Roadmap to Resilience Compendium

Disaster Resilient Universities

2025

PREPARE. PROTECT. PREVAIL

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Foreword

This Roadmap to Resilience Compendium has been elaborated within the Erasmus DRU Project, KA220-HED - Cooperation partnerships in higher education (KA220-HED). The DRU project addresses the Erasmus+ HE priority of promoting inter-connected higher education systems by:

- Collaborative Approach: The DRU project brings together a consortium of 5 institutions from 5 different countries to work together on disaster prevention and mitigation. The partners in the project are: The Mediterranean University of Albania, Javna Ustatova Univerzitet U Zenici Universitas Studiorum Zenicaensis Bosnia and Herzegovina, University of Ioannia Greece, Istituto Ad Ordinamento Universitario "Scuola Superiore Carolina Albasio" Italy, and Ovidius University of Constanta Romania. The collaboration and cooperation among partner institution allowed the project to promote the exchange of knowledge, best practices, and innovative ideas to create a more interconnected higher education system.
- Sharing Best Practices: One of the aims of the project is collecting and analyzing best practices related to disaster resilience in HEIs, to identify successful approaches taken by various universities at EU level and to create a repository of strategies that have proven effective. Thus, inter-connectedness is promoted by the facilitating framework that allows the implementation of successful strategies across different institutions.
- Network Building: The project brought together universities and relevant stakeholders, creating a network that fosters genuine innovation in the disaster resilience sector and builds a stronger, interconnected community of HEIs.
- Dissemination and Transferability: DRU consortium aims is disseminating its results widely, making them available to all

interested entities. In this way, the transferability of the project's results is ensured, as well as the contribution to a more interconnected higher education system in Europe.

- Multi-Country Impact: The project's focus on disaster resilience and response involving partner universities from different countries, provides a solid contribution to a more comprehensive and coordinated approach to disaster management.

The objectives of the DRU project are:

1. To address both the prevention and mitigation of disaster consequences through a cooperative and innovative approach, fostering a culture of preparedness, collaboration, and community support.
2. To strengthen collaborative resilience among HEIs by creating innovative cooperation models.
3. To empower Disaster Action Strategies through a curated repository of best practices and successful strategies in disaster resilience from 5 HEIs.
4. To promote Information Literacy and critical thinking among university staff, managers, and students, enabling them to discern reliable information from misinformation during disasters.
5. To build Digital Resilience, literacy and skills to detect and counter scammers exploiting vulnerable university students and staff during disasters.

The specific objectives of DRU Project are intricately linked to the priorities set forth by the Erasmus+ program, particularly in promoting inter-connected higher education systems and enhancing safety within the HE community.

The authors

1. The Purpose of the Compendium

This Compendium it's conceived to assist teachers and students, as well as any other interested party, to access information about different practices and intervention models in case of natural disasters. Earthquakes, floods, cyclones, storms, wildfires, volcanic eruptions, and landslides are natural processes that have sculptured the landscape of the earth for millenniums. Thus, human kind had to find ways to deal with these challenges.

The Guide tries to provide adequate answers to questions like: What do we do in case of a natural disaster? Who do we address? What are the actions we need to take? How do we keep ourselves safe? How do we help others? What are the things to avoid during a natural disaster? What do we do after the disaster ended?

Best practices for disaster interventions involve a comprehensive approach encompassing prevention, mitigation, preparedness, response, and recovery. This includes identifying hazards, implementing structural and non-structural measures, developing robust communication strategies, and setting clear roles and responsibilities.

Regular training, drills, and exercises are crucial for effective response, along with strengthening early warning systems and ensuring interoperability between agencies.

The Guide offers several principles and examples of action courses. These examples have been collected through a series of interviews and focus groups conducted within the partner universities, as well as with the relevant stakeholders in each country. The three types of natural disasters that this Guide is covering are fires, floods and earthquakes.

2. Disaster intervention framework

The natural processes (or hazards) that are the triggers for natural disasters are broadly classified into six categories (Chaudhary & Piracha, 2021; Below, Wirtz & Guha-Sapir, 2009; IRDR, 2014). The definitions and descriptions of each hazard are the following:

1. **Geophysical** – a geological hazard that originates from the solid crust of the Earth, usually associated with earthquakes, volcanic activity, and dry mass movement.
2. **Hydrological** – a hazard associated with the occurrence, movement, and distribution of fresh and saltwater over or beneath the Earth's surface. The events created by this hazard include floods, landslides, and scour and wave action.
3. **Meteorological** – a hazard that constitutes short-lived events having a time-span of minutes to a few days and are caused by atmospheric conditions that can be exacerbated by global climate change. For example, storms and or tornadoes, extra-tropical storms, tropical storms, fog, and sudden extreme temperature variation are included in this category of hazard.
4. **Climatological** – a hazard linked with variability in climate over a broad time-span. Droughts, wildfires, glacial movement, and glacial lake outburst are some of the events associated with this hazard.
5. **Biological** – a hazard originating from a biological substance, e.g., venom, mold, or a vector carrying disease-causing organisms, exposure to which poses a threat to other living beings or humans. Locust swarms, algal blooms, venomous wildlife infestation, and vector-borne diseases such as plague, malaria, dengue, and COVID-19 are some examples of this hazard.
6. **Extraterrestrial** – a hazard originating outside the Earth's atmosphere that may be caused by residues of asteroids, meteorites, comets, or human space debris, when these enter Earth's atmosphere, or the impact caused by these objects on Earth's surface.

The key elements of Disaster Intervention Best Practices are (Chartoff, Kropp & Roman, 2023; Oktari, Munadi, Idroes & Sofyan, 2020; Genç & Genç, 2025) as follows:

1. ***Prevention and Mitigation***: Proactive measures to minimize the impact of disasters, including risk assessments, hazard identification, and infrastructure improvements.
2. ***Preparedness***: Developing comprehensive disaster plans, establishing early warning systems, conducting drills, and ensuring adequate resources are available.
3. ***Response***: Implementing coordinated emergency response plans, and maintaining clear communication channels.
4. ***Recovery***: Initiating prompt recovery efforts, focusing on the "4 C's" (Communication, Coordination, Continuity, and Collaboration), and ensuring transparent disbursement of funds.
5. ***Coordination and Communication***: Establishing clear communication channels and collaborative decision-making processes among all stakeholders, including government agencies, NGOs, and the public.
6. ***Training and Exercises***: Conducting regular drills and exercises to ensure that all personnel are familiar with their roles and responsibilities, and that the communication systems are functioning effectively.
7. ***Risk Assessment***: Regularly assessing potential hazards and vulnerabilities to inform preparedness and response efforts.

8. ***Interoperability***: Ensuring that emergency response systems can effectively interact with each other, both within and between agencies, and with neighboring jurisdictions.
9. ***Community Involvement***: Actively engaging communities in disaster preparedness and response efforts to build resilience.
10. ***Transparency and Accountability***: Ensuring that resources are used effectively and efficiently, and that there is transparency in disaster relief efforts.

Fig. 1 - Steps of disaster management and dimensions of disaster resilience (Hossin, A., Chen, L., Asante, I., Asante Boadi, E., Adu-Yeboah, S.S., 2023).

3. Fire disasters. An overview

Fire disasters are caused by both human activities and natural events, with common human-caused ignitions including cooking errors, unattended campfires, faulty electrical systems, and deliberate arson. Natural causes, though less frequent, include lightning strikes and volcanic activity. The severity and spread of fires can be worsened by factors such as excessive dry vegetation, high winds, and drought conditions, which are often intensified by climate change.

Fig. 2 – Principal causes of fires (Retrieved from https://www.lumina.com.ph/news-and-blogs/blogs/top-causes-of-fire-incidents-in-the-philippines/).

Human Causes of fires include (Burge, 2023):

- **Cooking Accidents**: A common cause of residential fires, often due to unattended cooking or hot food.

- **Heating Equipment**: Faulty heaters, space heaters, or wood stoves can ignite nearby combustible materials.
- **Electrical Hazards**: Overused or faulty electrical wiring and appliances can cause sparks and fires.
- **Smoking**: Carelessly discarded cigarettes or other smoking materials can ignite flammable materials.
- **Arson**: Intentionally set fires are a significant cause of both structural and wildland fires.
- **Children's Accidents**: Young children playing with matches, lighters, or candles can start dangerous fires.
- **Flammable Liquids and Materials**: Careless use or storage of flammable liquids like gasoline can easily lead to fire.
- **Clutter**: Excessive clutter can act as fuel, helping fires to spread more rapidly.

Natural Causes of fires include (Jones, 2024):

- **Lightning**: A natural ignition source that can strike trees, rocks, or other objects, leading to fires.
- **Volcanic Eruptions**: While less common, hot magma from volcanic eruptions can ignite surrounding areas.
- **Natural Friction**: In some cases, the friction of bamboos swaying in high winds or rolling stones can create sparks.

Factors Exacerbating Fire Disasters (Department of Environment and Water, Government of South Australia):

- **Dry Conditions**: Densely dry vegetation, grass, and leaves provide ample fuel for fires.
- **Climate Change**: Increased temperatures, prolonged droughts, and altered weather patterns contribute to more frequent and severe wildfires.
- **Wind**: Strong winds can rapidly spread fires, making them harder to control.

4. Flood disasters. An overview

Flood disasters are primarily caused by excessive water from heavy rainfall, rapid snowmelt, overflowing rivers, or storm surges from tropical cyclones, leading to water submerging normally dry land. Human activities like urbanization, deforestation, and building on floodplains also increase flood risk by reducing natural water absorption and obstructing drainage. Infrastructure failures, such as dam or levee breaks, can also unleash large volumes of water, creating destructive floods.

There are 3 common types of floods according to the World Health Organization (https://www.who.int/health-topics/floods#tab=tab_1):

1. Flash floods are caused by rapid and excessive rainfall that raises water heights quickly, and rivers, streams, channels or roads may be overtaken.
2. River floods are caused when consistent rain or snow melt forces a river to exceed capacity.
3. Coastal floods are caused by storm surges associated with tropical cyclones and tsunami.

A fourth type is the urban flooding (Eldho, Zope & Kulkarni, 2018), meaning the inundation of populated areas due to excessive rainfall or river surges overwhelming storm drains and other infrastructure, a problem exacerbated by impermeable urban surfaces that prevent water absorption. This type of flooding is a global challenge, characterized by rapid onset, increased flood peaks, and significant impacts on urban residents, infrastructure, and

economic activity, requiring robust urban planning and resilient design strategies to mitigate its effects.

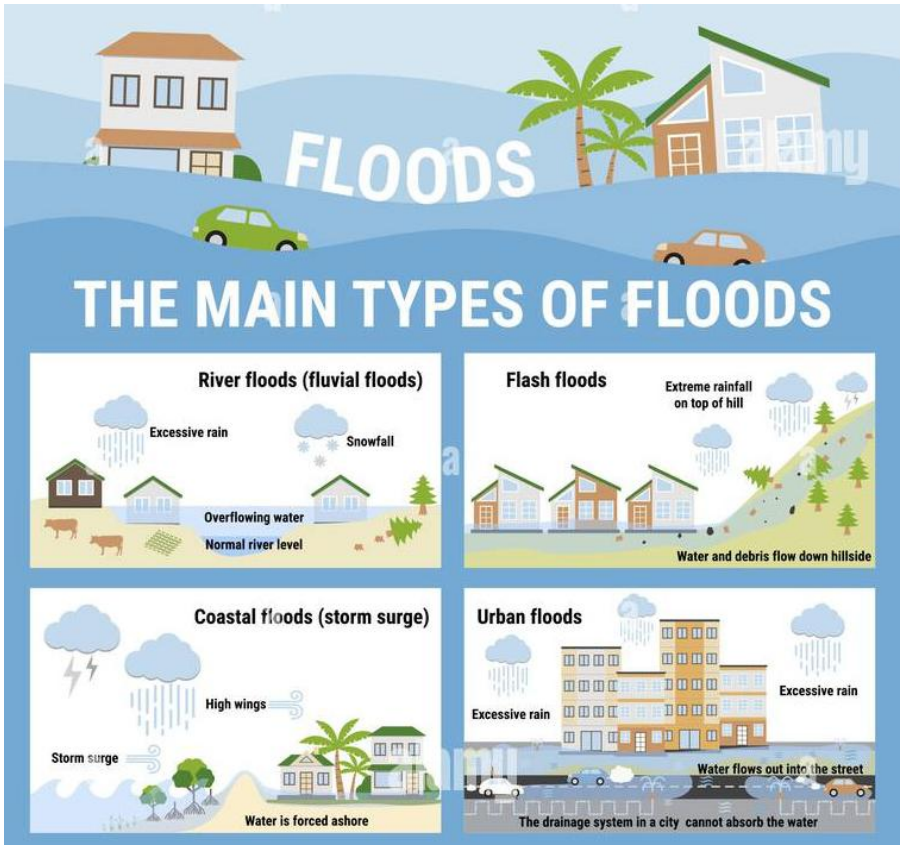

Fig. 3 – The main types of floods (https://www.shutterstock.com/search/cause-flood?image_type=illustration).

Natural Causes of floods include (Glago, 2021):

- **Heavy Rainfall**: Intense and prolonged rainfall over a short period or days can overwhelm the land's capacity to absorb water, causing streams and rivers to overflow their banks.
- **Rapid Snowmelt**: Large-scale melting of snow and ice can quickly contribute significant water to rivers and streams, increasing water levels.
- **Storm Surges & Tsunamis**: Powerful storms, hurricanes, and tsunamis can push large volumes of ocean water onto coastal areas, leading to widespread flooding.
- **Ice Jams**: Blocks of ice in rivers can obstruct water flow, causing it to back up and flood upstream areas.

Human-Induced Causes of floods include (Jonkman, 2005):

- **Urbanization:** The growth of cities, with large amounts of paved surfaces and inadequate drainage systems, prevents water from soaking into the ground, increasing runoff and flood risk.
- **Deforestation & Land Use:** Removing trees and vegetation, which naturally absorb water, leaves soil more vulnerable to erosion and waterlogging, exacerbating runoff.
- **Construction on Floodplains:** Building homes and other structures in river floodplains puts them directly in the path of floodwaters.
- **Poor Drainage Management:** Inadequate design or maintenance of drainage channels and structures can lead to blocked pathways for water, causing it to back up and flood areas.

Infrastructure Failure is another category of factors that can induce floods (Lebbe, Lokuge, Setunge, & Zhang (2014):

- **Dam Failures:** The structural failure or breakage of dams can release massive amounts of stored water, resulting in devastating flash floods downstream.
- **Levee Breaches:** Natural or artificial barriers (levees) designed to contain water can be overtopped or breached, allowing water to flood surrounding land.

5. Earthquake disasters. An overview

Earthquakes are disasters caused by the abrupt movement and slippage of rocks along faults in the Earth's crust, releasing energy as seismic waves that shake the ground. This movement results from tectonic plate boundaries colliding, separating, or sliding past each other, building up stress that is suddenly released. While most are natural, human activities like mining and large-scale construction can also trigger man-made earthquakes.

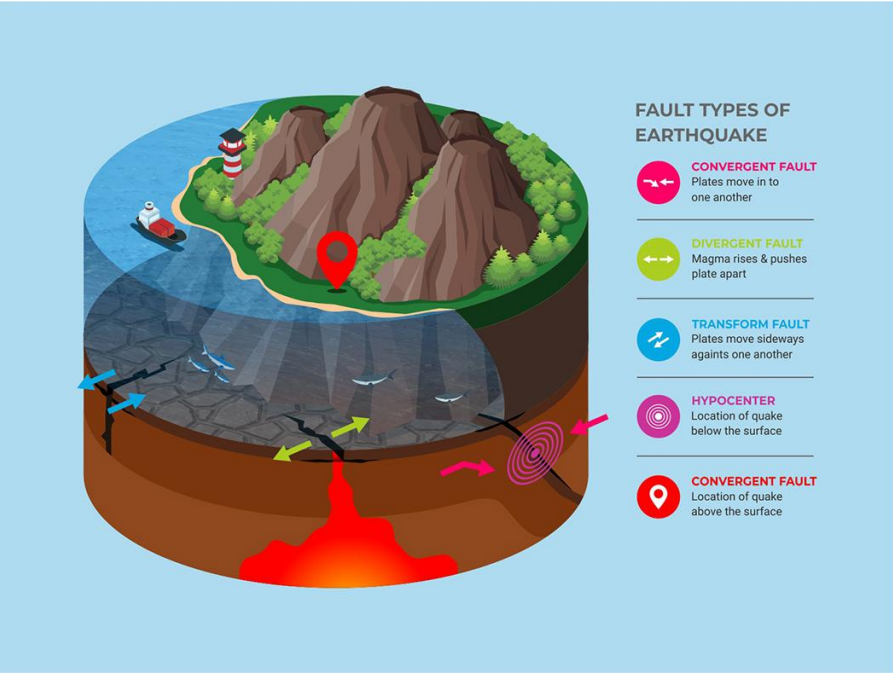

Fig. 4 – Types of earthquakes (https://thecolumn.ahacentre.org/posts/insight-posts/vol-43-natural-disaster-types-geophysical-earthquakes/).

Natural Causes of Earthquakes include (Arrhenius, Bladh & Lundholm, 2024):

- **Tectonic Plate Movement**: The Earth's outer crust is broken into large tectonic plates that are constantly moving.
- **Stress Build-up**: These plates get stuck at their edges due to friction, and stress builds up in the rocks.
- **Sudden Slip**: When the stress overcomes the friction, the rocks suddenly slip or fracture along a fault, causing an earthquake.
- **Seismic Waves**: The energy released by this slip travels through the Earth as seismic waves, which cause the ground to shake.
- **Volcanic Activity**: Volcanic eruptions can cause localized earthquakes due to the movement of magma and changes in pressure beneath the surface.
- **Impacts**: Although rare, the impact of large meteorites can also generate seismic waves, leading to an earthquake.

Man-Made Causes of Earthquakes include (Foulger, Wilson, Gluyas, Julian & Davies, 2018):

- **Mining and Drilling**: Human activities such as deep mining and oil and gas drilling can alter the stress balance in the Earth's subsurface, leading to induced seismicity.
- **Reservoir-Induced Seismicity**: The weight of water in large reservoirs behind dams can increase stress on the surrounding rocks, potentially triggering earthquakes.
- **Hydraulic Fracturing (Fracking)**: The process of fracking can destabilize subsurface geological structures, leading to minor to moderate earthquakes.
- **Nuclear Explosions**: Detonating nuclear warheads creates seismic waves that are similar to large earthquakes.

6. Contributors from DRU Partners

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The data we collected for this Guide comes from different sources. We used an **interview**, conceived by all the partners within the consortium. We selected questions which we applied to several people from teacher groups, management teams, students or administrative staff in each university. We gathered qualitative information about experiences, perspectives, and beliefs, divided on the following dimensions: risk perception, causes and vulnerabilities facing natural disasters, university needs and coping and resilience resources needed for reintegration after a natural disaster. These interviews proved to be crucial for understanding personal experiences, and complex approaches to challenges in the academic groups.

Focus groups were also conducted to gather opinions, feelings, and perspectives from small, diverse groups of participants within the partner universities, through guided discussions led by a moderator. We were able to explore complex issues, generate richer insights, and observe how meaning is constructed through participant interaction related to resilience when confronted to natural disasters.

We also used a **survey**, as a systematic method for gathering data by asking questions to a selected group of people to understand their opinions, behaviors, attitudes, or characteristics. The questions were agreed upon between the members of the DRU consortium. Each university applied it individually, via Google Forms, then the results were analyzed as a whole, with a comparative approach between practices. The sample we used for the analysis is presented in the table below:

QUESTIONNAIRE DEMOGRAPICS		
COUNTRY	**PARTICIPANTS**	**%**
ALBANIA	28	17.39
BOSNIA AND HERZEGOVINA	46	28.57
GREECE	33	20.50
ITALY	20	12.42
ROMANIA	34	21.12

7. Vulnerabilities, needs and coping resources in the case of fires

7.1. ALBANIA

Risk perception, causes and vulnerabilities

The interviews showed that the perception about the risk of fires is not neglectable, reaching a moderate level, explained by the high possibility of preventing the occurrence of these disasters.

Among the most common perceived causes, the electrical faults or the improper use of electrical equipment was highlighted.

As far as vulnerabilities are concerned, the perceived flaws target at the challenges of monitoring the legal compliance to fire codes, low awareness among students and staff members, as well as difficulties in the constant implementation of fire drills in universities.

Needs

The perception of some vulnerabilities raised the possibility of identifying niches for improvement measures such as:

- Regular and robust inspections, visible evacuation plans and regular fire safety drills.
- Raising the levels of awareness and accountability in preventing and responding to fire hazards.
- Clear responsibility assignments and staff training.

- Clear evacuation routes and visible signaling.

Coping and resilience resources

Among the most desirable and needed coping resources facing fires, the results from the interviews show the following:

- The capacity to remain composed, calm and structured, and follow procedures.
- Support from the colleagues and staff.
- Prompt institutional response and a strong collaboration between institutions.
- Prior safety fire training for staff and students.
- Psychological support.
- Trust in the institution and preparedness.
- Legal procedures for damage assessment,
- The use of teaching platforms if teaching facilities are affected.
- Off-site data backups and emergency power alternatives.

7.2. BOSNIA AND HERZEGOVINA

Risk perception, causes and vulnerabilities

The results of the interviews applied by the Bosnia and Herzegovina partners show that the risk of fires is considered relatively low, but not neglectable. The infrastructure is generally well-maintained, and fires didn't occur in recent years, not even wildfires. However, because the institution harbors classes, laboratories, offices and storage areas, there's always a potential risk for fires because of:

- Electrical equipment.
- Outdated wiring in some parts of the buildings.
- Improper handling of the materials.
- Flammable materials in laboratories.

Needs

The replies to our questions showed the need for regular inspections and maintenance of electrical systems, accessible and functional fire extinguishers, visible evacuation routes, and routine fire drills.

Proper signage and emergency lighting are perceived as crucial for safe and quick evacuation, as well as the installation of escape stairs, rebuilding of exits to adapt the facilities to safety standards. Acknowledging and reporting potential hazards, keeping exits unobstructed, and knowing how to use basic firefighting equipment is also very important. This leads to the need of educating the academic community, making sure that all staff and students are familiar with emergency procedures and know how to react in case of fire. Raising awareness and building a shared safety culture within the institution can be even more effective than physical infrastructure alone.

Just as important is the development of the protection and rescue system at the local level, to ensure citizens' safety from natural and other hazards. Public awareness campaigns about potential dangers are conducted very rarely, hence the need for these types of activities. Also, a stronger collaboration with social welfare services or religious leaders is needed.

Coping and resilience resources

As far as necessary coping resources, the interviews showed the following:

- The ability to stay calm and make rational decisions,

- Support from colleagues, family, and the professional network.
- Familiarity with safety procedures and participation in drills would reduce confusion and ensure a quicker response.
- Access to digital resources and flexible work arrangements would support professional reintegration.
- Trust in institutional coordination and a shared culture of preparedness would be key to overcoming the disruption and resuming responsibilities efficiently.
- The good organization of firefighting services, along with public appeals to citizens not to burn grass or light fires in open areas, are important preventive measures against the outbreak of fires. Thanks to continuous monitoring and rapid intervention, large-scale fires have been effectively prevented so far, with minimal losses and material damage.

7.3. GREECE

Risk perception, causes and vulnerabilities

The data collected from the interviews show that fires are perceived as a potential risk, caused by:

- Lack of uniformity among staff members regarding the procedures and instructions for emergencies.
- The relative low number of drill sessions.
- The existence of labs with potentially risky substances.
- The existence of just a basic framework in case of fire emergencies.
- The insufficient integrated alert system.
- Insufficient information about proper procedures applied to laboratories.
- Poor fire suppression systems.
- Low visibility of emergency signage.

Needs

The responses show that, generally, the newer buildings in the university meet basic safety standards. But for older buildings there's a strong need to upgrade emergency exits, signage, and fire protection systems.

More frequent safety inspections, improved lighting and emergency exit signs, the installation of real-time alert systems or expanded training for both staff and students are needed.

Needed improvement measures include:

- Routine safety checks of lab infrastructure
- Emergency power backups.
- Mandatory, short safety briefings or refreshers for all research staff.
- Installing emergency lighting in stairwells and corridors
- Ensuring all administrative offices have clear evacuation plans posted.
- Running joint drills with academic and administrative staff to ensure coordination.
- Email or phone calls for follow-up communication.
- Direct communication from lab supervisors or department heads.
- A more immediate and centralized communication tool—like a mobile alert app or SMS notification system.

Coping and resilience resources

The resources needed for coping and reintegration that the university has include:

- The communication within university departments.
- Direct instructions from supervisors.
- Emotional stability.

- Social support from colleagues or students.
- The familiarity with the university environment.
- The involvement of the university website and social media pages.

7.4. ITALY

Risk perception, causes and vulnerabilities

The responses obtained from the Italian partners show the existence of emergency procedures, but low awareness of these procedures among students, which increases the risks.

The contents of drills are mostly centered on evacuation measures, but rarely on prevention and intervention.

The university buildings themselves are a possible cause for risks, as some of them are isolated from the others.

Although there is a higher awareness for interventions in case of fires, other natural disasters are less emphasized.

Needs

Based on the vulnerabilities shown above, the following needs can be emphasized:

- The need for a visible signage or briefing that makes the fire procedures obvious to students.
- The need to update the existent procedures and a wider distribution of these procedures among employees and students alike.
- The introduction of designed Apps for emergency situations on university grounds.
- Extensive psychological support for dealing with natural disasters when they occur, as well as afterwards.

Coping and resilience resources

As far as the coping and reintegration resources that are needed, the Italian team suggested:

- Staying calm and focused.
- Social support within the university grounds.
- Authentic communication between departments, staff and students.
- The existing infrastructure that covers basic needs when facing hazards (like fire alarms, fire extinguishers, etc.).

7.5. ROMANIA

Risk perception, causes and vulnerabilities

Because fire is one of the top 5 disaster in Romania (according to Romanian Journal, 2025), the university has taken measures, according to the law, by setting appropriate communication measures, like alarms that function independently of external factors. These alarms allow the acknowledgement of a disaster happening, and alongside the evacuation plans can allow efficiently leaving the affected building.

Periodical drills are organized at university level, for both students and academic staff. Information about the use of fire extinguishers and about not to do during a fire are provided during such drills.

The documents related to these measures are constantly reviewed and updated, according to the current legislation. The management team of the university has extensive knowledge of the correct procedures and, at the university level, there is an operational Prevention and Protection Service.

Needs

Even if there are established plans and measures for the mitigation of natural disasters, their acknowledgement by the academic community is scarce. The fire prevention drills should be organized more frequently, especially because students change every 3 years, by graduating. Also, the results show that even if annual informative sessions are organized, not all employees attend them, because of challenges in establishing a common schedule.

The university is considering implementing a smart solution, a mobile app, for emergency notifications. Furthermore, because the university has different buildings across the city, some newer than others, there is a specific need of modernizing the existent detection and firefighting systems, which means extensive financial investment.

Information and skills about how to help others in these specific situations are needed.

Coping and resilience resources

More frequent fire drills would help the community as well, by empowering students, teachers and administrative personnel to help in other occasions, not only on the university grounds.

Keeping calm and a clear mind, as well as knowing exactly what to do in specific situations, would help increase the resilience facing natural disasters.

7.6. Questionnaire data analysis

The data we collected from the questionnaire shows that as far as fires are concerned, the situation is balanced. The highest percentage of people experiencing a fire came from Italy (100%), followed by Greece (45.5%) and Bosnia and Herzegovina (41.3%). Romania (26.4%) and Albania (32.1%) have lower values. Thus, the results indicate considerable variability in relation to the experience of fires in the different regions, suggesting possible differences in the frequency or perception of these events in the areas analyzed.

COMPARATIVE ANALYSIS BETWEEN PARTNER COUNTRIES

RISK: All participating countries see fire as a very possible risk, based on the possible occurrence of electrical problems, hazards from university labs and storage facilities, a less robust awareness about intervention procedures for the academic community.

NEEDS: Upgrading protocols and a higher number of technical inspections, integrated communication channels and more frequent practical drills are needed.

COPING: Emotional stability, decision making promptitude, social and psychological support, or a good communication with the responsible authorities, are among the strongest resources universities rely on.

8. Vulnerabilities, needs and coping resources in the case of floods

8.1. ALBANIA

Risk perception, causes and vulnerabilities

Flooding is not a common natural disaster in the region of Tirana, but heavy rains occasionally disrupt the infrastructure and people have to face drainage issues.

In terms of the risk perception, if a major flood occurs, at the university level it can affect access to the building, damage equipment, damage important archives or legal materials, as some of the important systems are located at semi-basement level, temporarily affect communication, and delay academic activities. The biggest problem would be related to students from rural areas, that might face isolation or challenges in the daily commutes, or could lose access to lectures or other academic services.

Emotionally, floods may cause stress or fear, particularly for the vulnerable students located in the rural areas, or the disabled ones, with limited mobility.

Needs

The most stressed need that emerged from the interviews is a rise of the level of institutional preparedness and communication during such events.

Coping and resilience resources

Coping and resilience facing floods is greatly related to the institutional preparedness and to optimal communication, that would affect the confidence of staff and students as well.

Other important aspects stat would support resilience and reintegration would be:

- The ability to stay calm, act rationally and coordinate with colleagues in responses.
- Social relationships within the university, as well as family, peers and community support.
- Access to official information, emergency protocols, strong documentation.
- The possibility to work remotely.
- Cooperation with local authorities.
- Legal understanding of emergency management and insurance coverage.
- Flexible policies for affected students, empathy and coordinated action.
- Clear responsibilities for the staff involved in the mitigation of these situations.
- Effective digital communication (like emails and notifications).

8.2. BOSNIA AND HERZEGOVINA

Risk perception, causes and vulnerabilities

The risk for floods is perceived as regionally reduced, but within wider surrounding areas, several flood experiences occurred. One of the main factors is the increasingly unpredictable weather patterns. From a material perspective, localized flooding could affect

transportation, access to university facilities, or damage infrastructure such as basements or archives. Extreme weather conditions could still cause temporary disruption to teaching, research, or administrative functions. Naturally, there is also a concern about the potential loss of life and the significant material damage that such events typically cause.

People can have a feeling of vulnerability, particularly those who have experienced floods in nearby areas or whose families live in more exposed zones. Students who travel from rural areas could be disproportionately affected in terms of access and safety.

Needs

Trust in local institutions and community response is relatively high, but I believe that more visible preparedness measures—such as communication protocols, awareness activities, and contingency planning—could further strengthen a sense of security among staff and students. While we do not live in daily fear of flooding, ongoing climate change reminds us of the importance of resilience, risk education, and community support.

Coping and resilience resources

In the case of a major flood, the most needed psychological resources seem to be:

- Personal resilience, reliable social networks, and access to timely information.
- The ability to stay calm under pressure, make rational decisions, and prioritize tasks.
- Flexibility and adaptability would be important to respond in a structured way, especially in a professional setting.
- Strong stress management skills are important in maintaining clarity during crisis situations.
- Close relationships—with family, neighbors, and colleagues. Mutual support, whether emotional or practical, plays a key role in recovery.
- The solidarity that tends to emerge within the academic community in challenging times, can be a source of strength and encouragement.
- The readiness and cohesion of the people and systems seem to make the biggest difference in the recovery process.

In terms of practical resources that are needed, the data shows:

- Access to verified information from official sources—such as municipal emergency services or civil protection agencies.
- Knowing where to go, what steps to take, and whom to contact can reduce confusion and help prevent panic.
- Having emergency kits, contact lists, and a clear institutional protocol.
- Trust in the institutions and their ability to coordinate an effective response.
- Active collaboration between institutions and the community—before, during, and after an event—can significantly reduce the long-term impact of a disaster.

Last, but not least, all these elements are essential. They should all be integrated into a comprehensive plan for timely and effective response. None of them should be viewed in isolation, as they are all part of a broader system of preparedness and resilience.

8.3. GREECE

Risk perception, causes and vulnerabilities

Greece has a high and increasing frequency of floods, particularly flash floods, which are the most common natural hazards in the country. An average of 26 floods occurred annually between 1980 and 2020, with most events concentrated in the autumn, especially November (according to https://www.statista.com/). Factors like mountainous terrain, a

Mediterranean climate with extreme weather, impermeable geology, and human interventions contribute to this high flood risk and frequency. Yet the data gathered from interviews don't show a high level of awareness about this natural hazard.

Needs

The information available at institutional level seems to be mostly basic, and usually based on written material or occasional announcements. There was no formal training specific to this risk. Thus, there is a need for workshops or short seminars, especially for offices that serve the public or are located in large buildings. Also, the development of clear procedures for how to safely power down equipment or secure hazardous substances during floods would be needed.

Coping and resilience resources

As in the case of fires, the psychological tools like calm, emotional stability, empathy seem to be important coping factors. The responses stressed the importance of official action plans as well, distributed to each individual or office. Clear instructions by role or office, so everyone knows what to do and who to report to, are perceived as equally important.

8.4. ITALY

Risk perception, causes and vulnerabilities

According to Castellarin et al. (2022), flood frequency in Italy is increasing, especially in the north and northeast, due to a combination of climate change, increased anthropogenic activities like urbanization and land impermeability, and poor management of riverbeds and vegetation. This has led to more frequent and severe flood events across the country, impacting businesses and infrastructure.

Needs

Following the logical steps might prove not to be enough even if there is some basic information about safety. There is the need to work toward standardizing safety features across all facilities and ensure that flood-prone areas have clear risk mitigation plans. This may include signage, regular drills, and a central platform for emergency plans and contact information.

There is also a need for more inclusive evacuation strategies, considering students with disabilities or language barriers.

Coping and resilience resources

As far as the resources for coping and reintegration, the interviews we conducted highlighted the following:

- Calm and emotional stability.
- The distribution of the responsibilities based on competences.
- Clear intervention protocols.
- Efficient communication channels like institutional email, radio and local television.

8.5. ROMANIA

Risk perception, causes and vulnerabilities

Romania is the fourth among EU countries in terms of flood risks. Yet in the city of Constanta, as well as in the Dobrogea region, there is a low level risk of such disasters (according to https://www.thinkhazard.org/en/report/2460-romania-constanta/UF).

Needs

The results we gathered show an increased need of assessment of the vulnerabilities of the technical infrastructure in the university, in the different buildings where academic activities are conducted.

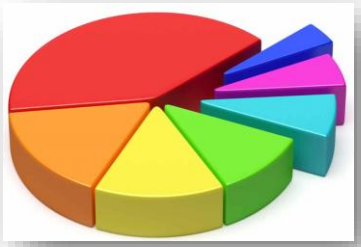
Specific activities for the academic staff can be enforced, thus enabling teachers and administrative staff to mitigate risks and to cope with the effects of natural disasters.

Coping and resilience resources

The strongest coping mechanisms we identified are:

- Efficient communication channels at institutional level, radio or social media.
- A strong relationship with the authorities.
- Keeping calm and emotionally stable.

8.6. Questionnaire data analysis



Our questionnaire shows that in the case of floods, Bosnia and Herzegovina stands out for a high rate of direct exposure (78.3%), followed by Albania (46.4%). The lowest percentages are recorded in Italy (15%) and Romania (32.3%), which may suggest a lower perception of hydrological risk in these areas.

COMPARATIVE ANALYSIS BETWEEN PARTNER COUNTRIES

There is thus a clear contrast between Bosnia and Herzegovina, where floods are perceived as a frequent and impactful phenomenon, and the other states we analyzed, where experiences are rather isolated or limited to certain regions. These results reflect the diversity of hydrological risks in the Balkan and Southern European area, confirming that natural hazards have a different incidence depending on the geographical and climatic characteristics of each country.

9. Vulnerabilities, needs and coping resources in the case of earthquakes

9.1. ALBANIA

Risk perception, causes and vulnerabilities

Earthquakes are perceived as moderate to high-risk events, for which the legal frame in Albania has some gaps. Socially, they can lead to loss of public trust if institutions are unprepared. Earthquakes could affect both homes and the university, disrupting classes and emotionally impacting students, staff and other services. Furthermore, the IT infrastructure is highly vulnerable, and data loss could be catastrophic institutionally.

People manifest a certain degree of awareness to this risk, but the tendency is to be overlooked until it actually happens.

From an emotional point of view, earthquakes are perceived as distressing, they cause panic, they affect concentration, learning and the overall wellbeing.

Needs

The responses we collected show the need for pre-established emergency plans, psychological support services, and flexible remote work policies. Information and legality are both important, as people must know their rights and responsibilities. Disaster recovery plans, cloud backups, and team coordination are seen as being most helpful and needed.

The technical equipment available at university level are not enough to cover the needs in the face of natural disasters as floods. There's also the need to revise the intervention methods and to deliver the information to the academic community.

Coping and resilience resources

In terms of resources needed for coping and reintegration, the interviews show the following:

- Trust in emergency protocols and the collective resilience of the academic community.
- Emotional strength, family support, and clear communication.
- Participation in training and simulations would also boost preparedness and professional reintegration.
- The existence of a strong family network and institutional clarity in roles and safety.
- Access to online platforms, and institutional flexibility.
- Emotional support, mental health services, and institutional guidance.

9.2. BOSNIA AND HERZEGOVINA

Risk perception, causes and vulnerabilities

Respondents are aware that the region is considered seismically active, particularly due to the history of significant earthquakes, including the devastating one in 1969. While such events are not frequent, the possibility of a strong earthquake remains a realistic risk.

The thought of an earthquake is concerning, especially in terms of potential damage to housing, disruption of infrastructure, and risks to human safety. Although some improvements have been made in terms of building standards and emergency awareness, many residential buildings, including older ones, may not be fully earthquake-resistant.

At the community level, an earthquake could have a profound impact. Besides the potential human and material losses, such an event would likely overwhelm local emergency services, disrupt education and healthcare, and significantly affect the economy.

Needs

Even with previous experiences, there is still a need for more structured community-level education, preparedness drills, and better coordination among institutions to strengthen resilience.

Respondents recognize the importance of preparedness and view earthquake risk as a serious issue that should not be underestimated. Civil protection services should play a key role in every society, developing models for an effective response. To do so, they must be recognized as socially relevant and be adequately staffed and technically equipped.

Coping and resilience resources

In the event of a major earthquake, respondents believe that both personal resilience and institutional preparedness are crucial for effective coping and professional reintegration.

Key resources would include mental and emotional resilience, a strong social support network (family, friends, colleagues), and access to reliable information and communication. The ability to stay calm, make informed decisions, and maintain a sense of routine would be essential in navigating the immediate aftermath and returning to work effectively.

Institutionally, the most important resources would include:

- Clear and practiced emergency response protocols, ensuring the safety of staff and students.
- Psychosocial support services to help individuals deal with trauma and stress.
- Flexible working arrangements (e.g., remote work, adjusted workloads) to facilitate a gradual return to professional duties.
- Strong internal communication systems to keep staff informed and connected.
- Backup infrastructure and digital platforms that allow teaching, research, or administrative work to continue even if physical spaces are damaged.

Additionally, leadership that communicates transparently and empathetically, along with a culture of solidarity and support within the institution, would greatly enhance recovery and reintegration efforts.

9.3. GREECE

Risk perception, causes and vulnerabilities

Greece is the most seismically active region in Europe, and therefore the European country with the highest seismic hazard (Pitilakis et al., 2024). The latest national seismic hazard map, currently used for the seismic design of buildings and infrastructure, was published in 2000, revised in 2003, and has not been updated since then (Sotiriadis et a., 2023). Hence reliable seismic hazard assessments are important for sustaining the economic developments of the country (Tsapanos, 2008).

Needs

At university level there is no formalized action plan beyond the general awareness of exits and safety zones. Given the responsibilities that come with research labs, there should be clearer protocols, especially for securing lab materials or shutting down equipment safely.

Some of the existing procedures are posted in corridors and near exits, and there's also some instructions that were sent by email. This leads to a moderate familiarization with them; there is a strong need for more detailed briefings or short training sessions that would improve awareness and preparedness among administrative staff. Regular refresher courses or scenario-based training would be helpful—especially for new technical staff or temporary researchers. Seismic securing of shelves and chemical storage units would also be needed.

Coping and resilience resources

The drills that were conducted from time to time, mainly for earthquakes and fire emergencies are useful for dealing with these challenges. Greater involvement from both staff and students would help improve overall preparedness.

9.4. ITALY

Risk perception, causes and vulnerabilities

Italy is among the countries with the highest seismic risk in the Mediterranean (according to https://rischi.protezionecivile.gov.it/en/seismic-0/), due to its geographical position in the zone of confluence between the African and Eurasian clusters.

However, the responses from the interviews show that earthquake or flood scenarios are overlooked. No earthquake or flood preparedness exercises were organized at university level, which greatly increases the risks in facing these challenges.

Needs

Based on these results, we conclude there is a high need for specific procedures and instructions for earthquakes, as well as online tutorials or short in-person sessions on risk preparedness, especially tailored for students. Other needs would cover a broader, all-hazard approach that includes climate risks and practical simulations. A multilingual notification system via SMS or app would help the international community in particular.

Coping and resilience resources

The conclusions retrieved from the interviews show similar answers for all hazards. They include:

- The collective resilience of the academic community.
- Emotional strength, family support, and clear communication.
- Participation in training and simulations would also boost preparedness and professional reintegration.
- Access to online platforms, and institutional flexibility.
- Emotional support, mental health services, and institutional guidance.

9.5. ROMANIA

Risk perception, causes and vulnerabilities

The interviews show some gaps in the acknowledgement of intervention plans or procedures. The information is usually transmitted through meetings organized by the responsible people, in charge with the services for prevention of the effects of disasters. Not all personnel in the university are aware of these plans.

Needs

An interesting idea that emerged from our data is the presentation of these plans, procedures and activities through a centralized system or a dedicated platform, or through institutional emails. The contents can be videoclips that can be distributed to all the members f the academical or administrative staff, as well as to students, especially because of the challenges of getting everyone to a common time table.

The technical equipment available at university level are not enough to cover the needs in the face of natural disasters as earthquakes. There's also the need to revise the intervention methods and to deliver the information to the academic community. An assessment about the vulnerabilities of the university infrastructure is needed. The academic community needs more sensitivity in acknowledging the risks.

The university needs a strategy that would create an efficient mechanism for limiting the effects of natural disasters.

Coping and resilience resources

As far as the resources for coping and reintegration, the interviews we conducted highlighted the following:

- Calm and emotional stability.
- The distribution of the responsibilities based on competences.
- Clear intervention protocols.
- Efficient communication channels like institutional email, radio and local television.

9.6. Questionnaire data analysis

The results from our questionnaire show that in terms of earthquake experience, the highest exposure is reported in Bosnia and Herzegovina (89.1%), Greece (93.9%) and Romania (88.2%). In contrast, Italy has a significantly lower percentage of respondents who say they have experienced an earthquake (50%), which can influence the level of awareness and preparedness. Only 22 respondents from the entire sample (13.7%) say they have never experienced an earthquake.

These results suggest that, in most of the countries we analyzed, earthquakes represent a common and direct experience for the population, which confirms the high degree of seismic exposure in the Balkan and Southern European region. The only significant exception is Italy, where more balanced responses can be explained either by the geographical distribution of respondents (areas with lower seismic risk) or by the different perception of minor seismic events.

COMPARATIVE ANALYSIS BETWEEN PARTNER COUNTRIES

There is thus a clear contrast between Bosnia and Herzegovina, where earthquakes are perceived as a frequent and impactful phenomenon, and the other states we analyzed, where experiences are rather isolated or limited to certain regions. These results reflect the diversity of seismological risks in the Balkan and Southern European area, confirming that natural hazards have a different incidence depending on the geographical and climatic characteristics of each country.

Fig. 5 - *Most Common Natural Disasters in European Countries* (https://www.reddit.com/r/MapPorn/comments/12ascxc/the_number_one_most_common_natural_disasters_in/)

10. Comparative analysis for natural disasters

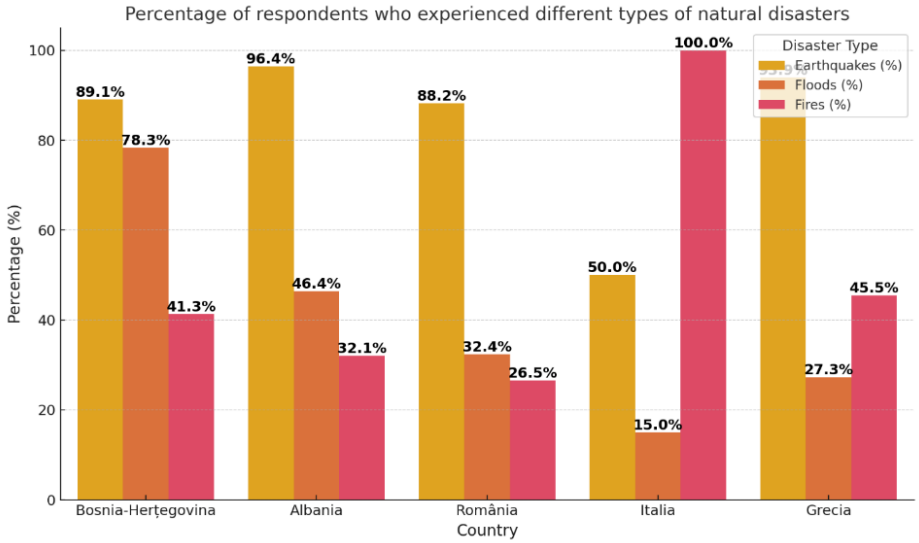


Fig. 6 – *Percentage of surveyed participants from each country who reported having experienced earthquakes, floods, or fires in their area of residence. Data are based on self-reported experiences.*

This graphic distribution (Fig, 6) provides a clear comparative picture of the risk profile experienced in each country and contributes to a better understanding of regional differences in the perception of danger and the need for institutional and personal adaptation to these contexts. High values can reflect not only objective realities, but also a greater degree of social and institutional awareness of the phenomenon.

It is clear that, at a general level, earthquakes are the most common type of disaster experienced in all the countries analyzed, with percentages ranging from 50% (Italy) to 96.4% (Albania). Romania, Greece and Bosnia and

Herzegovina also have a high seismic profile, suggesting a heightened perception of the risk associated with these events. Our data supports the general European framework from Fig. 5.

In the case of floods, Bosnia and Herzegovina (78.3%) and Albania (46.4%) have the highest percentages, indicating more frequent hydrological exposure or recent collective memory related to such events. On the other hand, Italy and Greece register low values (15% and 27.3%), and Romania is at an intermediate level (32.3%).

As far as fires are concerned, Italy stands out clearly, with all respondents reporting that they have experienced such an event (100%). This result is consistent with the recent climatic realities in the region, frequently affected by wildfires and heat waves. Bosnia and Herzegovina (41.3%) and Greece (45.5%) have moderate values, while Romania (26.4%) and Albania (32.1%) have a lower exposure to this type of risk.

MAIN IDEAS FROM THE COMPARISON

- Bosnia and Herzegovina stands out for its high exposure to all three types of disasters.
- Romania and Greece confirm the seismic risk through very high rates of direct experience with earthquakes, but have lower exposure to floods and fires.
- In Italy, on the other hand, the experience with fires is dominant, which may reflect recent climate realities such as heatwaves and wildfires.
- Albania has a moderate and balanced exposure to all three risks, indicating possible versatility in the perceived risk profile.

PROCEDURES COMPARISON

The data collected reflects the existence or absence of key elements such as evacuation plans, information maps, periodic simulations for various emergency scenarios (earthquakes, floods, fires), protective equipment (fire extinguishers, alarms), campus communication systems and lists of responsible contacts. In addition, the degree to which teaching staff and students are informed about these procedures and whether there are specialized departments to coordinate information and training activities shall be assessed.

The data suggest that although many universities have formal procedures in place in case of emergency, transparency, communication and institutional coherence in their implementation remain major challenges. The incomplete or non-existent information of staff and students, as well as the uncertainty regarding the existence of training structures, indicate an acute need to strengthen institutional strategies on preparedness and protection against natural disasters.

The results suggest that, overall, universities in the countries analyzed tend to have procedures in place for managing emergencies, but the degree of formalization and implementation varies considerably. The differences identified may reflect distinct levels of national regulation, organizational safety culture and exposure to natural hazards specific to each country.

Although in some countries (Albania, Italy) there is a strong organizational culture regarding the communication of emergency procedures, in others (Greece, partly Romania and Bosnia and Herzegovina) there are major gaps in the transmission and updating of information. Thus, although procedures formally exist in most universities, the level of dissemination and effective application through staff training remains uneven and represents an important institutional vulnerability.

Also, the information of students is much more deficient than that of university staff, which indicates a serious institutional vulnerability. Especially in Greece and partly in Bosnia and Romania, students — who make up the majority population on campuses — do not receive sufficient training in case of real emergencies.

Furthermore, although some universities formally have specialized departments, the level of communication to the academic community remains insufficient. Thus, the general perception is that responsibilities are diffuse, which can affect the real effectiveness of emergency management.

The following sections of the guide are based on the results we obtained from the survey.

We chose the questions based on a solid documentation from the scientific literature, about the best practices of intervention for each type of natural disaster.

The task of the respondents was to mark which of the procedures for fires/ floods/ earthquakes intervention are known to them as employees of the university.

Based on the frequency of the responses, we put together the following best practices in mitigating natural disasters.

11. Best intervention practices for fires

PROCEDURES OF FIRE INTERVENTIONS

1. To follow the signs to the nearest exit from the fire in an orderly manner.
2. To urge students to stay calm, listen to instructions, move around in an organized manner, keep quiet, and refrain from running.
3. To avoid returning for personal belongings in the affected buildings/rooms.
4. To not use the elevators in the institution.
5. To know where fire extinguishers are located.
6. To pay attention to students with disabilities who require special measures.
7. To activate the fire alarm if a fire is discovered.
8. To call the roll after arriving at the safe location and determine if all students are present and have been evacuated.
9. To call the person responsible for emergencies at university level.
10. To report immediately if there are people missing.
11. To remain in safe zones until it's safe to move.

The fundamental rules of fire evacuation are almost unanimously known and respected. The high level of compliance suggests both the effectiveness of the safety signage installed in the institutions and the existence of a strengthened organizational culture around fire safety. However, there is a small minority that would not follow the evacuation signs, which shows that it is still necessary to carry out periodic practical exercises, in order to transform this declarative knowledge into effective and automatic behaviors in emergency situations.

The basic rules on maintaining calm and discipline in case of fire are very well understood and internalized by the academic community in all the countries analyzed. The small minority that would not adopt this behavior indicates that, although the general level of training is very good, simulation exercises and regular training remain essential to strengthen collective reflexes and reduce the risk of panic in real situations.

The rule on avoiding additional risk exposure for personal belongings is well understood and respected, being perceived as a logical and necessary measure. However, the existence of a small percentage of respondents who would ignore this recommendation (about 1 in 12) shows that, in panic situations, the instinct to recover goods can prevail over reason. For this reason, simulations and practical training remain essential to transform theoretical recommendations into safe reflexes, capable of reducing the risks of additional victims.

The rule on not using elevators is strongly internalized among the academic community, being one of the best-known fire safety measures. However, the minority of respondents who would ignore this prohibition highlights the importance of continuously reiterating this recommendation and organizing practical exercises, in order to prevent dangerous instinctive reactions in real situations.

The dimension of inclusion and solidarity is well represented among the academic community. The majority of respondents recognize the need for measures tailored to people with disabilities, reflecting not only a high level of risk awareness, but also a clear orientation towards respecting the

principles of fairness and protection of the vulnerable. However, the existence of a small percentage of negative responses shows that it is necessary for universities to continue to promote an organizational culture based on inclusion, through specific evacuation plans and dedicated trainings.

The vast majority of respondents are aware of the importance of triggering the fire alarm, an essential measure for alerting others and initiating evacuation procedures. However, the proportion of those who would not activate the alarm (almost 1 in 7) signal the existence of vulnerabilities: either the lack of practical training, or the fear of triggering false alarms. These findings underscore the importance of regular training programs and simulations to turn this rule into a collective reflex.

The overwhelming majority of respondents are aware of the importance of full evacuation verification, an essential measure for collective safety and victim prevention. However, the existence of a small percentage of respondents who would not consider this action necessary suggests the need for additional accountability of teachers and administrative staff, who have a key role in coordinating and completing the eviction process.

Overall, there is a good level of awareness about calling the designated official, but the relatively high proportion of those who would not follow this procedure (especially in Bosnia and Greece) indicate the need for institutional clarity and greater visibility of those responsible for emergency situations.

The immediate reporting of missing or missing persons is perceived as a top priority by the majority of respondents, reflecting a high level of civic responsibility and concern for collective safety. The very low percentage of negative responses suggests that this rule is well internalized and accepted.

The vast majority of respondents are aware of the importance of staying in safe areas until the danger is completely eliminated. The rule is well internalized in all countries, which indicates a high level of discipline and prudence in emergency situations. However, the low percentage of those who would leave safe areas too early suggests that regular simulations and training are needed to turn this attitude into a collective reflex and reduce the risk of premature exposure to hazards.

The answers analyzed in this section show that the overwhelming majority of participants know and declare that they would **comply to the fundamental rules of safety in case of fire**. Following the signs to the nearest exit, staying calm, listening to instructions and avoiding running are almost unanimously accepted measures. Respondents also say that they would not return to the affected buildings to recover personal belongings and that they would avoid the use of elevators, which demonstrates the internalization of some critical rules for accident prevention.

An important aspect is the attention paid to vulnerable people: over 90% of participants recognize the need to support students with disabilities, which reflects an organizational culture oriented towards inclusion and solidarity. In addition, most respondents said they would activate the fire alarm in the event of the discovery of an outbreak, check that all students had been evacuated and immediately report the absence of some people. These behaviors suggest **a clear understanding of each individual's role in collective safety**.

The results also indicate a high **willingness to work with designated emergency officers at university level**, even though in some countries (such as Bosnia and Herzegovina or Greece) the percentages are lower compared

to Albania, where there is full compliance. Overall, participants recognize the importance of institutional coordination and immediate reporting to authorities.

Another significant element is the compliance with the measure to remain in safe areas until the danger is completely removed. The very high proportion of positive responses confirms that this rule is well understood and accepted, reflecting a **high level of discipline and prudence**.

Overall, the data suggest that **fire preparedness is high in all countries analyzed, and most of the fundamental rules are already well internalized**. However, there is a constant minority — about 5–15% of respondents — who would not comply with some of the measures, which shows that periodic simulations, practical exercises and training campaigns are needed to turn this declarative knowledge into collective reflexes.

12. Best intervention practices for floods

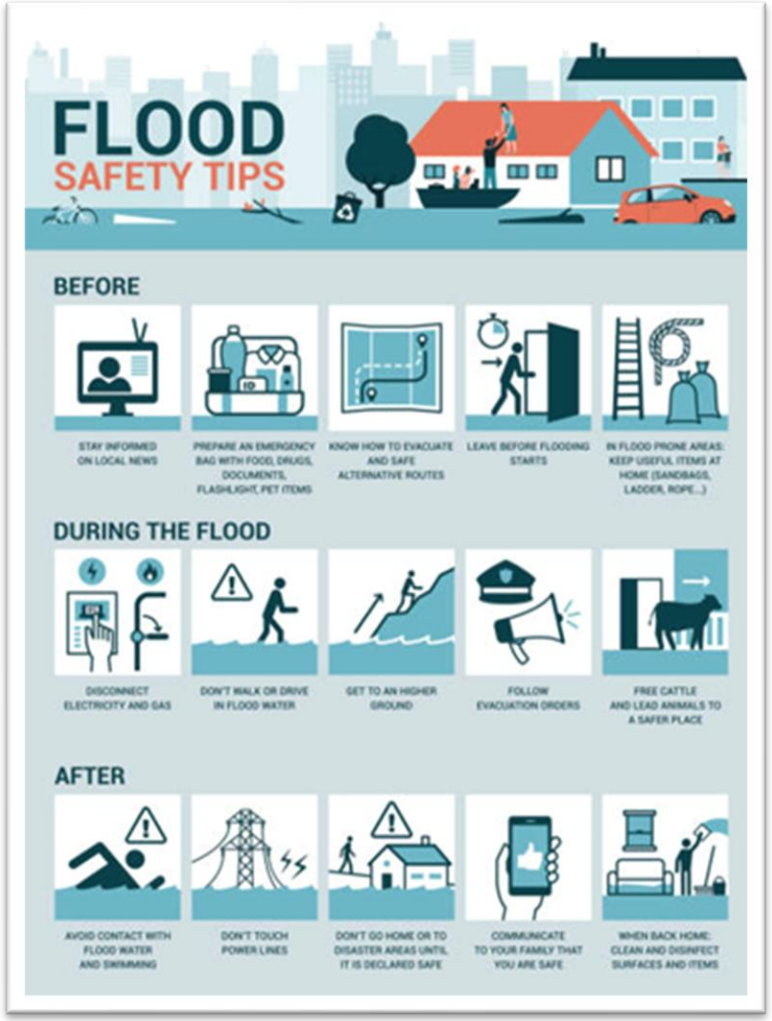


Fig. 7 – *Flood safety tips*
(https://www.istockphoto.com/ro/ilustra%C8%9Bii/preparing-for-flood)

PROCEDURES OF FLOOD INTERVENTIONS

1. To decommission electrical equipment before flooding.
2. To not touch electronic equipment if they are in water.
3. To go up to the upper floors.
4. To watch the media for flood announcements.
5. To not touch electrical cables after flooding.
6. To stay away from flood-affected buildings.
7. To contact the people responsible at the community level for electricity problems.
8. To move very carefully on the stairs in flooded areas to prevent slipping and injury.
9. To use adequate drinking water sources.
10. To disinfect objects that are affected by the flood before use.

Although most respondents are aware of the importance of this measure, there are still a quarter of them who would not disconnect electrical equipment in the event of flooding. This vulnerability indicates the need for practical training and information campaigns on the risks of electric shock and damage to infrastructure in hydrological hazard situations.

The basic rule of electrical safety in flood conditions is almost unanimously known and accepted. The small proportion of those who would ignore this measure (almost 1 in 16 respondents) suggests, however, the need to maintain information campaigns and practical training, as the risk of electric shock remains one of the most serious dangers in flood situations.

Most respondents have internalized the self-protection rule related to moving to higher areas in case of flooding. However, the proportion of those who would not follow this recommendation (around 1 in 6) signal the need for additional training, as the lack of adoption of this behavior considerably increases the risk of exposure to hazards.

The majority of respondents recognize the essential role of the media in transmitting official alerts and recommendations in case of floods. However, there is a significant minority (almost 1 in 5) who would not use this information channel, which signals either a lack of trust in the media or a preference for other sources (social networks, direct communication). This finding underlines the importance of diversifying communication channels and strengthening the credibility of official messages among the university population.

The measure to avoid buildings affected by floods is very well known and internalized by the academic community in all five countries analyzed. The high level of compliance suggests that this intuitive, easy-to-understand rule associated with the risk of structural collapse or electric shock is already part of the common knowledge baggage. However, the existence of a small percentage of negative responses (especially in Bosnia, Romania and Italy) shows that practical education and regular training remain necessary to completely eliminate risky behaviors.

The majority of respondents are aware of the dangers associated with moving on stairs in flood conditions and understand the importance of caution for accident prevention. However, the minority proportion of those who would not comply with this recommendation (especially in Italy and Albania) confirms the need for further practical training and awareness campaigns on the associated risks.

Hygiene and health safety norms are well known among the academic community in all the countries analyzed. However, the existence of a small percentage of negative responses (almost 1 in 12 respondents) highlights the need to continue awareness campaigns on the risks of consuming contaminated water after natural disasters, especially in areas with poor infrastructure or where access to drinking water may be limited.

Although most respondents are aware of the importance of sanitizing objects after a flood, there are notable differences between countries. Italy and, to a lesser extent, Greece and Romania, face lower levels of awareness, which may pose an increased risk to public health in the post-disaster context. This suggests the need for additional educational campaigns and practical training on disease prevention through simple hygiene measures.

Respondents' responses on flood behaviors show that the majority are **aware of the main prevention and protection measures**. Most people say that they would turn off or disconnect electrical equipment before the flood occurs and, almost unanimously, would avoid touching equipment in contact with water, a sign that the risk of electric shock is well understood at the level of the university population. At the same time, most participants recognize the importance of climbing to the upper floors in case of rising water levels and monitoring media announcements.

At the same time, the responses confirm a **high level of compliance with intuitive and fundamental rules**: keeping your distance from the affected buildings, moving cautiously on flooded stairs to prevent landslides, as well as using clean sources of drinking water. In addition, more than 80% of respondents mention that they would disinfect affected objects before reuse, which indicates a correct understanding of the health risks after water withdrawal.

However, the **differences between countries are visible**. Albania and Bosnia and Herzegovina have very high levels of compliance, while Italy and, to a lesser extent, Romania and Greece, have lower percentages of measures such as disinfecting objects or checking water sources. These variations can be attributed to the different degree of exposure to flood risk, but also to educational and institutional preparation.

Overall, the data show that students and academics in the countries analyzed are mostly aware of and comply with the basic recommendations for managing flood situations. However, the minority that would not adopt these measures — between 10 and 20% depending on the indicator — suggests that there is still room for additional training campaigns and practical exercises to strengthen safety reflexes and reduce risks to community health.

13. Best intervention practices for earthquakes

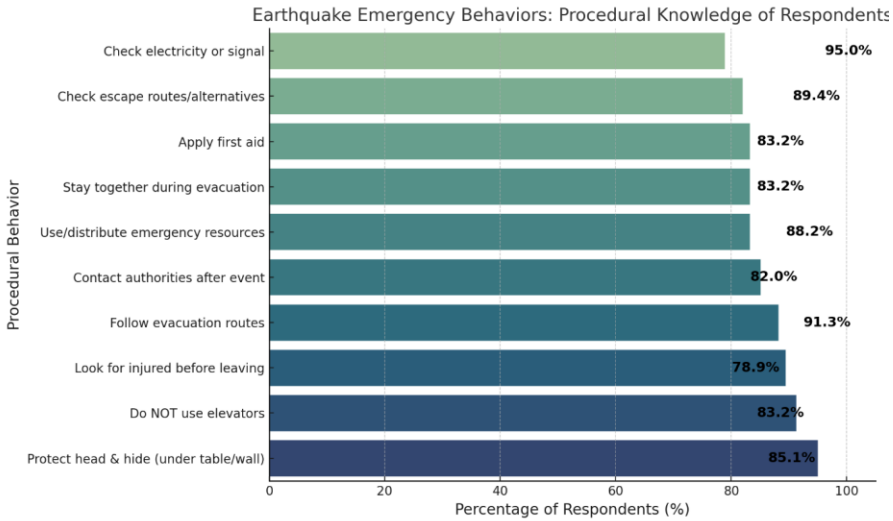
Fig. 8 – *Earthquake tips*
(https://www.earthquakecountry.org/dropcoverholdon/)

PROCEDURES OF EARTHQUAKE INTERVENTIONS

1. To drop on the floor to avoid falling, protect the head, neck, and chest by hiding under a table, a sturdy desk, or near an interior wall of resistance.
2. Watch around for objects that could cause harm if they fall.
3. After the earthquake is over, to look in the room for a few seconds before leaving it, to see if there are any injured people.
4. Apply first aid procedures if there are injured.
5. To stay by each other's side during the evacuation.
6. To follow specific evacuation procedures and routes for leaving buildings safely.
7. To check if the escape routes are safe and/or look for alternatives in case they are blocked.
8. To not use the elevators in the institution.
9. To check if there is electricity or a signal for phones.
10. To utilize and distribute first aid resources after the event (water, food, shelter, etc.).
11. To address the persons/authorities responsible after the natural disaster.

The section on procedural behaviors and knowledge in emergency situations aims to analyze how respondents know and are prepared to apply correct protection measures during an earthquake. Behaviors such as sheltering under a solid table or desk, avoiding the use of elevators, checking evacuation routes, providing first aid to injured people, maintaining calm and following procedures for safely exiting buildings are essential elements of an effective response in such contexts. The level of knowledge and assumption of these behaviors is a direct indicator of the degree of procedural literacy and the efficiency of the training offered in the university environment. The analysis of this type of behavior allows the assessment of the individual and collective capacity to react in a critical situation and highlights the differences between countries according to risk exposure, security culture and institutional preparedness strategies.

Behaviors and procedural knowledge in the event of an earthquake are a key indicator of personal and collective security literacy. The data obtained show a high level of familiarity with the main protective measures, which suggests a good internalization of the behavioral norms associated with such an event.



Fig, 9 - *Procedural Earthquake Response Knowledge – Percentage of Respondents Aware of Recommended Behaviors*

Most of the measures analyzed are well known and internalized, which confirms the conclusions previously presented on the high level of procedural literacy. The high percentages reflect not only the effectiveness of previous trainings, but also a possible cultural familiarity with seismic risk among respondents.

The distribution of responses by country confirms a relatively uniform degree of procedural awareness, with small variations. Romania, Greece and Bosnia and Herzegovina stand out for their constant and high positive responses, while Italy and Albania show some differences, especially in terms of post-event reactions (checking the phone, contacting the authorities).

Overall, the data reflect a strong culture of earthquake prevention, both individually and collectively, which can be correlated with the frequency of this type of risk in the areas analyzed and the degree of institutional integration of safety measures.

A high level of awareness and knowledge of self-protection measures in the event of an earthquake, probably due to public information campaigns, the direct experience of the population with seismic hazards and the inclusion of this type of recommendations in educational programs. In contrast to the results in the previous tables (where there were gaps in formal information about the procedures), here the individual knowledge seems solid and evenly distributed, which is a strong point of the security culture in the region.

The university population in the five countries has a good level of knowledge on safe behaviors after an earthquake, confirming a culture of prevention and solidarity in emergency situations. The fact that respondents understand the importance of assessing the immediate environment for identifying victims suggests an awareness not only of self-protection, but also of collective responsibility.

Overall, the majority of respondents have a positive attitude towards the application of first aid procedures, which confirms an important level of civic responsibility and solidarity in emergency situations. However, the percentage of those who would not intervene (almost 1 in 6) indicates the need for practical training programs and better training in the field of first aid.

A strong spirit of solidarity and cooperation among respondents, which can contribute to a safer and more efficient evacuation in case of emergency. However, the minority proportion of those who would not comply with this rule suggests that there is still room for awareness and training campaigns on the importance of group cohesion during eviction.

Compliance with official eviction procedures is strongly internalized by the academic community in the countries analyzed. The high compliance rate reflects both individual awareness and confidence in the effectiveness of these procedures for reducing risks. However, the minority proportion of those who would not follow evacuation routes (especially in Greece and Bosnia) suggests that communication barriers or deficiencies in practical training still exist.

In general, the majority of respondents are aware of the importance of checking and adapting evacuation routes, but there is still a significant percentage (almost 1 in 5) that would not consider this measure. This gap highlights the need for additional practical training campaigns and evacuation simulations, aimed at strengthening collective reflexes in the face of emergency situations.

The rule of avoiding the use of elevators is strongly internalized by the academic community, probably due to constant information campaigns and the intuitive nature of this measure. Even so, the minority percentage of those who would use the elevator (especially in Romania and Albania) shows that there is a need to strengthen practical training and explain the major risks associated with using it during earthquakes or fires.

Most respondents are aware of the importance of checking basic infrastructure (electricity, communications) immediately after an emergency, but differences between countries suggest different practices and priorities. Particularly in Italy and Romania, the higher proportion of negative responses may signal either a lack of clear training on these checks, or a different perception of the role of this behavior in ensuring safety and communication.

Solidarity and community cooperation are strong traits among respondents from all countries analyzed. The overwhelming majority recognizes the importance of managing basic resources for survival in the immediate aftermath of a disaster. However, the existence of a large minority (almost 1 in 6 respondents) who would not adopt this measure highlights the need for additional educational programs on the importance of collaboration and equitable sharing of resources in crisis contexts.

Overall, respondents have a high level of trust in the role of authorities and institutional leaders after a natural disaster, recognizing the importance of their involvement in managing the situation. However, the minority percentage of those who would not do so (almost 1 in 7 respondents) suggests the existence of communication barriers, distrust in institutions or lack of clarity regarding post-disaster procedures.

Participants' responses highlight a **high level of awareness regarding recommended behaviors in earthquake situations**. The overwhelming majority of students and academics say they would check the room immediately after the earthquake to make sure there are no injured people, and most recognize the importance of applying first aid procedures. Also, organized evacuation is perceived as a priority: respondents say that they would stay together throughout the trip and follow the established routes, adapting in case of blockages by identifying alternative routes.

Fundamental rules, such as avoiding the use of elevators, are almost unanimously internalized, suggesting that these measures have been well assimilated into the public consciousness. At the same time, a significant part of respondents underlines the importance of checking the basic infrastructure (electricity, telephone signal) and recognize the role of distributing emergency resources (water, food, shelter) in the immediate aftermath of the earthquake. In addition, appealing to the responsible authorities is mentioned as a necessary practice by the majority of participants, which reflects a **high degree of trust in public institutions**.

However, **the comparative analysis between countries reveals some differences**. While in Albania and Romania the degree of compliance is very high, Italy and, to a lesser extent, Bosnia and Herzegovina and Greece record lower percentages in terms of providing first aid or reporting to the authorities. **These discrepancies can be explained either by different levels of practical training or by distinct perceptions of the role of institutions**.

Overall, the data indicate a **solid preparedness for seismic situations**, accompanied by a **well-defined spirit of solidarity and cooperation**. However, the minority of those who would not comply with the basic recommendations show that additional training, practical exercises and awareness campaigns are still needed to standardize the level of training and reduce vulnerabilities at the level of university communities.

14. Capacity for human intervention and training

The analysis of data on the training of students and teachers, as well as the infrastructural endowment of universities, highlights both strengths and significant vulnerabilities in the capacity for human intervention in emergency situations.

In terms of student training, the results show that the level of preparedness for first aid is low and unevenly across the countries analyzed. **Only a third of respondents confirm that students benefit from training** in this regard, and the proportion of those who do not know is very high. This highlights both the lack of systematic programs and deficiencies in institutional communication. Albania and Italy are in a relatively better position, but in Bosnia and Herzegovina and Greece the level of preparedness is extremely low.

The situation is not much different in the case of teachers. Although teachers play a key role in managing emergencies, **only a third of respondents say they are trained in providing first aid**. In Albania and Italy, the percentage reaches 50%, but in Romania and especially in Greece the level is much lower. The presence of a large number of "don't know" answers suggests the lack of visibility of these training programs, even when they exist.

From the point of view of **safety infrastructure**, the data are more **favorable**. The majority of respondents confirm the existence of fire alarms both on campuses and in administrative buildings. Italy and Albania stand out for an almost complete level of coverage, while Romania also shows good results. In contrast, Bosnia and Herzegovina and Greece record lower percentages, below 70% in the case of administrative buildings, revealing important structural vulnerabilities.

Overall, a mixed picture emerges: **the infrastructure is generally well developed and visible, while the actual training of the university community remains insufficient.** This discrepancy highlights a major risk: even if there are equipment and procedures, their effectiveness depends on people's ability to act correctly and promptly. Therefore, universities should intensify their efforts not only in the technical endowment, but especially in the implementation of training programs and practical simulations, which transform declarative rules into real competences and reflexes of collective behavior.

The analysis of data on human intervention capacity and university training in emergencies highlights a mixed picture: although basic infrastructure and facilities are in place, **training and communication are often insufficient or unevenly distributed across countries**.

A first aspect refers to the training of students and teachers in providing first aid. The data show low levels of training: only about a third of respondents confirm that students or teachers are trained in this regard. The differences between countries are notable: Albania and Italy show better results, while Bosnia and Herzegovina and Greece have the lowest values. Moreover, the large number of "don't know" answers signal the lack of transparency and visibility of programs, even when they exist.

At the infrastructural level, the situation is more favorable. Fire alarms are present in most campuses and administrative buildings, with very good results in Italy, Albania and Romania, but with visible shortcomings in Bosnia and Herzegovina and Greece. Contact lists and evacuation plans/maps exist in less than three-quarters of universities, and their visibility is limited: many respondents say they do not know if these tools are available.

A critical point is the simulations and practical exercises. Only a third of respondents say that they are organized regularly, while the majority confirm their absence or the existence of only punctual exercises (especially for fires). The lack of these simulations significantly reduces the ability of the university community to transform theoretical rules into effective behavioral reflexes.

In terms of communication systems, the data show **structural and organizational deficiencies**. Only half of the respondents confirm the existence of clear alerting mechanisms, and when they exist, traditional

solutions predominate: sound systems and posters. The use of modern technologies, such as alerting apps or integrated digital systems, is marginal. The same trend is reflected in, where only 61.5% confirm that there are dedicated information systems for staff and students. In Bosnia and Herzegovina and Greece, these percentages fall below 50%, which is a major vulnerability.

As for protective equipment, the data are more positive. Almost all universities are equipped with fire extinguishers and other basic equipment; these are ubiquitous and form the backbone of the protective infrastructure. However, additional equipment such as smoke detectors, hydrants, fire doors or sprinklers is not evenly distributed. In addition, a small but relevant percentage of respondents indicate a lack of facilities or lack of knowledge of them.

Last but not least, there is also a preventive dimension related to the vigilance of the university community. The majority of respondents state that they are attentive to objects that can cause fall damage during a disaster (Table 46), which shows a good level of individual awareness.

15. Results of the focus groups

BOSNIA AND HERZEGOVINA

By bringing together individuals with different roles within the university (from senior leadership to students), the focus group method ensured that all aspects of disaster resilience were covered—from strategic planning to operational execution, and the practical concerns of students. Additionally, the collaborative environment fostered by the focus group setting encouraged participants to reflect on their own experiences and the

challenges faced by others, leading to richer insights into potential solutions for improving disaster preparedness.

Earthquake Preparedness. Participants agreed that the risk of earthquakes in Zenica is real, heightened by mining pits around the city which could exacerbate damage. Concerns focused on:

- Safety of older university buildings and their structural resilience.
- Lack of visible and practiced emergency procedures, which undermines confidence in readiness.
- Emotional impact: strong fear and stress among staff and students in case of sudden events.

Flood Preparedness. Participants highlighted that flood risk is seasonal but significant, recalling the 2014 floods and recent events in B&H. Concerns focused on:

- Flooding could disrupt teaching, research, and damage equipment.
- Drainage and illegal logging were noted as aggravating factors.
- Emotional stress and student safety during commuting were emphasized.

Fire Preparedness. The risk of fire was rated lower than earthquakes or floods, but not negligible. Concerns focused on:

- Participants mentioned outdated wiring, laboratory equipment, and human error as possible triggers.
- While extinguishers are available, drills and systematic staff/student training are lacking.

Resources and Coping Mechanisms.

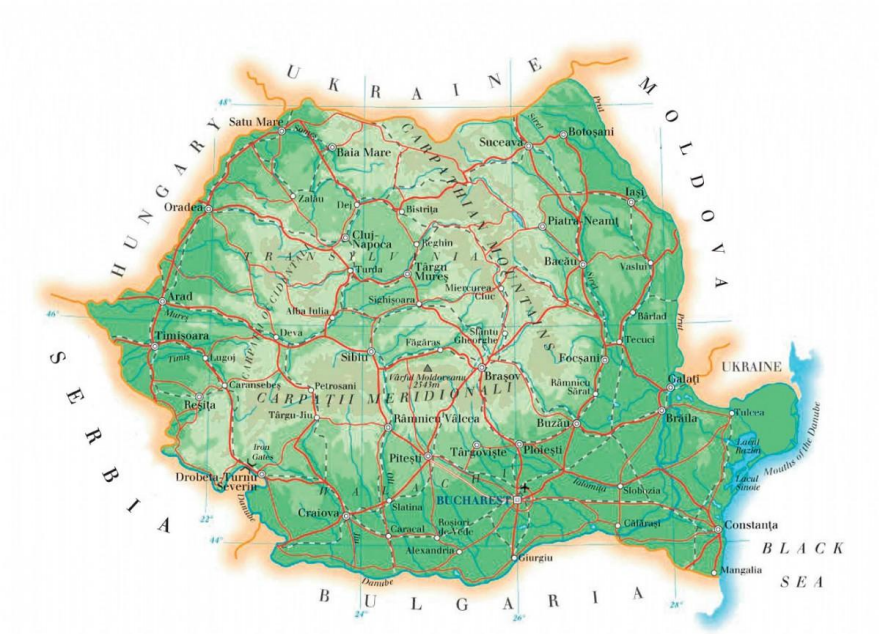
- Personal: resilience, ability to stay calm, preparedness kits, family and social support.
- Institutional: clear protocols, transparent leadership, psychosocial support, flexible work/study arrangements, strong communication channels, digital infrastructure for remote teaching.
- Community dimension: solidarity and mutual help within the university community were repeatedly mentioned as a strength.
- *Communication Protocols*. Current methods (alarms, written notices) are viewed as insufficient and outdated. Participants suggested multi-channel communication systems including SMS alerts, mobile apps, loudspeakers, and digital signage.
- *Infrastructure and Building Safety*. Older university buildings lack adequate evacuation routes and modern fire safety documentation. Participants suggested risk assessments per building, clear evacuation signage, and addressing bottlenecks in stairways and corridors that could hinder evacuation.
- *Psychological Dimension and Community Resilience*. Participants stressed emotional preparedness as critical, highlighting strong anxiety linked to earthquakes. Emphasis was placed on peer-to-peer support and the value of student solidarity in emergencies. The idea of psychological training sessions was supported.
- *Training and Student Involvement*. Students from Occupational Safety proposed integrating mandatory safety drills into curricula. Staff emphasized first aid training for students and employees, potentially in cooperation with the Faculty of Medicine. Student peer-trainers could play a central role in awareness campaigns.

Suggestions for optimizing institutional activity in calamity situation. Following the discussion, following suggestions for improvements were highlighted by the focus group:

- Initiate clearer and more specific training/education and drills in the event of natural disasters.
- Familiarize employees and students with the procedures at the university and canton levels.
- Introduce practical training for students as they were not legally required to undergo it as opposed to employees.

- Highlight evacuation plans at all organizational units after previously completed elaborations.
- Improve the alarm system in the event of natural disasters at all organizational units.
- Engage students from the Department of Occupational safety and medicine to conduct workshops for other students.
- Create joint posters to be displayed at organizational units as instructions for employees and students.
- Record short educational videos that will be available on websites and faculty premises.
- Include this topic and video as the obligatory material for all freshmen students in the opening hour of the University.

ROMANIA



The focus group discussions highlighted a consensus on the urgent need to strengthen the institutional preparedness for disasters, both at the infrastructure and procedure level, as well as on the practical and psychological training of staff and students. The participants pointed out that there are currently gaps in evacuation plans, communication protocols and clear information for members of the university community on how to act in case of emergencies.

At the same time, existing strengths were highlighted, such as the training of medical students in first aid and specific teaching infrastructure (mannequins, simulators), which could be harnessed in the interdepartmental training of the entire university community. The participants emphasized the importance of regular and applied exercises with physical presence to train the adaptive behaviors necessary in crisis situations.

The discussions also highlighted the need for psychological preparation and the development of personal and collective resilience in the face of disasters, which is considered as important as physical training. The potential for the involvement of psychology specialists in teacher training, auxiliary staff and students for the effective management of emotional reactions in such contexts was discussed.

The participants stressed that the training efforts should not be punctual, but integrated into the long-term institutional strategy, and the self-organization and collegial initiative were identified as important resources in increasing the resilience of the academic community. It stressed the importance of allocating adequate resources, periodically reviewing evacuation plans and interdepartmental collaboration in building a safe and prepared university environment for any emergency situation.

The analysis of all the data captures a nuanced picture of the level of emergency preparedness in the universities of the five participating countries. Broadly speaking, the fundamental rules of behavior in the event of an earthquake, fire or flood are well known by students and university staff, but their practical application and infrastructural support differ considerably from one national context to another.

With regard to earthquakes, the responses show a good understanding of the essential measures: protecting the injured, providing first aid, organizing evacuation and avoiding lifts. Cooperation and solidarity appear as common features, although in Italy and Bosnia there are lower percentages on certain questions.

For floods, most respondents recognize the importance of simple but vital measures: disconnecting electrical equipment, going upstairs, using clean water, or disinfecting objects touched by water. However, there are visible differences between countries: Albania and Bosnia have a high level of compliance, while Greece and Italy show lower values on several indicators.

In fires, the level of awareness is even higher. Most would follow the escape routes, keep calm, would not return for goods and would avoid elevators. There is also an increased attention to vulnerable colleagues and a willingness to quickly report critical situations. However, there remains a small part of respondents (about 5–10%) who would not comply with these rules, which shows that practical exercises are still necessary.

The most problematic dimension Is related to the capacity for human intervention and institutional preparedness. Even if the basic infrastructure is present (alarms, fire extinguishers, evacuation plans), the practical training of students and teachers is modest, and emergency simulations are rarely organized. Also, communication systems exist in many universities, but traditional variants (sound ads, posters) are mostly used, while fast digital solutions are barely mentioned.

In short, universities in the countries analyzed have a relatively solid safety infrastructure and a community aware of the basic rules. However, there remains an important gap between what is known and what is being done. Insufficient practical training, lack of exercises, and poor communication are the most obvious vulnerabilities.

Best Practices in Disaster Risk Reduction in Education: Case Studies from Bosnia and Herzegovina

In the context of increasing climate-related and natural hazards, strengthening resilience in the education sector has become a critical component of national disaster risk reduction strategies. Bosnia and Herzegovina, through partnerships with the United Nations and international donors, has piloted several innovative approaches to safer schools. Two best practices stand out — not only for their effectiveness but also for their potential to be replicated across similar contexts.

1. VISUS Methodology: A Structured Approach to Identifying School Safety Needs

One of the most significant steps forward has been the introduction of the VISUS methodology (Visual Inspection for defining Safety Upgrading Strategies) in Bosnia and Herzegovina, implemented under the UN's "Disaster Risk Reduction for Sustainable Development" program.

This methodology is designed to support decision-makers in assessing the safety of school infrastructure through structured visual inspections. Rather than relying solely on expensive technical assessments, VISUS enables a multi-hazard evaluation of school buildings, identifying potential risks related to earthquakes, landslides, floods, and structural weaknesses.

What sets VISUS apart is its systematic and prioritization-based approach. Inspectors not only document physical vulnerabilities but also assess the urgency of interventions, estimate required financial investments, and propose tailored strategies for each facility. In a country where resources for infrastructure upgrades are limited, this evidence-based prioritization allows ministries and local governments to allocate funds more efficiently and equitably.

Crucially, the implementation in Bosnia and Herzegovina involved academic institutions, particularly the University of Sarajevo and the University of Banja Luka, as technical partners. These universities played a central role in localizing the methodology, conducting inspections, and training future professionals. This partnership ensured that technical capacity remains within the country, strengthening long-term sustainability.

In practice, VISUS empowers governments to act not on assumptions, but on data. It ensures that the most vulnerable schools are addressed first, and that the solutions proposed are realistic, cost-effective, and locally appropriate.

2. Safe School Environment Model: Building a Culture of Preparedness

While VISUS addresses the physical safety of school facilities, a parallel initiative, the Safe School Environment Model focuses on the people who occupy those buildings every day.

Developed under the same Joint Swiss-UN DRR program, this model introduces a comprehensive framework for emergency preparedness within schools, aiming to build institutional and community-level resilience. The program supports schools in developing emergency response plans, conducting drills, and forming Disaster Risk Reduction (DRR) teams made up of staff, students, and local stakeholders.

Training is a central component. Teachers and students receive practical instruction on how to respond during fires, floods, earthquakes, or other emergencies. In 10 pilot schools, over 3,000 students have already participated in training activities, and school-level DRR teams have been formally established and linked to municipal risk management platforms.

This integration of school-based efforts with local disaster response structures ensures that preparedness does not remain isolated at the institutional level but becomes part of a broader system of community resilience.

The Safe School Environment model shifts the paradigm from reactive to proactive. It helps schools become active agents of safety, not just passive recipients of aid in the aftermath of a disaster.

3. Digital Disaster Planning: The DRAS Platform in Bihać

As disaster risks become more complex, the need for digital tools in local planning is increasing. In the city of Bihać, this challenge has been met with the introduction of the DRAS platform (Disaster Risk Assessment and Simulation), supported by the United Nations Development Programme (UNDP). This platform represents a significant step toward modernizing how municipalities prepare for and respond to natural hazards.

The DRAS platform offers a suite of digital tools that help visualize, simulate, and plan for disasters such as floods, fires, and earthquakes. It integrates geographic data with population and infrastructure maps to support targeted risk management strategies.

What makes the DRAS platform particularly valuable is its integration into local decision-making processes. It is actively used by municipal civil protection services, urban planners, schools, and NGOs to prioritize risk-reduction investments, develop response plans, and educate communities.

The outcomes so far have been promising. The platform has significantly improved both institutional and community-level awareness of local hazards. It has also contributed to more efficient resource allocation and faster emergency planning. The active involvement of educational institutions and civil society ensures that the tool is not only technical but also widely understood and used.

This initiative reflects how digital innovation can enhance disaster preparedness and resilience at the local level. Bihać's experience shows that accessible and well-integrated digital tools can empower communities to make informed, life-saving decision.

Best Practices in Disaster Risk Reduction in Education: Case Studies from Italy

Seismic Emergency – University of Naples "Federico II"

Source: University of Naples Federico II. Prima simulazione di emergenza terremoto del Dipartimento di Biologia. Retrieved from https://www.dipartimentodibiologia.unina.it/prima-simulazione-di-emergenza-terremoto-del-dipartimento-di-biologia/

The University of Naples Federico II has established an integrated model for seismic risk management, combining technical guidelines, clear assignment of responsibilities, communication tools and practical evacuation drills. The initiative is documented in a comprehensive operational plan, supported by an informational brochure and the recording of a first live simulation conducted at the Department of Biology.

Preparatory steps include updating the emergency management team, verifying evacuation routes and assembly areas, and checking equipment. Each drill is preceded by a planning report detailing the schedule and is attached to the Emergency Management Plan, guaranteeing traceability and procedural consistency.

The alert protocol uses two distinct signals: Signal 1 (simulation start) and Signal 2 (full evacuation). When available, audio messages are broadcast via the public address system from the Emergency Management Centre. This dual-phase signalling helps test both notification and evacuation readiness.

The simulation held on 19 October 2023 in Building 7 at Monte Sant'Angelo simulated an earthquake of magnitude greater than 5.0. Following the initial warning, Signal 1 was issued at 11:00 and Signal 2 at 11:02, initiating a floor-by-floor, orderly evacuation based on emergency plans. The entire evacuation, including room checks across all floors, was completed in approximately six minutes. Once concluded, the coordinator declared the "all clear," allowing re-entry; drill logs and any non-conformities were documented and forwarded to relevant offices for corrective actions.

A key element is the inclusion of persons with disabilities. The plan requires prior identification of such individuals, assignment of specific support responsibilities and collaboration with the Rector's Disability Delegate to ensure accessible evacuation routes and assembly points.

The informational brochure communicates behaviour guidelines during and after tremors (seeking cover, avoiding elevators, checking on others, securing gas and chemicals) along with emergency numbers and a functional organigram. This instrument promotes public awareness and consistent behaviour both in normal conditions and emergencies.

Federico II's model stands out for its comprehensiveness: combining planning, execution, documentation and inclusivity. Measuring evacuation time and

documenting non-conformities make each drill an organizational learning tool, enabling targeted updates to the Emergency Management Plan and prioritizing structural or logistical improvements.

Finally, by integrating proactive communication, scheduled simulations and engagement of technical and administrative staff, the university fosters a culture of shared safety. The Department of Biology's experience illustrates a replicable model. Universities wishing to adopt it should develop written procedures, clear organizational charts, evaluation tools (reports and logs) and training programs for the entire community.

16. Suggestions

Following the focus group discussions, a wide range of possible improvements were outlined that could be implemented at institutional level, in order to increase preparedness and resilience in situations of calamity.

- 'The universities' management should conduct a risk analysis for each building, identifying potential hazards and mitigation strategies.
- The universities should hold regular disaster preparedness meetings and exercises for staff and students.
- The Faculty of Medicine should work with other departments to provide first aid courses to university staff and students.
- The Psychology Department should develop training courses on psychological reactions that occur during disasters and coping mechanisms.
- The universities should review and update evacuation plans and signage in all buildings.
- The universities should form a working group to further develop disaster preparedness initiatives throughout the institution.
- Facility management should assess and improve emergency exits, especially in problem areas such as basements and isolated rooms.
- The universities should integrate disaster preparedness information into training programs for new employees and students.
- The faculties should develop a strategy for emergency notifications and communications during disasters.
- The management team of the university should allocate resources for improving infrastructure and training in case of disasters.
- The universities should develop an integrated emergency communication plan, including multiple channels (mobile applications, emails, digital displays and sound alarms), periodically tested to ensure effective real-time operation.
- The universities should organize interdisciplinary simulations, involving all faculties, to practice cooperation between various departments in case of emergency situations.
- The universities' management should establish clear protocols on the roles and responsibilities of teachers, auxiliary staff and students in each type of disaster, so that each person knows exactly what to do.
- The universities should create visual and accessible information materials, such as brochures, posters and explanatory videos for evacuation procedures and first aid, distributed both physically and on online university platforms.
- The universities should create and maintain an updated database of resources and emergency contacts, quickly available to all members of the academic community.
- The Department of Psychology should periodically monitor the psychological state of staff and students involved in real exercises or events, through psychological support sessions and counseling.
- The universities should periodically evaluate the effectiveness of emergency preparedness programs by collecting structured feedback from participants and adapting programs according to the identified needs.
- The faculties should promote an organizational culture of safety and resilience by periodically including these themes in curricular and extracurricular activities.

17. Useful resources

This section provides additional information about natural disaster mitigation, prevention and strategic action, based on the scientific literature in the field. Please consult:

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