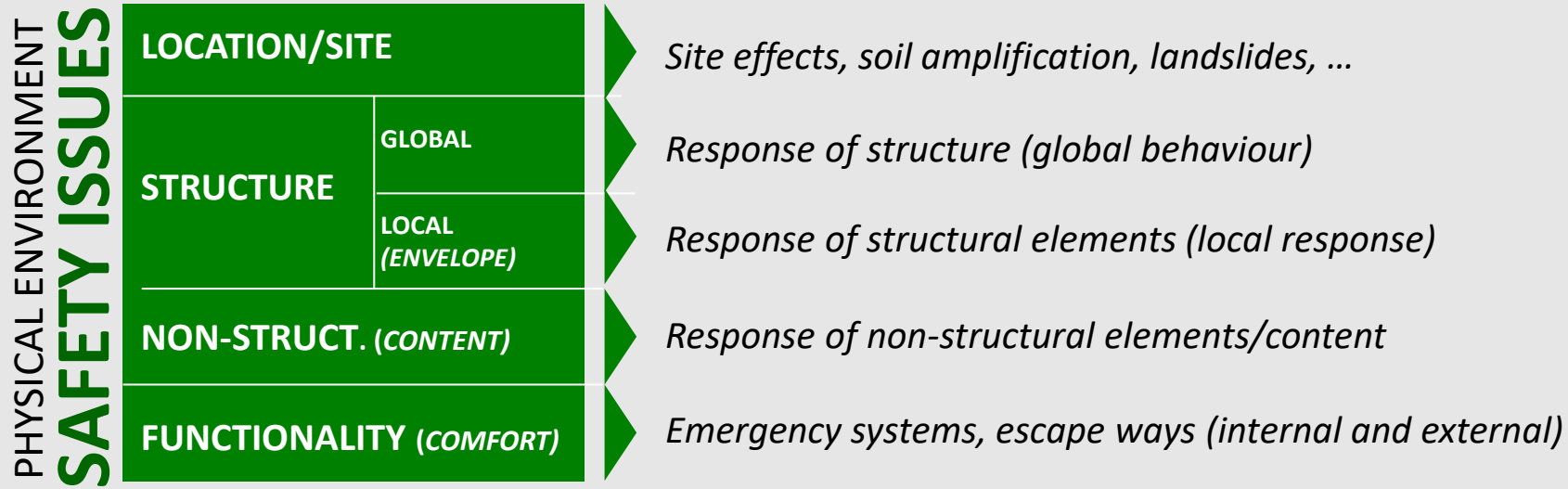
Main aspects to investigate and to assess

- Site
- Buildings
- Facilities
- Schoolyard





Life Safety assessment requires to consider every situation that can cause injuries or deaths as a consequence of an adverse event (earthquake, flood, fire, wind, incident).



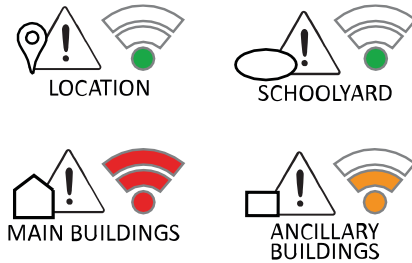
SAFETY ASSESSMENT IS A MULTIDIMENSIONAL PROBLEM

A SINGLE NUMBER OR INDICATOR IS NOT SUFFICIENT FOR AN EXHAUSTIVE SAFETY-CHARACTERIZATION

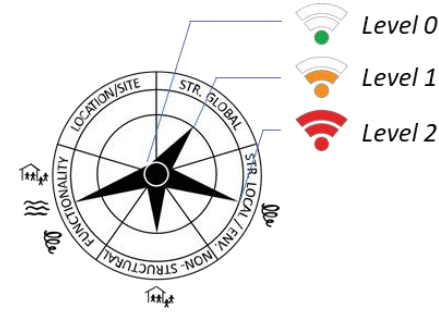
OUTCOMES

Safety situation

WHERE
Warning levels



WHAT (issue and cause)
Rose of intervention needs

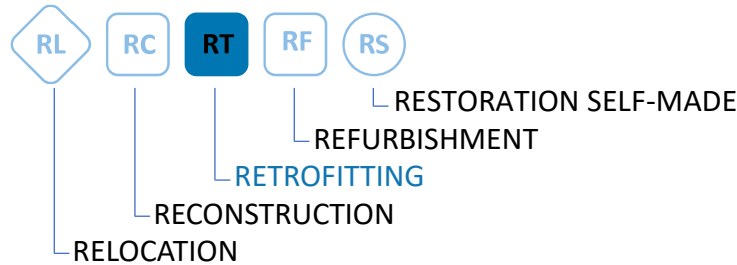


OVERALL MULTI-HAZARD SAFETY JUDGEMENT

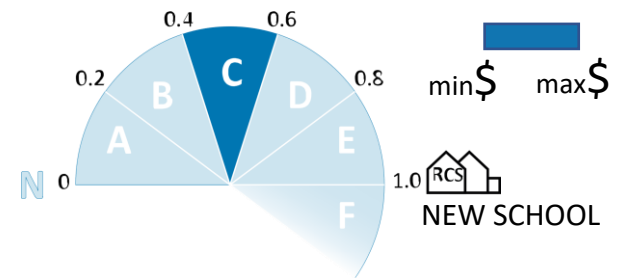


Safety upgrading needs

HOW (SUGGESTED)
Safety upgrading actions



HOW MUCH (PRELIMINARY ESTIMATION)
Budget allocation



Status



INFORMATION FOR



HOW



assesses the safety situation for all relevant hazards and ordinary use (**MULTI-HAZARD**)
EARTHQUAKE, WATER-RELATED, AIR-RELATED, FIRE, ORDINARY USE

VISUS METHODOLOGY



Visual Inspection for defining Safety Upgrading Strategies



evaluates the safety situation of a large number of learning facilities for the optimization of resources use (**TECHNICAL TRIAGE**)

takes into account the local characteristics of the country (**ADAPTATION**)



transfers the knowledge to local personnel (**TRAINING**)

acquires information through rapid **SURVEYS**

applies validated, uniform and rapid evaluations (**AUTOMATED** elaboration with **PRE-CODIFIED** algorithms)

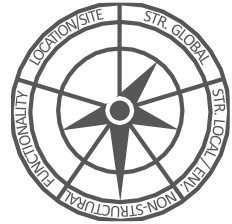
WHAT



WARNING LEVELS



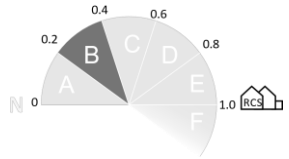
ROSE OF INTERVENTION NEEDS



SAFETY STARS



BUDGET ALLOCATION



WEB-MAPS



DATABASE



GRAPHICAL INDICATORS on safety situation, safety upgrading needs, school characteristics

INDIVIDUAL REPORTS comprising a technical description of outcomes for each school assessed

COLLECTIVE REPORT presenting an overview of the outcomes for all the schools assessed

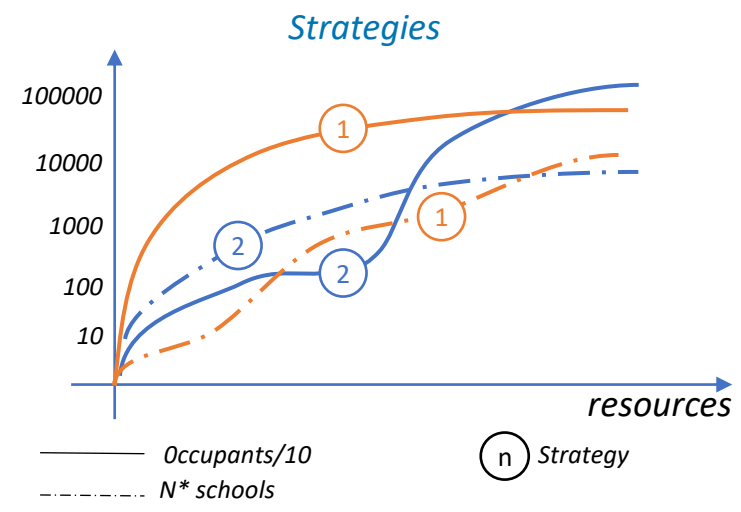
DATABASE with all the outcomes (school characteristics and general information, safety indicators, intervention and resources needs)

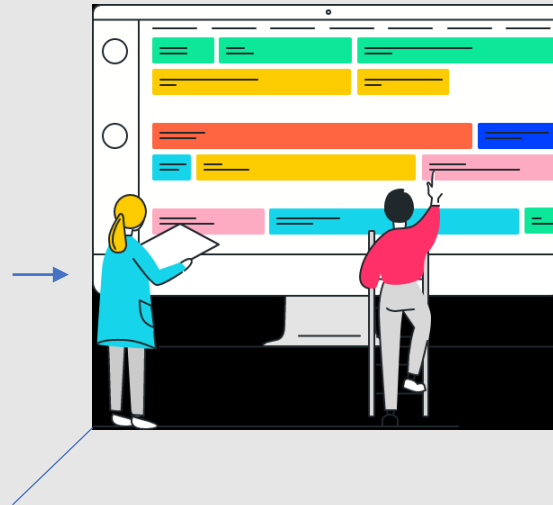
MAPS with the geolocation of each school and a summary of the outcomes



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

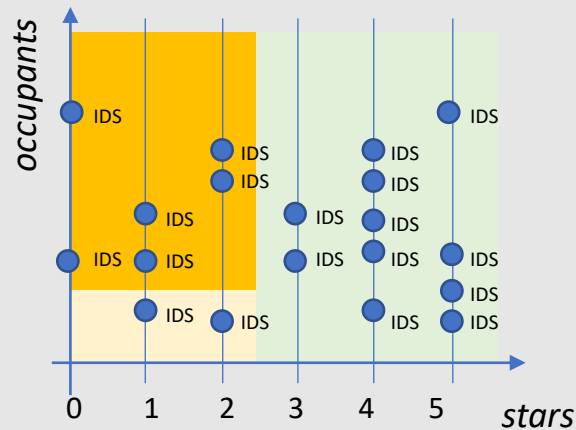
- prioritization by **exposure to a specific hazard** or multiple hazards (considering also the ordinary use)
- prioritization by **physical vulnerability**
- prioritization by **number of occupants**
- prioritization by **type of critical issue** identified (e.g. structural critical issue, non-structural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



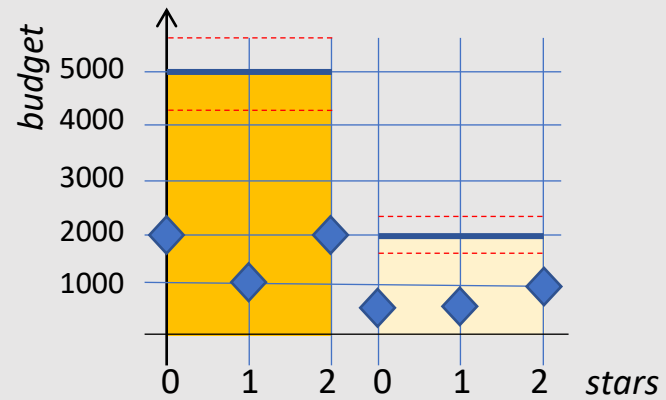


SCHOOL SAFETY
UPGRADING
ACTION PLAN

Defining priorities

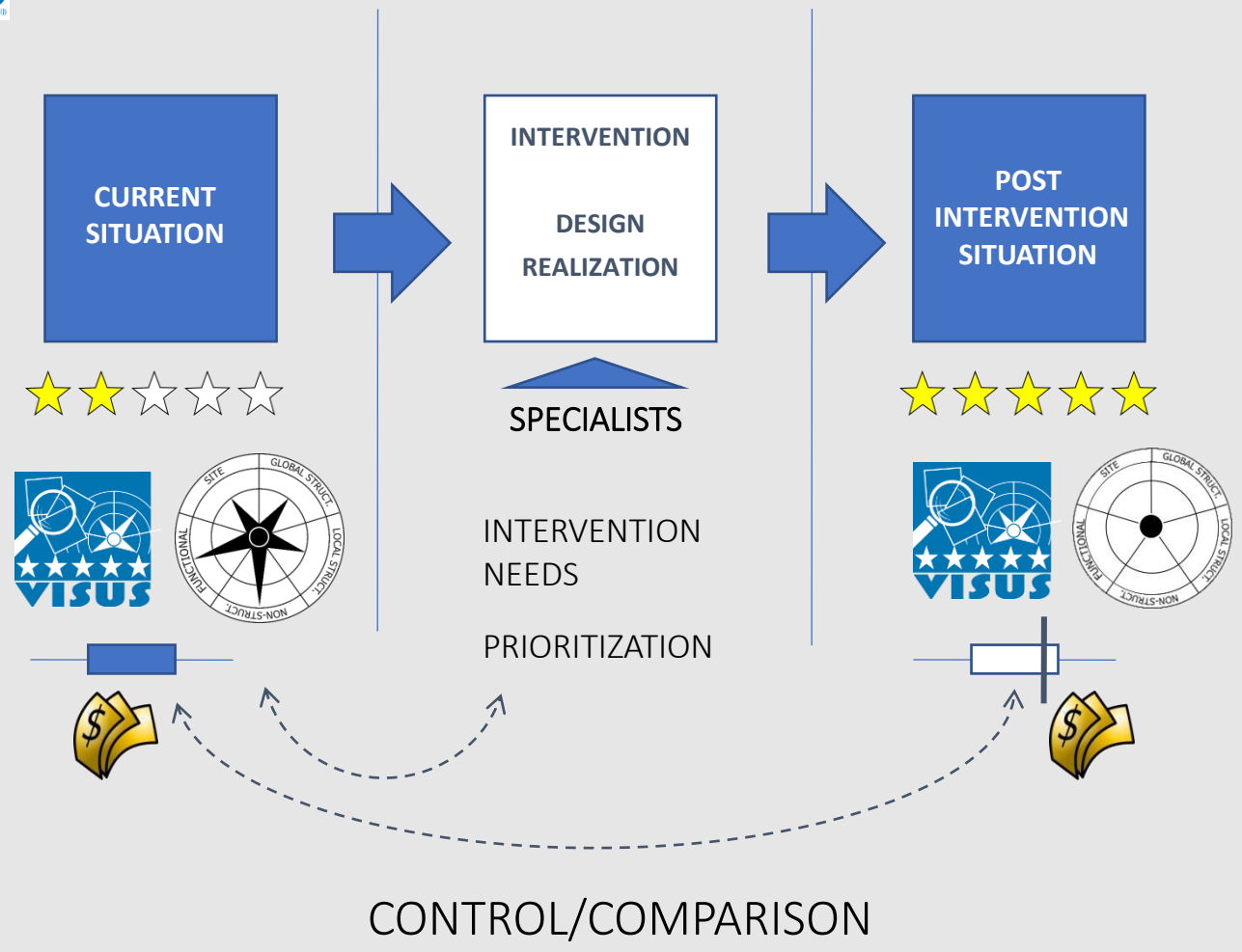


Defining and managing budget allocation





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





3

Understand how VISUS works

1

PREPARATION, with **ADAPTATION** of VISUS to local context and **TRAINING** of surveyors and local experts on VISUS

2

Execution of the **SURVEYS** and upload of data

3

Automated **ELABORATION** of the survey data through pre-codified algorithms

4

Automated creation of **REPORTS** and development to decision-makers





Preparation meeting



Training



Exercise

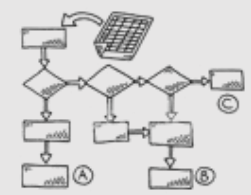


Survey



Data upload

AUTOMATED ELABORATION



Outcomes



Preparation

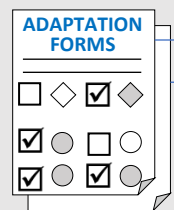
Steering committee



Local committee



ADAPTATION to local specificities



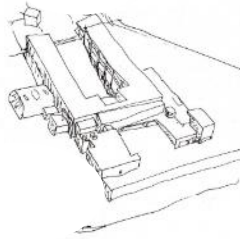
Training



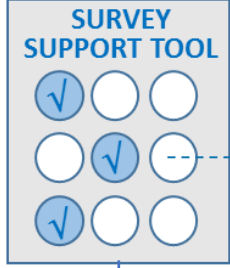
Training of local surveyors
(university students, technicians...)

Survey

SELF-MANAGED



VISUS TRAINED SURVEYORS



Graphical language



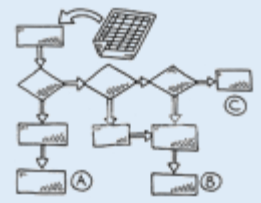
Elaboration

AUTOMATED



VISUS 'blue-box' software

based on pre-codified evaluation criteria



i-VISUS application

Outcomes

With the support of local committee
ADAPTATION TO LOCAL CHARACTERISTICS
of the country



Meeting with decision makers



Training of local surveyors (students and technicians)



On-site training

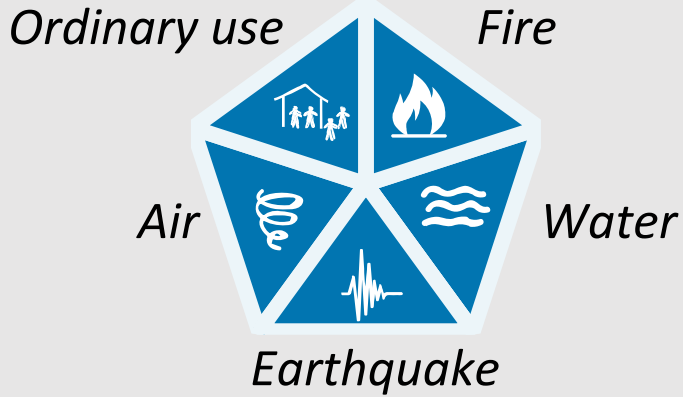


Learn-by-doing




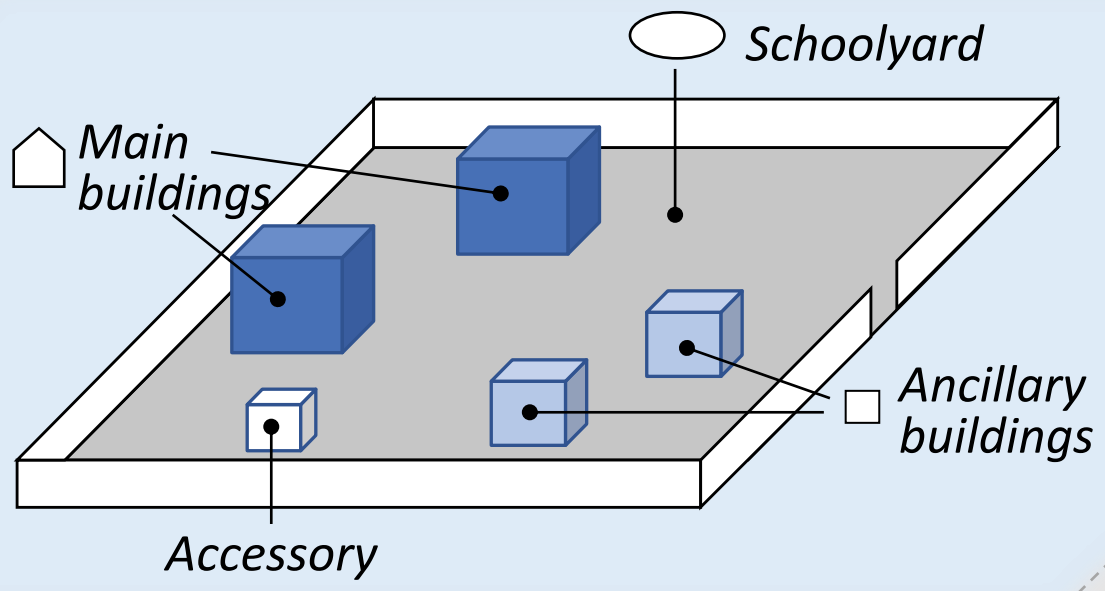
Items to survey

Multi-hazard



Components of physical environment

 School complex



 Location



PREPARATION

SURVEY

ELABORATION

PRE-SURVEY
DESK WORK

ON FIELD

POST-SURVEY
DESK WORK

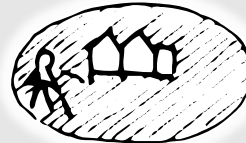
GENERAL
INFORMATION



LOCATION
SURVEY



SCHOOLYARD
SURVEY



BUILDING
EXTERNAL SURVEY



BUILDING
INTERNAL SURVEY



"GENERAL
INFORMATION" FORM

"SCHOOL SKETCH
AND NOTES" FORM

"LOCATION INSPECTION"
AND "SCHOOLYARD INSPECTION"
FORM

"BUILDING EXTERNAL
INSPECTION" FORM

"BUILDING INTERNAL
INSPECTION" FORM

Surveys execution

VISUS survey forms

For the school complex
(general information, location and schoolyard)

For each school building
(main and ancillary)

VISUS MULTI-HAZARD SURVEY GENERAL INFORMATION

SCHOOL INFORMATION

School name: _____

State/Country: _____ Province/District: _____

Address (Village no. 1): _____

Coordinate system: WGS 84 Other: _____ Latitude: _____ Longitude: _____

CONTACTS

Contact name: _____ Phone: _____

E-mail: _____ Fax: _____

SURVEY TEAM

Role	Name

USE OF THE SCHOOL

Type of school: Public Private

Weekly usage: Mon Tue Wed Thu Fri Sat Sun

Yearly usage: Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Grade levels taught: Pre-primary/Kindergarten Grade 1 Grade 2 Grade 3 Grade 4 Grade 5 Grade 6 Grade 7 Grade 8 Grade 9 Grade 10 Grade 11 Grade 12

People in the school: Male Female

Only during the day: Yes No

Day and night (admission): Day Night

VISUS MULTI-HAZARD SURVEY LOCATION INSPECTION

LOCATION INSPECTION

SCHOOL ID CODE: _____

Team: _____ Survey date: _____

GENERAL INFORMATION

1. SITE INFORMATION

1.1.1. SITE LOCATION: Urban Suburban Rural

1.1.2. SITE TYPE: Residential Commercial Industrial Institutional Public Private

1.1.3. SITE AREA: _____

1.1.4. SITE PERIMETER: _____

1.1.5. SITE ELEVATION: _____

1.1.6. SITE DRAINAGE: _____

1.1.7. SITE SURROUNDINGS: _____

1.1.8. SITE ACCESS: _____

1.1.9. SITE VISIBILITY: _____

1.1.10. SITE SECURITY: _____

1.1.11. SITE PROTECTION: _____

1.1.12. SITE EQUIPMENT/FACILITIES: _____

1.1.13. SITE UTILITIES: _____

1.1.14. SITE SERVICES: _____

1.1.15. SITE INFRASTRUCTURE: _____

1.1.16. SITE ENVIRONMENT: _____

1.1.17. SITE CLIMATE: _____

1.1.18. SITE SOIL: _____

1.1.19. SITE VEGETATION: _____

1.1.20. SITE WILDLIFE: _____

1.1.21. SITE AIR QUALITY: _____

1.1.22. SITE WATER QUALITY: _____

1.1.23. SITE NOISE: _____

1.1.24. SITE VIBRATION: _____

1.1.25. SITE LIGHTNING: _____

1.1.26. SITE WILDFIRE: _____

1.1.27. SITE TERRORISM: _____

1.1.28. SITE OTHER: _____

VISUS MULTI-HAZARD SURVEY SCHOOLYARD INSPECTION

SCHOOLYARD INSPECTION

ESTIMATED SCHOOLYARD AREA (m²): _____

GENERAL INFORMATION

2.1.1. SCHOOLYARD TYPE: Open Enclosed

2.1.2. SCHOOLYARD AREA: _____

2.1.3. SCHOOLYARD PERIMETER: _____

2.1.4. SCHOOLYARD ELEVATION: _____

2.1.5. SCHOOLYARD DRAINAGE: _____

2.1.6. SCHOOLYARD SURROUNDINGS: _____

2.1.7. SCHOOLYARD ACCESS: _____

2.1.8. SCHOOLYARD VISIBILITY: _____

2.1.9. SCHOOLYARD SECURITY: _____

2.1.10. SCHOOLYARD PROTECTION: _____

2.1.11. SCHOOLYARD EQUIPMENT/FACILITIES: _____

2.1.12. SCHOOLYARD UTILITIES: _____

2.1.13. SCHOOLYARD SERVICES: _____

2.1.14. SCHOOLYARD INFRASTRUCTURE: _____

2.1.15. SCHOOLYARD ENVIRONMENT: _____

2.1.16. SCHOOLYARD CLIMATE: _____

2.1.17. SCHOOLYARD SOIL: _____

2.1.18. SCHOOLYARD VEGETATION: _____

2.1.19. SCHOOLYARD WILDLIFE: _____

2.1.20. SCHOOLYARD AIR QUALITY: _____

2.1.21. SCHOOLYARD WATER QUALITY: _____

2.1.22. SCHOOLYARD NOISE: _____

2.1.23. SCHOOLYARD VIBRATION: _____

2.1.24. SCHOOLYARD LIGHTNING: _____

2.1.25. SCHOOLYARD WILDFIRE: _____

2.1.26. SCHOOLYARD TERRORISM: _____

2.1.27. SCHOOLYARD OTHER: _____

VISUS MULTI-HAZARD SURVEY BUILDING EXTERNAL INSPECTION

BUILDING EXTERNAL INSPECTION

BUILDING ID CODE: _____

SCHOOL ID CODE: _____

Team: _____ Survey date: _____

GENERAL INFORMATION

3.1.1. BUILDING TYPE: Residential Commercial Industrial Institutional Public Private

3.1.2. BUILDING AREA: _____

3.1.3. BUILDING PERIMETER: _____

3.1.4. BUILDING ELEVATION: _____

3.1.5. BUILDING DRAINAGE: _____

3.1.6. BUILDING SURROUNDINGS: _____

3.1.7. BUILDING ACCESS: _____

3.1.8. BUILDING VISIBILITY: _____

3.1.9. BUILDING SECURITY: _____

3.1.10. BUILDING PROTECTION: _____

3.1.11. BUILDING EQUIPMENT/FACILITIES: _____

3.1.12. BUILDING UTILITIES: _____

3.1.13. BUILDING SERVICES: _____

3.1.14. BUILDING INFRASTRUCTURE: _____

3.1.15. BUILDING ENVIRONMENT: _____

3.1.16. BUILDING CLIMATE: _____

3.1.17. BUILDING SOIL: _____

3.1.18. BUILDING VEGETATION: _____

3.1.19. BUILDING WILDLIFE: _____

3.1.20. BUILDING AIR QUALITY: _____

3.1.21. BUILDING WATER QUALITY: _____

3.1.22. BUILDING NOISE: _____

3.1.23. BUILDING VIBRATION: _____

3.1.24. BUILDING LIGHTNING: _____

3.1.25. BUILDING WILDFIRE: _____

3.1.26. BUILDING TERRORISM: _____

3.1.27. BUILDING OTHER: _____

VISUS MULTI-HAZARD SURVEY BUILDING INTERNAL INSPECTION

BUILDING INTERNAL INSPECTION

BUILDING ID CODE: _____

SCHOOL ID CODE: _____

Team: _____ Survey date: _____

GENERAL INFORMATION

4.1.1. BUILDING TYPE: Residential Commercial Industrial Institutional Public Private

4.1.2. BUILDING AREA: _____

4.1.3. BUILDING PERIMETER: _____

4.1.4. BUILDING ELEVATION: _____

4.1.5. BUILDING DRAINAGE: _____

4.1.6. BUILDING SURROUNDINGS: _____

4.1.7. BUILDING ACCESS: _____

4.1.8. BUILDING VISIBILITY: _____

4.1.9. BUILDING SECURITY: _____

4.1.10. BUILDING PROTECTION: _____

4.1.11. BUILDING EQUIPMENT/FACILITIES: _____

4.1.12. BUILDING UTILITIES: _____

4.1.13. BUILDING SERVICES: _____

4.1.14. BUILDING INFRASTRUCTURE: _____

4.1.15. BUILDING ENVIRONMENT: _____

4.1.16. BUILDING CLIMATE: _____

4.1.17. BUILDING SOIL: _____

4.1.18. BUILDING VEGETATION: _____

4.1.19. BUILDING WILDLIFE: _____

4.1.20. BUILDING AIR QUALITY: _____

4.1.21. BUILDING WATER QUALITY: _____

4.1.22. BUILDING NOISE: _____

4.1.23. BUILDING VIBRATION: _____

4.1.24. BUILDING LIGHTNING: _____

4.1.25. BUILDING WILDFIRE: _____

4.1.26. BUILDING TERRORISM: _____

4.1.27. BUILDING OTHER: _____

Graphical language VISUS OBS

The icons represent lightning, protection, and defense, which are key themes in the VISUS hazard survey forms.



FORMS AND PICTURES DIRECTLY BY THE TABLET

TO MAKE EASIER AND FASTER THE SURVEY



To reduce COST/BENEFITS (time consuming)
Taking into account the experience of Pilot projects

VIDEO WITH EXAMPLE OF i-VISUS DATA COMPILATION



On cloud



Local

For making surveys

Version for:

- **supporting** the survey of schools,
- **collecting pictures** associated to the OBS,
- **uploading** the data to the VISUS cloud and database

Adaptation values are **defined** for each project

Data should be **validated** before the final evaluation of outcomes

For capacity building

Version for:

- **testing** how the methodology works,
- becoming **familiar** with the use of the forms,
- **understand** how different parameters could **affect the outcomes** and their **importance**

Adaptation values can be **modified** to test their effects

Data are **not uploaded** on the VISUS database

VISUS evaluation

Safety situation

Safety upgrading needs

Status

Safety evaluations

Safety evaluations

- Location:
- Schoolyard:
- Main buildings:
- Ancillary buildings:

Distribution of buildings considering the Warning Levels

Main buildings:

Ancillary buildings:

Warning roses envelope

MAIN BUILDINGS AND SCHOOLYARD

HAZARDS ASSOCIATED TO NEEDS:

STRUCTURAL GLOBAL: W, E
NON-STRUCTURAL: E
FUNCTIONALITY: W, U, F, E

ANCILLARY BUILDINGS

HAZARDS ASSOCIATED TO NEEDS:

STRUCTURAL GLOBAL: W
NON-STRUCTURAL: W
FUNCTIONALITY: W

VISUS multi-hazard safety stars

SUMMARY OF OUTCOMES FOR EACH LEARNING FACILITY

Complementary evaluations

- Accessibility: Partially accessible
- Water and Sanitation: Good
- Maintenance: Basic
- Content and Equipment: Poor
- Comfort: Basic
- Security: Controlled access

safety upgrading actions

- Location: n No action
- Schoolyard: s Self action
- Main buildings:
- Ancillary buildings:

Upgrading Financial Commitment (UFC)

UFC index: 0.34

Budget allocation
239 - 478 K\$

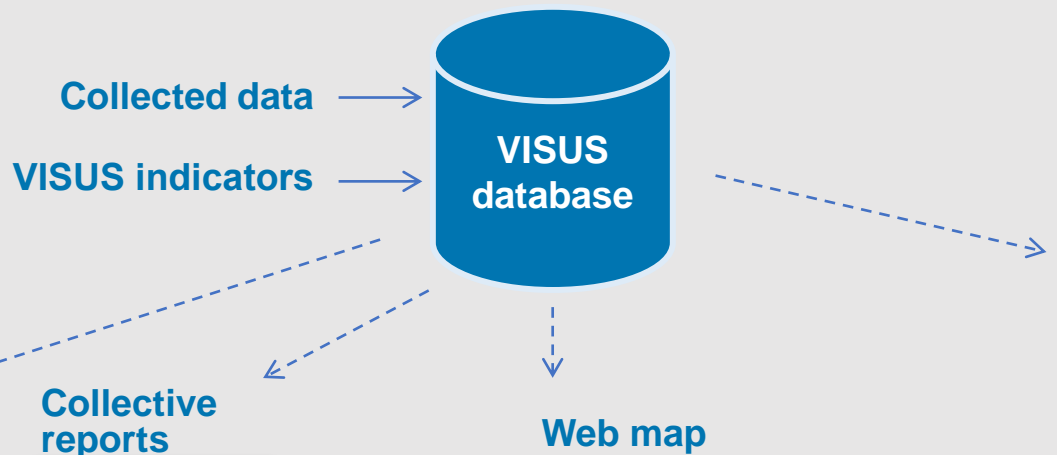
Category	Distribution Considering the Building Area	Distribution Considering the Building Number	Distribution Considering the Classrooms
Main buildings	n: 394 l: 156 h: 98	n: 2 l: 1 h: 1	n: 4 l: 1 h: 2
	Distribution considering the building area		
	Distribution considering the building number		
Ancillary buildings	Distribution considering the building area		
	Distribution considering the building number		



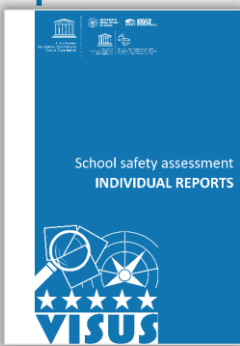
AVAILABILITY OF THE ASSESSMENT RESULTS through:

DATABASE

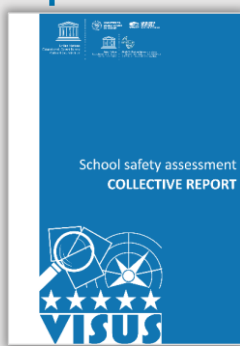
with all the outcomes (school characteristics and general information, safety indicators, intervention and resources needs)



Individual reports



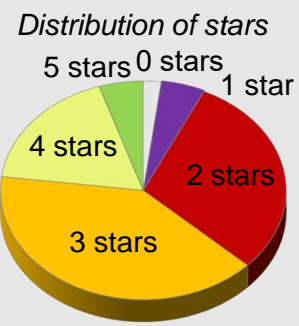
Collective reports



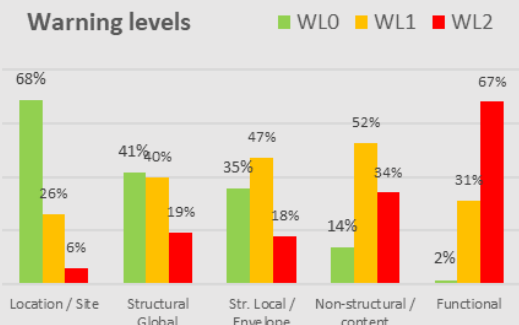
Web map



Statistics



Distribution of warning levels



NAME OF THE SCHOOL

SCHOOL IDENTIFICATION

SCHOOL NAME

Country: Indonesia
Province, district: MALUKU
Address: ADDRESS HERE

LOCATION

COORDINATES
LATITUDE: 123456
LONGITUDE: 123456
ALTITUDE: m

CONTEXT

SCHOOLYARD AND SCHOOL BUILDINGS

TOTAL NUMBER	7	TOTAL AREA	526 m ²
MAIN BUILDINGS	2		300 m ²
ANCILLARY BUILDINGS	5		226 m ²
CLASSROOMS	7		
SCHOOLYARD AREA			3225 m ²

TOILETS (NUMBER): 1

PEOPLE IN THE SCHOOL: STUDENTS 151, TEACHER 13, OTHER 1

EDUCATIONAL TYPOLOGY

OWNER

USAGE

SPECIFIC VALUES / FUNCTIONS

BUILDING TYPES

MULTI-HAZARD EVALUATIONS

REFERENCE HAZARDS

EARLY WARNING

VISUS SAFETY INDICATORS - FOR REFERENCE HAZARDS

SAFETY EVALUATIONS

WARNING ROSES - ENVELOPE

VISUS MULTI-HAZARD SAFETY STARS

COMPLEMENTARY EVALUATIONS

SAFETY UPGRADING ACTIONS

SAFETY UPGRADING REQUIREMENTS

CONSTRUCTOR-SITE INCREASE FACTORS

INDONESIA PILOT PROJECT Survey: 08/08/2016 SCHOOL ID p.1

NAME OF THE SCHOOL

B01 MAIN BUILDINGS

BUILDING TYPE

GEOMETRY AND DIMENSIONS

VERTICAL STRUCTURAL MATERIAL AND SYSTEM

ROOF STRUCTURE

ROOF COVERING

INDICATORS: WARNING ROSES AND SAFETY STARS

USE

EVALUATIONS

MAINTENANCE

ACCESSIBILITY

COMFORT

SECURITY

CONTENT/EQUIPMENT

STRATIFICATION PROFILE: PROFILE QUALIFIERS (PQs)

INDONESIA PILOT PROJECT Survey: 08/08/2016 SCHOOL ID p.4

Photo reportage Critical situations

NAME OF THE SCHOOL

B01 PICTURES REPORTAGE

INDONESIA PILOT PROJECT Survey: 08/08/2016 SCHOOL ID p.5

School characteristics Summary of evaluations

Specific evaluations

COLLECTIVE REPORTS

MAPS (WEB MAPS)

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

summary panels

statistics

SCHOOL ID	
Name	School name
Number of main buildin...	3
Number of ancillary bui...	3
People in the school	1002
Stars - Multihazard	●●○○○
Stars - Ordinary use	●●●○○
Stars - Fire hazard	●●●○○
Stars - Water hazard	●●●○○
Stars - Earthquake haz...	●●●○○
Stars - Air hazard	●●●○○
Intensity of Upgradin...	34.0
Budget allocation	171 - 419
latitude	123456789
longitude	123456789
Link to report	http://sprint.uniud.it/sites/default/f



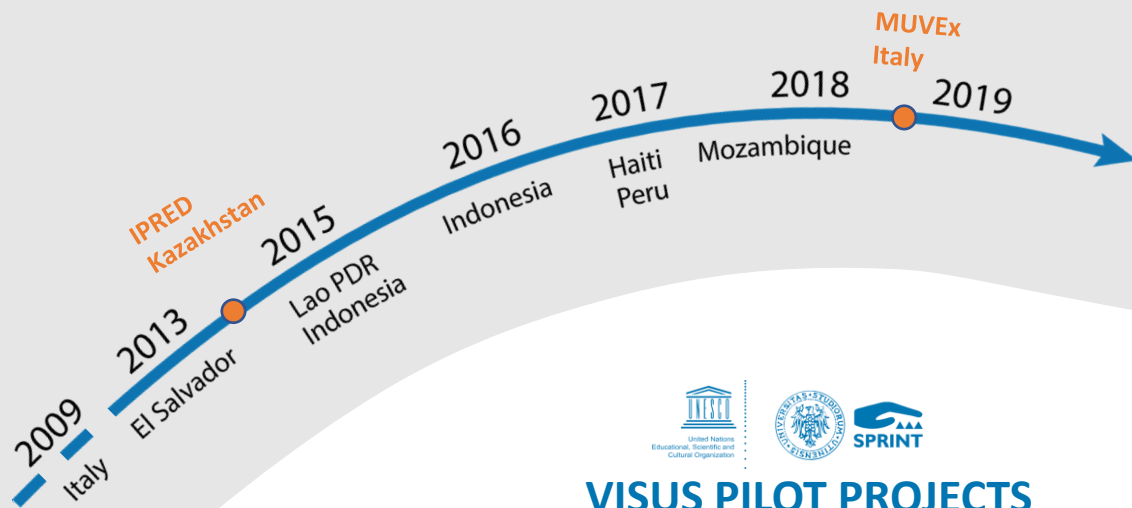
4

Overview of worldwide VISUS pilot projects

Worldwide pilot projects
How VISUS outcomes can support DM



GUIDELINES: the result of worldwide pilot projects and scientific revisions



VISUS PILOT PROJECTS



Seismic



Italy
El Salvador

Multi-hazard



Indonesia
Laos
Peru
Haiti
Mozambique



The following outcomes were achieved from the implementation of this project:

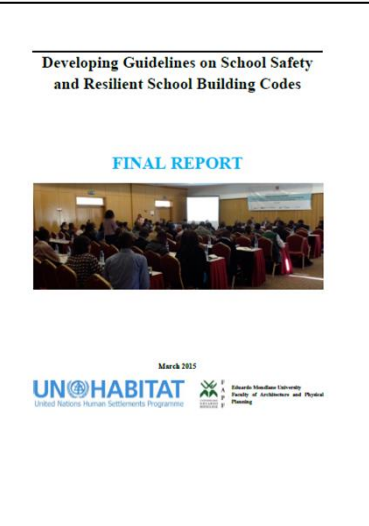
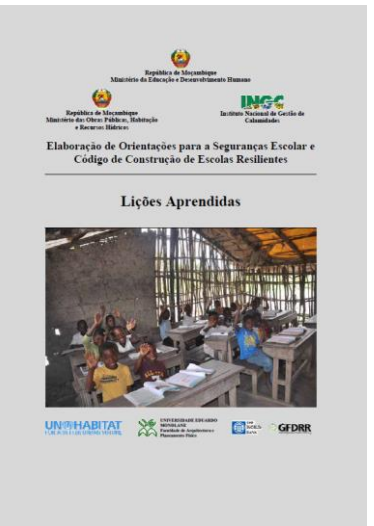
- ❖ Training of 30 decision-makers;
- ❖ Training of 40 trainers to build capacities locally and ensure the sustainability of the project on the long run;
- ❖ Training of 45 surveyors and their;
- ❖ Multi-hazard school safety assessments in 100 schools in the province of Maputo;
- ❖ 869 School buildings assessed;
- ❖ Development of a collective report and 100 individual reports as outputs of this project.

Typologies

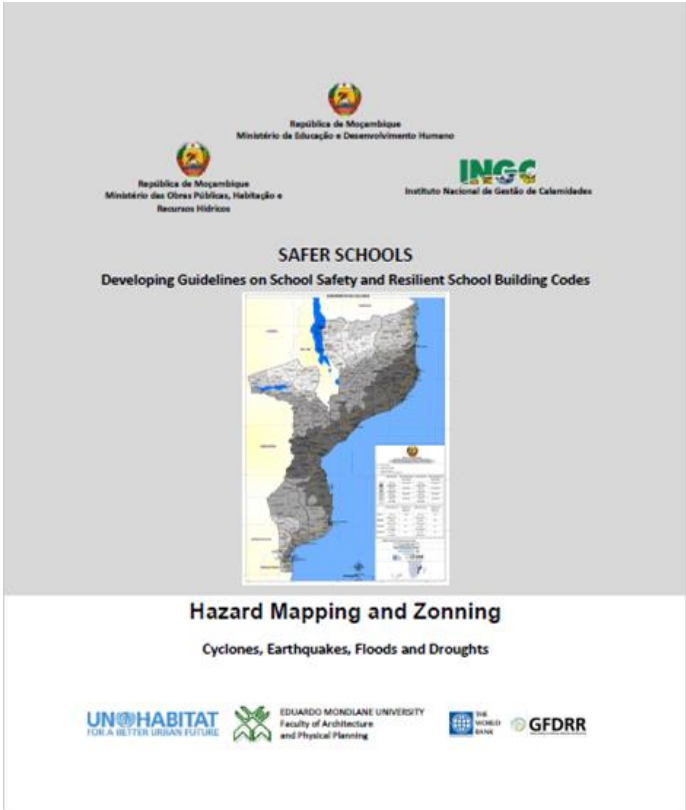


SAFER SCHOOLS
Developing Guidelines on School Safety and Resilient School Building Codes

DIAGNOSIS & RECOMMENDATIONS
Executive Summary

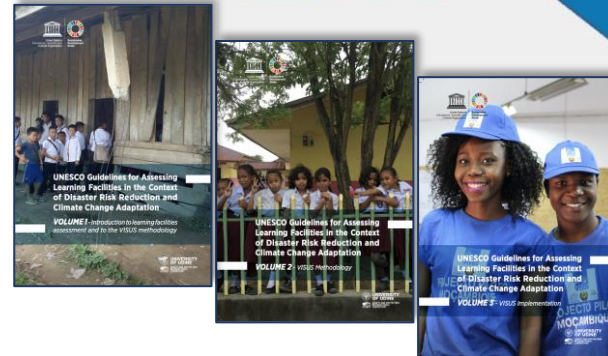
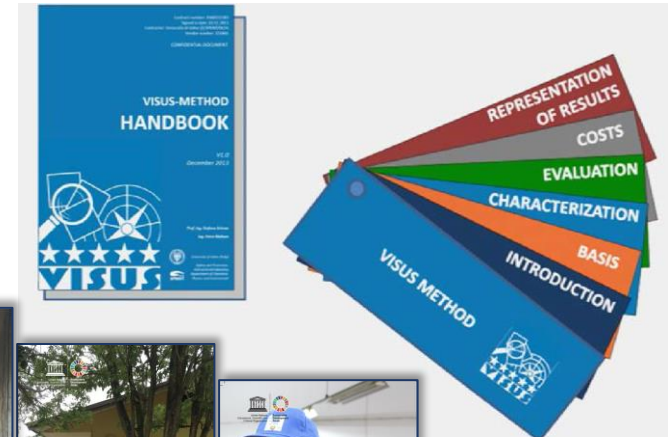
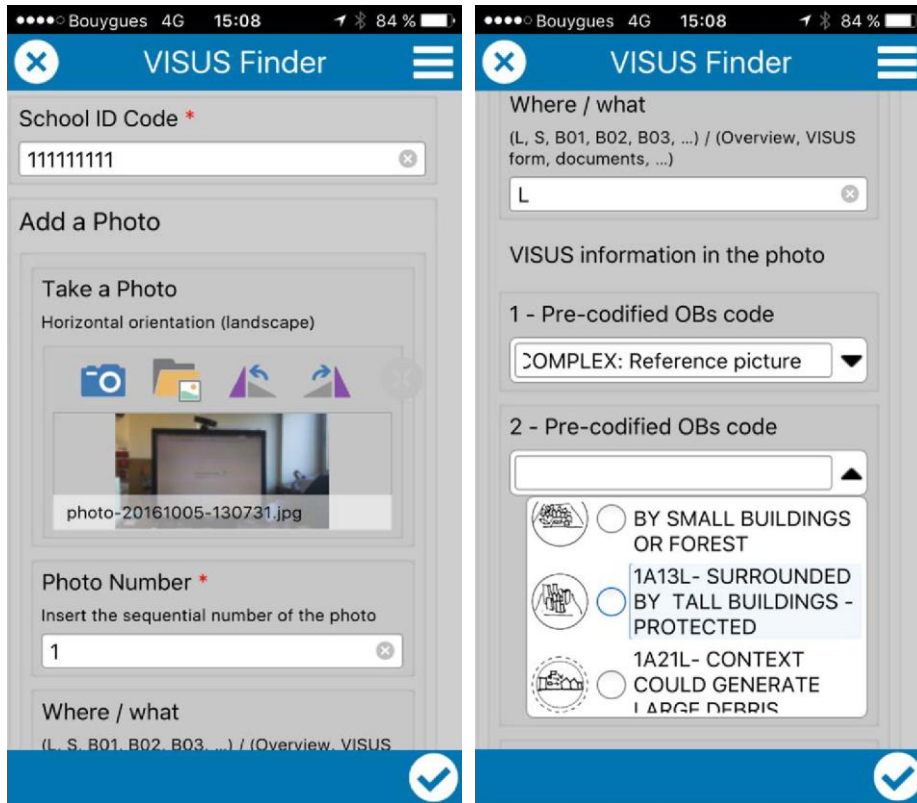


Hazards



Adaptation

Development of materials and tools for the implementation of VISUS including the development of a mobile application adapted for the particularities of the country





Training workshop for decision-makers

Held on 22 November 2017, the meeting saw the participation of 30 decision-makers



Training for trainers

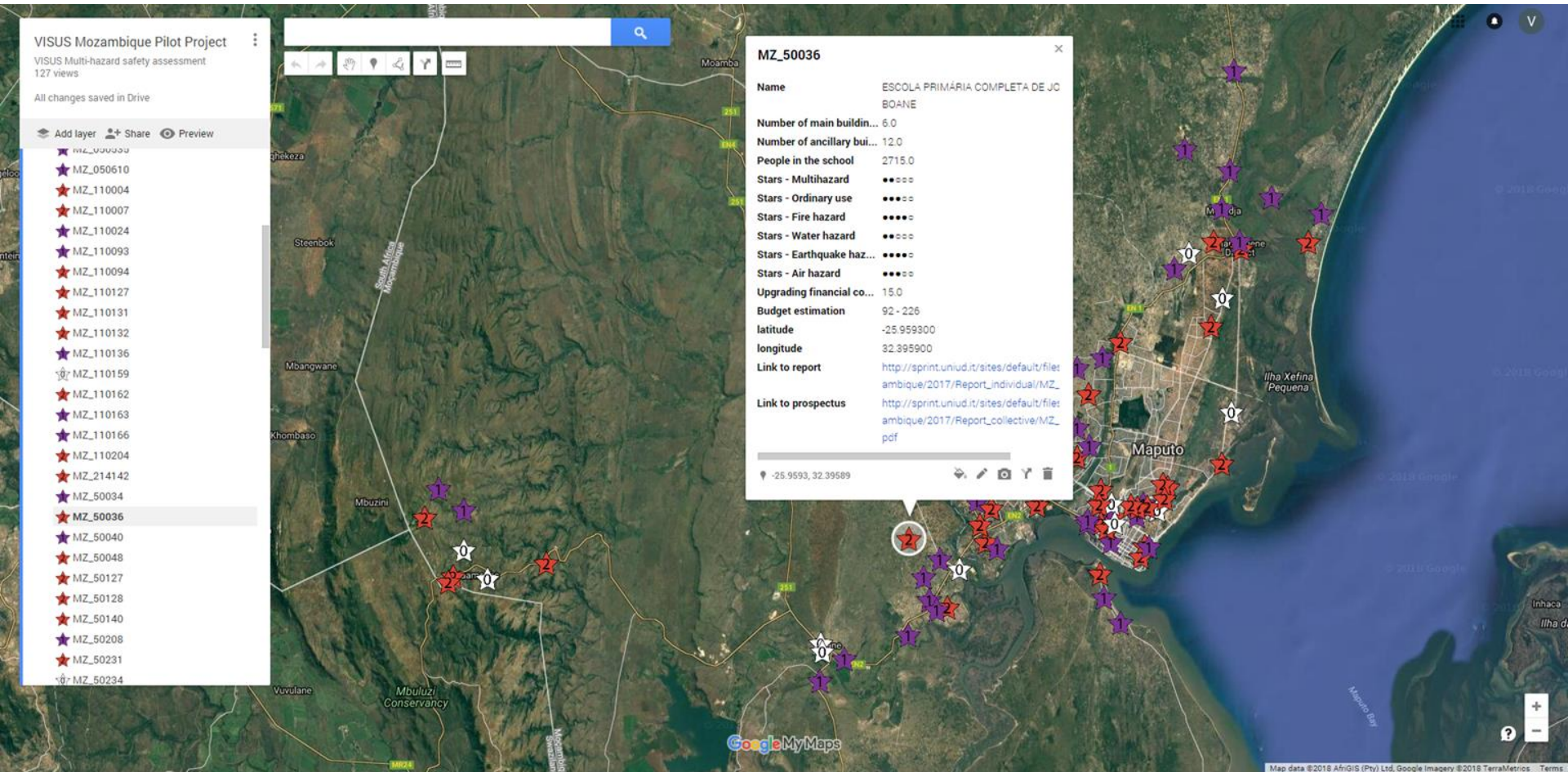
40 participants attended the training workshop for trainers from 23 to 24 November 2017




Training workshop for surveyors

Assessment

The training was attended by 30 final-year students. Out of these trained surveyors, the 21 best performers were chosen for the fieldwork






ESCOLA PRIMÁRIA COMPLETA 4 DE OUTUBRO

MAIN BUILDINGS

B01



BUILDING TYPE

PERMANENT SEMI PERMANENT NON PERMANENT

CONSTRUCTION DATE: 1994
STANDARD: REGU

GEOMETRY AND DIMENSIONS

PLAN SHAPE: SIMPLE, ELONGATED
ELEVATION SHAPE: SIMPLE

NUMBER OF FLOORS ABOVE AND UNDERGROUND: 1 / 0

NUMBER OF STRUCTURAL UNITS: 1
AREA (m²): 165

VERTICAL STRUCTURAL MATERIAL AND SYSTEM R.C. VERTICAL FEES ONLY

ROOF STRUCTURE STEEL STRUCTURE

ROOF COVERING TILES OR PIECES (SHARP)


UTILIZATION

CLASSROOMS MALE TOILETS OFFICES KITCHEN GYM LIBRARY STORAGE OTHER USES UNUSED UNDER CONSTRUCTION

FEMALE TOILETS LABORATORY CANTEN AUDITORIUM ARCHIVE BEDROOMS TECHNICAL ROOM

VISUS SAFETY INDICATORS: WARNING ROSES AND SAFETY STARS


ORDINARY USE
Normal conditions



☆☆☆☆☆
Action

LIGHT INTERVENTIONS


FIRE



☆☆☆☆☆
Action

NO ACTION REQUIRED


WATER
0.3-1.0 m



☆☆☆☆☆
Action

LIGHT INTERVENTIONS


EARTHQUAKE
PGA 0.15-0.20 g



☆☆☆☆☆
Action

LIGHT INTERVENTIONS


Air
V 88-117 km/h



☆☆☆☆☆
Action

LIGHT INTERVENTIONS

MULTI-HAZARD




☆☆☆☆☆
Action

MODERATE INTERVENTIONS


COMPLEMENTARY EVALUATIONS

WATER & SANITATION




POOR

MAINTENANCE




POOR

ACCESSIBILITY




ACCESSIBLE

COMFORT




POOR

SECURITY



LIMITED ACCESS


CONTENT/EQUIPMENT



POOR

VISUS CHARACTERIZATION PROFILE: PROFILE QUALIFIERS (PQs)


SALUBRITY	ASPECT	ASPECT	ASPECT
PROBABILITY OF OCCURRENCE WITH POTENTIAL CONSEQUENCES ON HEALTH	SAFETY FROM BUILDING	PROTECT FROM BUILDING WITH POTENTIAL EMPLOYMENT SITUATIONS	
TRIGGER / SOURCE	DIRECT-TO-RISK SCENARIO	DIRECT-TO-RISK SCENARIO	INDIRECT-TO-RISK SCENARIO
NO REGULATING RESOURCES	PREPARED TO FUTURE (FACILE MANEUVRE)	PREPARED TO FUTURE (FACILE MANEUVRE)	PREPARED TO FUTURE (FACILE MANEUVRE)
HAZARD INTENSITY	HAZARD INTENSITY	HAZARD INTENSITY	HAZARD INTENSITY
WATER DEPTH	WATER VELOCITY	NO PROTECTION	MODERATE ACTION
UNDERMINING	LOCAL STRESS	ASPECT	ASPECT
UNDERMINING NOT UNDERWAY	LOCAL STRESS UNDERMINATION	SAFE PATH TO SAFE ZONE	
HAZARD INTENSITY	HAZARD INTENSITY	HAZARD INTENSITY	HAZARD INTENSITY
MODERATE HAZARD	REFERENCE CLASS	REGULAR PERFORMANCE BEHAVIOUR	REGULAR PERFORMANCE BEHAVIOUR
LOCAL CRITICAL ISSUES	POTENTIAL RISK OF ELEMENTS	ASPECT	ASPECT
NO LOCAL CRITICAL ISSUES	NO CRITICAL ISSUES	NO CRITICAL ISSUES	NO CRITICAL ISSUES
HAZARD INTENSITY	HAZARD INTENSITY	HAZARD INTENSITY	HAZARD INTENSITY
MODERATE HAZARD	REFERENCE CLASS	MODERATE CLASS	MODERATE CLASS
LOCAL CRITICAL ISSUES	POTENTIAL RISK OF ELEMENTS	ASPECT	ASPECT
NO LOCAL CRITICAL ISSUES	NO CRITICAL ISSUES	NO CRITICAL ISSUES	NO CRITICAL ISSUES




ESCOLA PRIMÁRIA COMPLETA 4 DE OUTUBRO

PICTURES REPORTAGE


B01




Obs: Representative picture of the building, moderate to poor structure, permanent building, main building, shallow foundation.
PQs:




Obs: Overview of the building
PQs:




Obs: Overview of the building
PQs:




Obs: moderate amount of upholstered or plastic-based furniture.
PQs:




Obs: multiple exits from the building, unsecured egress.
PQs:




Obs: (Steel/wood) steel, wood structure.
PQs:




Obs: Tilted ceiling.
PQs:




Obs: STRUCT. COLUMN.
PQs:




Obs: no openings in enclosed openings (e.g. shutters).
PQs:




Obs: roof of veranda is extension of main roof, steel structure.
PQs:




Obs: moderate amount of fabric or wood-based furniture, portions of usable elements, heavy conspicuous, regular furniture, multi-structural equipment.
PQs:




Obs: curtains, shutters or dawning on the window, some insulation system.
PQs:




Obs: Fan.
PQs:




Obs: power unit.
PQs:




Obs: Box and kit.
PQs:




Obs: electricity and light fixture.
PQs:




Obs: washing machine.
PQs:



Obs: poor maintenance.
PQs:



Obs: floor in room.
PQs:



Obs: low light fixture of usable elements, heavy conspicuous.
PQs:



Strengthening Mozambique's Capacities for Assessing School Facilities

COLLECTIVE REPORT

VISUS

Status

Tag	Name	Description	Evaluations
♿	Accessibility	Set of characteristics of the school complex referring to the possibility to reach, approach and gain access to it.	Very good Good Satisfactory Poor Very poor
💧	Water & sanitation	Water and sanitation facilities available in the school complex, including toilet facilities and drinking water access points.	Very good Good Satisfactory Poor Very poor
🔧	Maintenance	Set of activities performed to preserve and conserve the original condition of the buildings and other assets that are part of the school complex.	Very good Good Satisfactory Poor Very poor
📚	Content/equipment	Set of tools, materials and other physical resources which are stored within the school complex for different usage and purposes.	Very good Good Satisfactory Poor Very poor
🏠	Comfort	Set of characteristics of the school complex which contribute to making users at ease and facilitate school accessibility and usage.	Very good Good Satisfactory Poor Very poor
🛡️	Security	Set of characteristics of the school complex referring to personal and structural safety of all personnel operating on site and of the school complex.	Very good Good Satisfactory Poor Very poor

VISUS Multi-hazard assessment

Safety warning evaluations

Tag	Description	Tag	Description
📍	Safety warning for location	🟢	Absence of concerns for personal safety
🏫	Safety warning for schoolyard	⚠️	Potentially difficult situations for personal safety
🏠	Safety warning for main buildings	🚫	Potentially heavy consequences for personal safety
🏢	Safety warning for ancillary buildings	🚫	Potentially heavy consequences for personal safety

VISUS warning rose

Multi-hazard VISUS safety stars

VISUS multi-hazard safety stars provide a quick overview of the level of safety of each school facility or school complex. Each star is five-pointed and is assigned when the school is safe against all hazards. The stars are partially colored when the school is safe against selected hazards.

Meaning of the assigned number of stars

- ☆☆☆☆☆ Unsuitable site
- ☆☆☆☆ Suitable site
- ☆☆☆☆ Stability of the building
- ☆☆☆☆ Life safeguard
- ☆☆☆☆ Rapid resume of operations
- ☆☆☆☆ Immediately operational

ID	SCHOOL CHARACTERISTICS	STATUS	VISUS MULTI-HAZARD ASSESSMENT	SAFETY UPGRADING ACTIONS	BUDGET ALLOCATION
XXXXXXX	<p>SCHOOLYARD AREA: 9420 m²</p> <p>MAIN BUILDINGS: 2442 m²</p> <p>ANCILLARY BUILDINGS: 0 m²</p> <p>CLASSROOMS: 16</p> <p>PEOPLE IN THE SCHOOL: 808</p>	<p>NOT ACCESSIBLE</p> <p>POOR</p> <p>POOR</p> <p>POOR</p> <p>POOR</p> <p>LIMITED ACCESS</p>	<p>LOCATION</p> <p>SCHOOLYARD</p> <p>MAIN BUILDINGS</p> <p>ANCILLARY BUILDINGS</p> <p>Overall assigned multi-hazard stars: 1</p>	<p>EXTERNAL INTERVENTION</p> <p>UPGRADED SITUATION</p> <p>LEGEND: NO ACTION REQUIRED, SELF INTERVENTIONS, LIGHT INTERVENTIONS, MODERATE INTERVENTIONS, HEAVY INTERVENTIONS, RECONSTRUCTION, EXTERNAL INTERVENTIONS</p>	<p>INDEX: 1.27</p> <p>CLASS: F</p> <p>ESTIMATED RANGE: 448-547 K\$</p>
XX:XXXX	<p>SCHOOLYARD AREA: 1250 m²</p> <p>MAIN BUILDINGS: 1040 m²</p> <p>ANCILLARY BUILDINGS: 197 m²</p> <p>CLASSROOMS: 7</p> <p>PEOPLE IN THE SCHOOL: 260</p>	<p>NOT ACCESSIBLE</p> <p>POOR</p> <p>BASIC</p> <p>POOR</p> <p>BASIC</p> <p>LIMITED ACCESS</p>	<p>LOCATION</p> <p>SCHOOLYARD</p> <p>MAIN BUILDINGS</p> <p>ANCILLARY BUILDINGS</p> <p>Overall assigned multi-hazard stars: 3</p>	<p>EXTERNAL INTERVENTION</p> <p>LOCALIZED</p> <p>UPGRADED SITUATION</p> <p>LEGEND: NO ACTION REQUIRED, SELF INTERVENTIONS, LIGHT INTERVENTIONS, MODERATE INTERVENTIONS, HEAVY INTERVENTIONS, RECONSTRUCTION, EXTERNAL INTERVENTIONS</p>	<p>INDEX: 0.28</p> <p>CLASS: B</p> <p>ESTIMATED RANGE: 42-51 K\$</p>

Typical school building construction



Ordinary use becomes one of the most common problems in schools.



The main observed weakness of the surveyed buildings is their low structural capacity.



Some local structural problems occur at the roof structures.



The surveys revealed the presence of structural and non-structural elements which could danger students (e.g. by falling or collapsing) due to their instable conditions;



Presence of asbestos in several schools



Fire protection can be easily achieved.



Strong wind can cause severe damage, especially to roof cover, due to the bad connections to the roof structures.



Floods can reach until 2 meters of the walls of the school and more.



External interventions as mentioned before (drainage, gutters, etc.) can reduce the impact of floods during rainy seasons.

- Launch a national programme for school assessment.
- Implement a prioritization plan for rehabilitation, retrofitting or replacing unsafe schools (including relocation).
- Reinforce the national database of schools with a more detailed information on safety vulnerabilities
- Create a database on the typical damages caused after the impact of natural and technological hazards events.
- Support academic studies from research institutions that will help on improving the adaptation of the methodology to particular local conditions.
- Improve information on costs details (i.e. database of local cost of interventions).
- Plan for continuous monitoring, financing, and oversight for ongoing facilities maintenance and safety.
- Involve parents and communities.

Worldwide institutions involved on the revision and improvement of the methodology



INVOLVED INSTITUTIONS

- 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)
- UNESCO IICBA (Ethiopia)
- UNESCO-IHE (The Netherlands)
- University of Ljubljana (Slovenia) – UNESCO'S Chair
- United Nations Environment Programme (UNEP)
- United Nations Office for the Coordination of Humanitarian Affairs (OCHA)
- UNICEF
- Save the Children

VISUS COMING PILOT PROJECTS AND SCALING UP PROGRAMMES UNDER NEGOTIATION AND READY FOR IMPLEMENTATION



Coming Projects

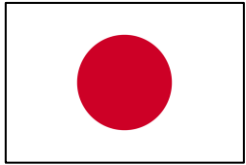
- Dominican Republic
- Panama
- Costa Rica
- Argentina
- Ecuador
- Syria
- Saudi Arabia
- Bosnia
- Afghanistan
- Gambia

Jamaica

Scaling-up

- Peru
- Haiti
- El Salvador
- Indonesia
- Mozambique

THANKS to our supporters



(In the framework of the UNESCO-IPRED Platform)



United Nations
Educational, Scientific and
Cultural Organization



Indonesian
Fund-in-Trust



Humanitarian Aid
and Civil Protection



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



GFDRR
Global Facility for Disaster Reduction and Recovery



Save the Children



1) Worldwide implementation through GADRRRES's Members Field Offices and with the Scientific Support of the UNESCO's Chair (SPRINT-Lab, University of Udine)

21,581	Learning facilities to be assessed (prioritizing those belonging to the Associated Schools Network (ASPnet) and those located in UNESCO's Biosphere Reserves, Global Geoparks and World Heritage Sites)
416	National and local universities and vocational institutes to be involved
10x2	Regional trainings for decision-makers to be held
20	Regional technical trainings for trainers to be held
416	National trainings of surveyors to be held
193	UNESCO Member States involved (plus the 11 Associated Members of UNESCO)

2) Development of a platform for automatic reporting

3) Continues improvement of the methodology through MUVEx and country implementation

4) Global report on the status of learning facilities worldwide



5

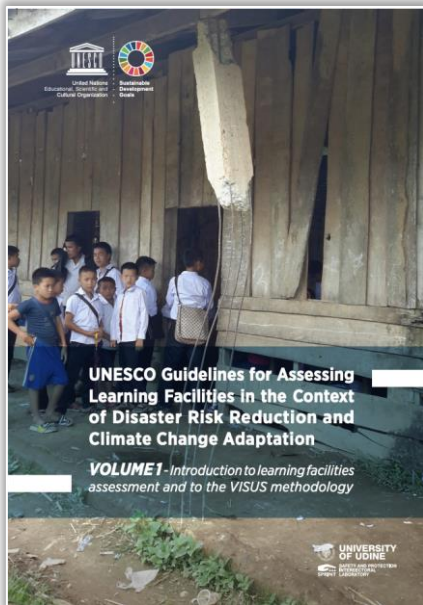
Final discussion

THANK YOU!

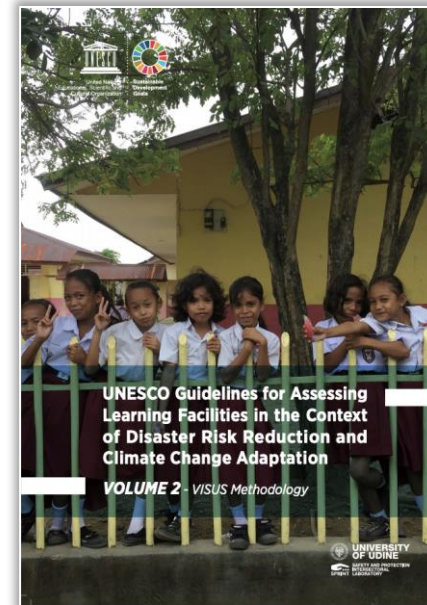
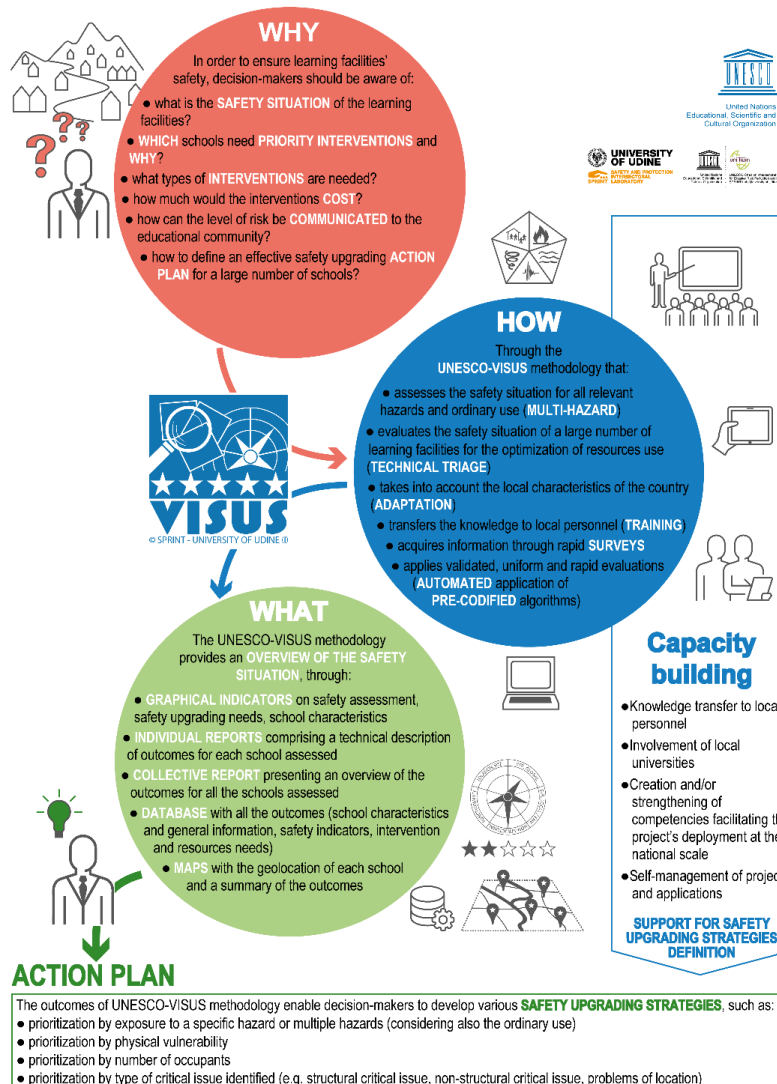
WE ARE ON THE FIELD
READY TO PLAY OUR ROLE

Looking forward
to receive your comments



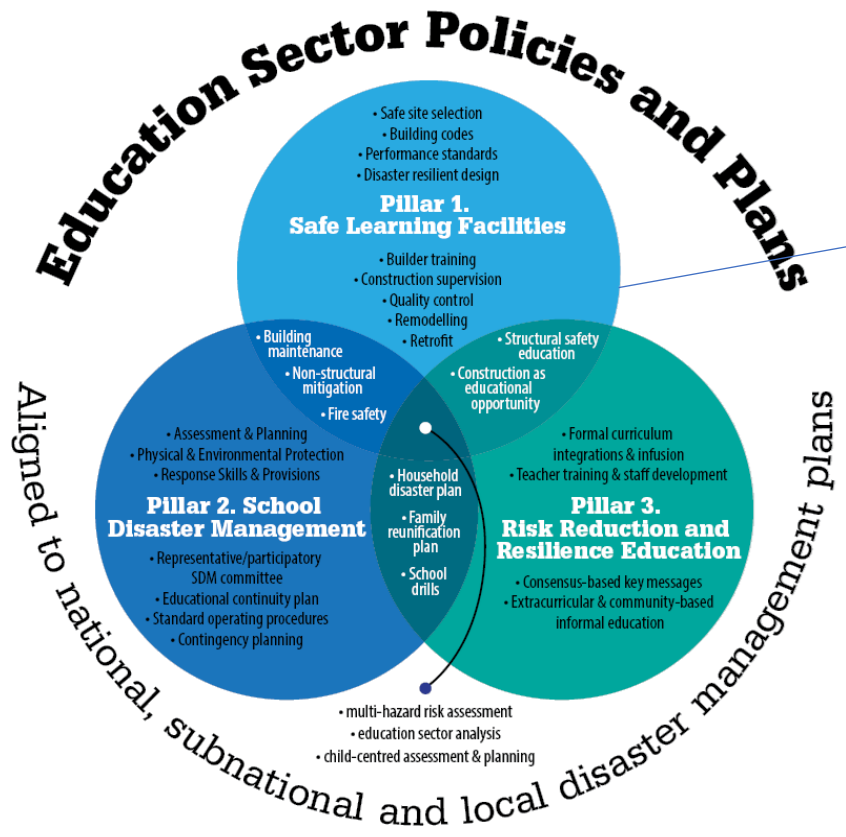


VISUS FOR SAFER LEARNING FACILITIES

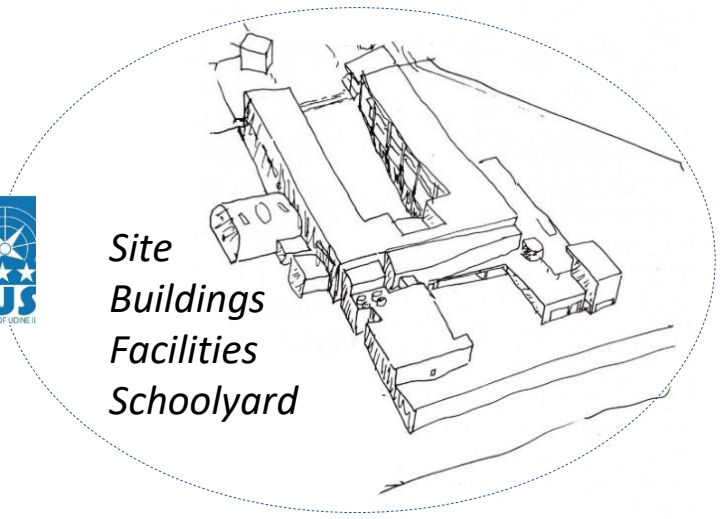




THE THREE PILLARS OF THE COMPREHENSIVE SCHOOL SAFETY



PHYSICAL ENVIRONMENT



Site
Buildings
Facilities
Schoolyard

SAFETY GOALS

LIFE SAFETY
(CHILDREN)

CONTINUITY
(EDUCATION ACTIVITIES)

LOSS PREVENTION
(SAFEGUARD OF INVESTMENTS)

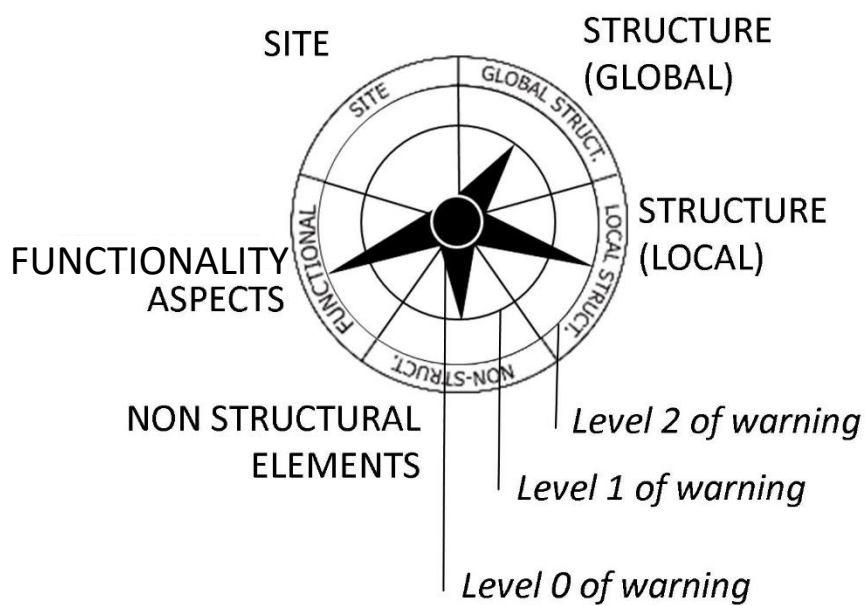
*Global Alliance for Disaster Risk Reduction and Resilience
in the Education Sector (GADRRRES)*


Sendai Framework for Disaster Risk Reduction 2015-2030





GRAPHICAL REPRESENTATION OF THE SITUATION

ROSE OF WARNING NEEDLES (INTERVENTION NEEDS)



Level 0 
 No actions are needed
Absence of elements of concern

Level 1 
 Action is needed to avoid
difficult situations for people
 safety

Level 2 
 Action is needed to avoid
heavy consequences for people
 safety



GLOBAL SAFETY INDICATOR



GLOBAL JUDGEMENT ON SCHOOL FACILITIES SAFETY

Performance criteria for the progressive assignment of the safety stars (scenario-dependent)

- ☆ ☆ ☆ ☆ ☆
Unsuitable site
(Level 2 of concern for site)
- ★ ☆ ☆ ☆ ☆
Suitable site
(absence of Level 2 of concern for site)
- ★ ★ ☆ ☆ ☆
Stability of the building
(absence of Level 2 of concern for structural global)
- ★ ★ ★ ☆ ☆
Life safeguard
(absence of Level 2 of concern for all issues)
- ★ ★ ★ ★ ☆
Rapid resume of operations
(absence of Level 1 of concern for structural global and local)
- ★ ★ ★ ★ ★
Immediately operational
(absence of Level 1 of concern for all issues)