RESILIAGE
Revolutionising
community resilience

PSYCHO-SOCIAL RESILIENCE AND RISK COMMUNICATION IN DISASTERS

7th Edition - 15th June 2025

www.resiliage.eu

Funded by
the European Union

INTRODUCTION

RESILIAGE is a three-year European research project (2023-2026) focused on enhancing community resilience through the integration of cultural and natural heritage in Disaster Risk Reduction (DRR). Funded by Horizon Europe, it explores how heritage, as a significant resource of local communities, can strengthen societal resilience in the face of natural hazards and extreme events. By conducting field research and engaging communities in multi-hazard scenarios, RESILIAGE aims to co-generate actionable knowledge, empowering communities to better prepare for and mitigate disaster risks, while also addressing the effects of climate change.

The project is led by Politecnico di Torino and involves 18 partners from 10 countries, including first responders, policymakers, citizen associations, and heritage organisations. Through its **five CORE Labs** established in different countries, RESILIAGE uses a **S**ystemic **R**esilience **I**nnovation (**SyRI**) framework to analyse governance, social interaction, and other critical factors. This framework identifies and improves practices that strengthen community resilience, using cultural heritage in disaster risk management and climate change adaptation. In addition, each CORE Lab specialises in a specific governance scale, including city district, municipality, municipality network, regional, and cross-regional.

By engaging stakeholders in collaborative and participatory processes, the project seeks to **create digital tools** and **soft solutions** that strengthen community preparedness and promote long-term strategies for disaster resilience.

CONTENT

The **Booklet #7 Psycho-Social resilience and risk communication in disasters** explores the psychosocial approach in RESILIAGE, focusing on **how recent crises and disasters have impacted the lives, livelihoods and environments** of European citizens in unforeseen and unprecedented ways. These events have highlighted a significant gap in our understanding of individual and collective behaviour during such emergencies, a gap that undermines the effectiveness of first responders (FRs), the design of technological systems and the development and implementation of adequate policy measures such as Preparedness Plans (PPs) across different scales.

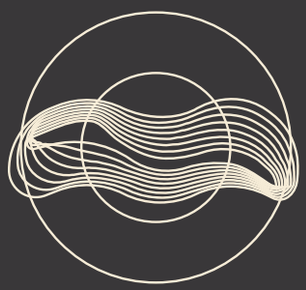
Crucially, **crises unfold over different timescales (before, during and after the event)** and anticipating **human behaviour** across these phases is **essential for building resilience.** The way individuals perceive a threat can significantly influence whether a crisis becomes disruptive. Unfortunately, **people often lack clear knowledge about how to act** when a disaster strikes, and their behaviours may not be appropriate or safe. Risk perception is shaped by heuristics which, while efficient, also introduce cognitive biases. As Jensen and Ong (2020) argue, **understanding how people perceive risk is vital for effective disaster risk management.** It enables better emergency response planning and can motivate citizens to take preventative action. Communication therefore plays a pivotal role in correcting biased perceptions and promoting more objective and informed responses to risks.

The psychosocial approach in RESILIAGE also addresses the **mental health impacts that follow disasters.** These impacts can include post-traumatic stress disorder (PTSD), depression, and other psychological conditions (Boscarino et al., 2014; De Jesús et al., 2022). Often, **contingency plans overlook mental health considerations** and individuals may find themselves without effective psychological coping mechanisms. However, trauma is not solely a source of harm, it can also catalyse post-traumatic growth (PTG). As described by Magne, Jaafari and Voyer (2021), PTG refers to the **positive psychological changes that some individuals experience after a major trauma.** These changes can include a renewed appreciation for life, strengthened relationships, personal growth, new opportunities and the development of a deeper sense of spirituality.

To explore these themes, RESILIAGE conducted two complementary field studies within its five CORE Labs:

- **An experimental study** examined how to communicate **natural hazard risks in advance.** Participants were invited to view three different poster designs displaying ten key safety behaviours related to local disaster scenarios (e.g., floods, earthquakes, wildfires, heatwaves, landslides). Each poster **varied in the level of detail,** from pictograms alone to pictograms with brief text and, finally, pictograms with more detailed illustrations. An eye-tracking camera was used to analyse participants' **visual engagement with each poster**, while pre- and post-questionnaires measured **changes in risk perception and emotional response.**
- **An online survey**, distributed from April to July 2024, collected data from citizens in all five CORE Labs. It explored **individuals' past experiences with natural hazards**, their perception of associated risks, their trust in institutions and both the negative (e.g., PTSD) and positive (e.g., PTG) psychological effects of those experiences.

Discover how experimental **poster-based communication strategies were tested across Europe using eye-tracking technology**, and learn what an online survey revealed about real-life disaster experiences, mental health outcomes, and trust in institutions. Together, these insights contribute to shaping more resilient communities and more human-centred crisis responses.



Core Lab

Famenne - Ardenne
BELGIUM

FAMENNE-ARDENNE CORE LAB

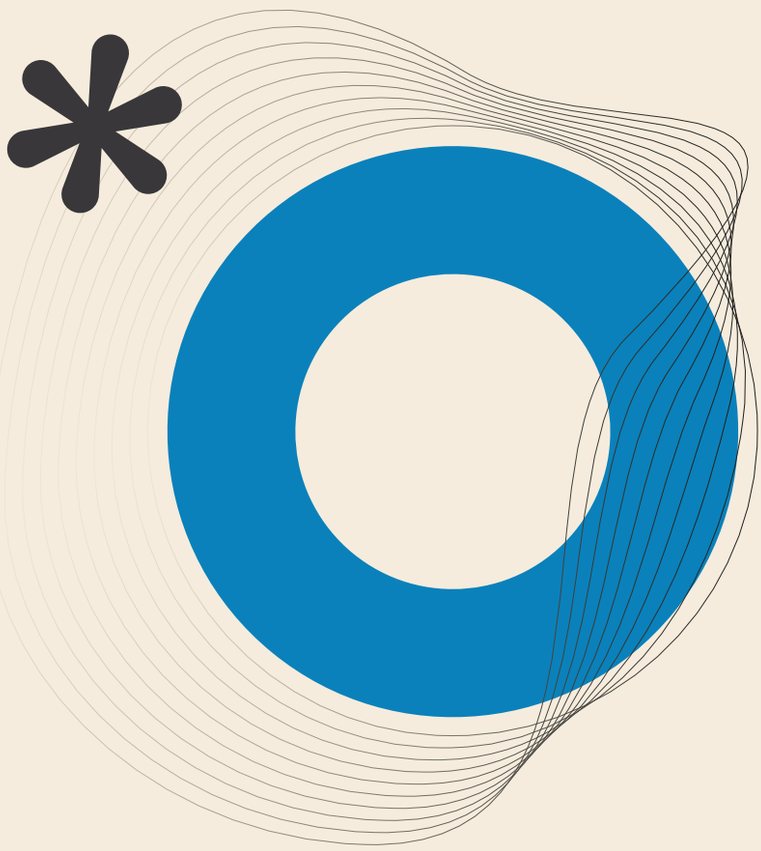
EYE-TRACKING EXPERIMENT: COMMUNICATING THE RISK BEFORE DISASTER

Core Lab
Famenne - Ardenne
BELGIUM

Impact of visual communication

Posters showing **behaviours to adopt in natural hazard situations** help promote risk perception and support emotional regulation. After viewing these posters, participants reported a **decrease in both positive and negative emotions**. This shows that simple and concise visual communication is effective in encouraging adaptive behaviour during disasters by strengthening risk awareness and emotional stability.

However, a high perception of risk and emotional regulation alone are **not enough to ensure that individuals will take action to adapt**. Visual communication should therefore **be combined with more engaging methods** such as exercises, workshops, and training sessions to encourage active participation and preparedness.



Characteristics of visual communication media

Eye-tracking measurements provided further insights into the **effectiveness of the posters**. The clarity and detail of the poster must be tailored to the purpose of the communication:

- The **'pictograms only poster'** is the simplest but may lack sufficient detail for promoting deep understanding.
- The **'pictograms and texts poster'** (simplified with explanatory text) allows information to be processed faster and is therefore the most appropriate for immediate crisis situations. It strikes a balance between clarity and speed of understanding.
- The **'illustrations and texts poster'** (the most detailed) takes longer to process visually, making it less suitable for emergency situations. However, it gives people a stronger sense of understanding the risk, which can increase their feeling of control, reduce uncertainty, and improve preparedness.

It is **advisable to use more detailed and explicit communication materials** before a disaster to build knowledge, and simpler, faster-to-read materials during an actual emergency.

"pictograms only" poster | "pictograms and texts" poster | "illustrations and texts" poster

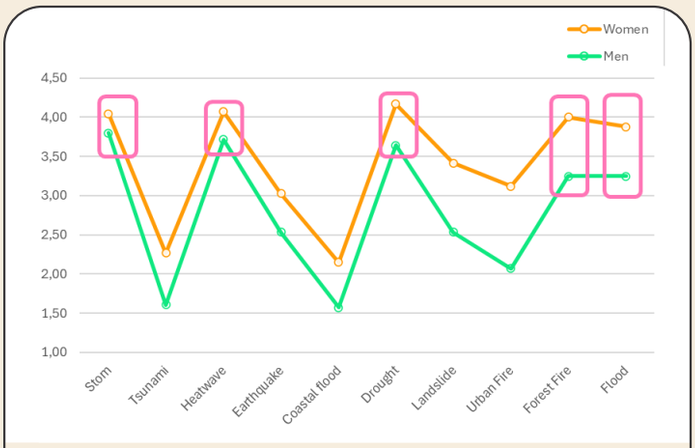
Online survey on risk perception and psychological impacts of past disasters

Perception of the risk of natural hazard

Participants generally viewed environmental hazards as **more dangerous for others than for themselves.** This reflects comparative optimism (Weinstein, 1980), which can hinder disaster preparedness. It is important to communicate the specific vulnerabilities of CORE Lab populations to counter this bias.

Interestingly, **prior experience of natural hazards did not significantly influence** participants' current risk perception. Participants viewed droughts and wildfires as the most significant risks, despite the recent major floods of 2021, likely due to increased media focus on climate change and heat-related disasters. This highlights the **need to ensure that floods remain a priority** for citizens of Famenne-Ardenne.

Women consistently perceived disaster risks as more threatening than men.



Level of risk perception of different natural hazards (out of 5)

Trust in institutions

Participants placed the **most trust in family, friends, and rescue organisations** for disaster management, and the least trust in religious organisations, local authorities, and national governments.

When it came to providing reliable information, **scientists, rescue services, and healthcare professionals were the most trusted sources**, while religious groups, local authorities, and national governments were again seen as less reliable.

Psychological impacts of natural hazards

Around 11.8% of participants showed symptoms of **post-traumatic stress disorder** (PTSD), with two-thirds being women. No first responders (FRs) reported high PTSD scores. This higher vulnerability among women aligns with findings that **women perceive greater risk**, which can heighten emotional distress and impede adaptive behaviour (Blondé & Girandola, 2016).

PTSD symptoms can affect both **direct victims and those indirectly exposed through family, friends, or the media**. Thus, mental health support must extend to indirect victims as well.

At the same time, PTSD symptoms and high-risk perception can be linked to post-traumatic growth (PTG), highlighting the **potential for positive psychological change after disasters**. Encouraging PTG is essential to help individuals recover and grow from traumatic experiences.

Finally, the survey showed that **greater trust in institutions was associated with fewer PTSD symptoms and higher levels of PTG**. Trust in scientific, health, and rescue organisations therefore appears to play a crucial role in maintaining mental health following a disaster.

Core Lab
Crete
GREECE

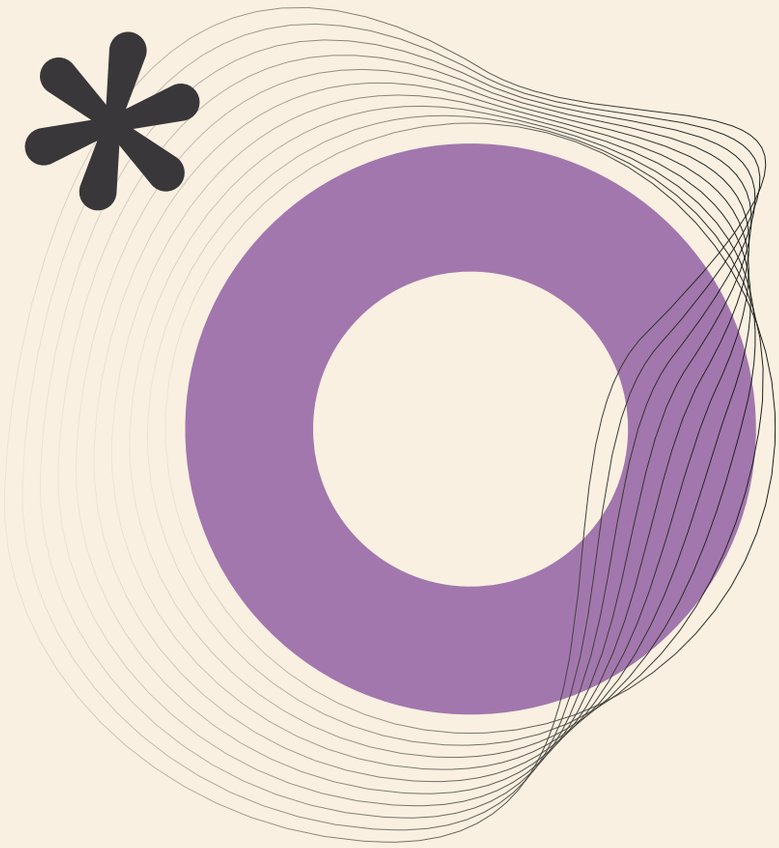
CRETE GREECE CORE LAB

COMMUNICATING THE RISK BEFORE DISASTER

Core Lab
Crete
GREECE

Impact of visual communication

Posters showing behaviours to adopt in natural hazard situations were found to **encourage risk perception and support emotional regulation**. After viewing the posters, both positive and negative emotions decreased. This simple and concise form of visual communication helps **foster adaptive behaviours** during disasters by strengthening awareness and emotional control.
However, a high perception of risk and changes in emotion alone are **not enough to guarantee that people will actively take steps to adapt**. Therefore, visual communication through posters should be combined with more engaging activities, such as exercises, workshops, and training sessions, to further encourage action.



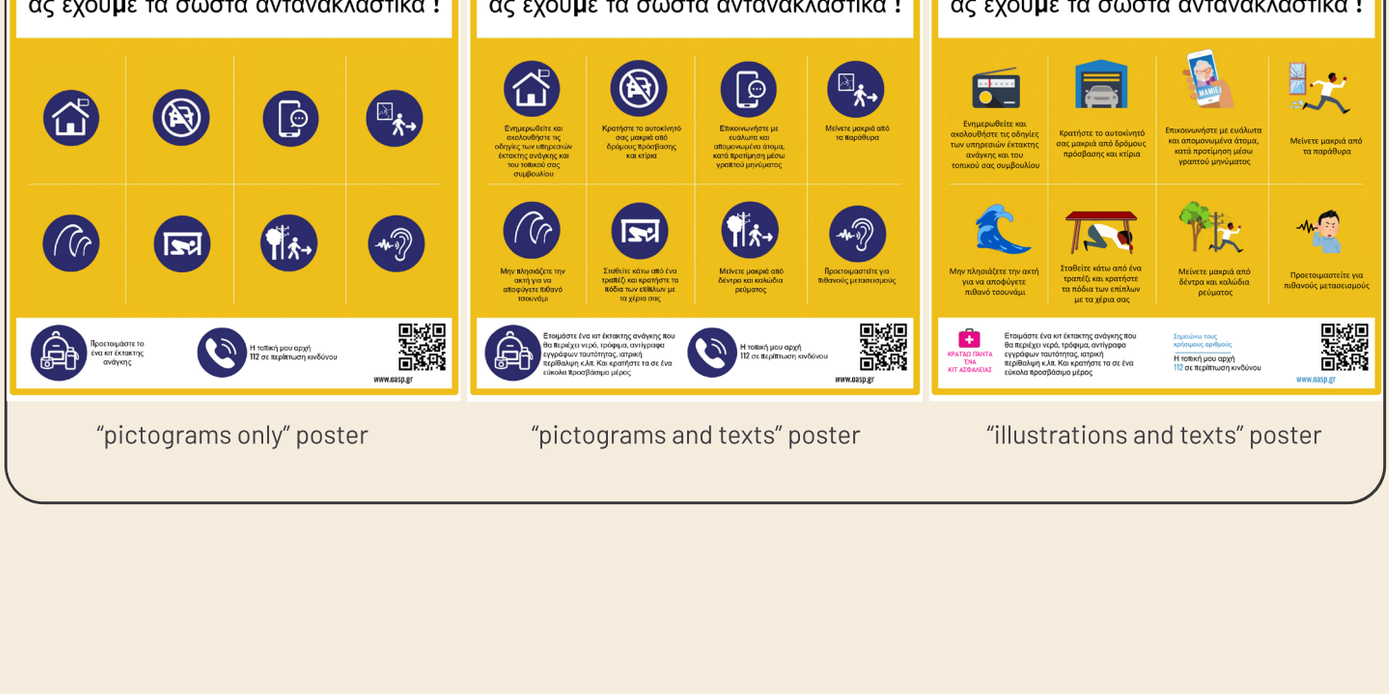
Characteristics of visual communication media

Eye-tracking studies revealed that the **level of detail** in a poster should match the communication goal:

- The **‘pictograms only’** poster is the simplest but might not provide enough information for deeper understanding.
- The **‘pictograms and texts’** poster is processed more quickly and appears to be the best option for emergency contexts. It strikes a balance between being explicit and easy to understand under pressure.
- The **‘illustrations and texts’** poster (the most detailed) is less suited to emergency situations because it takes longer to process visually. However, it helps people feel more knowledgeable about disaster risks, which can boost their sense of control, reduce uncertainty, and improve preparedness.

Overall, it is advisable to **use more detailed communication** in advance of a disaster to build knowledge, and simpler, quicker-to-read visuals during an emergency.

Participants also highlighted the need for **visual communication materials to be accessible to disabled and vulnerable groups**. They suggested improvements such as audio warnings, tactile warning signs with special alphabets, and the use of colour codes adapted for people with colour vision deficiencies.



“pictograms only” poster | “pictograms and texts” poster | “illustrations and texts” poster

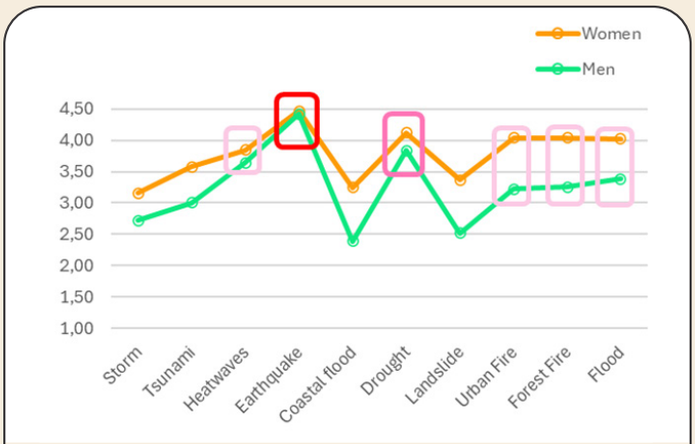
Online survey on risk perception and psychological impacts of past disasters

Perception of the risk of natural hazard

Generally, participants from the CORE Labs perceived **environmental disasters as more dangerous for others than for themselves**. This reflects comparative optimism (Weinstein, 1980), which can be a challenge for disaster preparedness. Communications should therefore **emphasise the vulnerability of local populations**.

Prior experience of disasters did not seem to significantly affect risk perception. Participants considered earthquakes the greatest threat, followed by droughts. Heat-related disasters — such as droughts, heatwaves, and fires — were also perceived as highly impactful, likely due to the growing effects of climate change and increased media coverage.

Overall, women tended to perceive most disaster risks as more threatening than men did.



Level of risk perception of different natural hazards (out of 5)

Trust in institutions

When it came to managing disaster risks, participants placed the **most trust in relatives (family and friends), neighbours, and scientists**. They trusted religious organisations and local authorities the least.

For reliable information, participants trusted **scientists, healthcare services, and relatives the most**, while religious organisations, local authorities, and the police were trusted the least.

Psychological impacts of natural hazards

Out of the total sample, **12.7% of participants reported symptoms of PTSD** — a notably **high figure**. Among those reporting PTSD symptoms, 86% were women and 29% were volunteers, identifying these groups as particularly vulnerable.

This increased vulnerability among women may be linked to their higher perception of risk, which, as Blondé and Girandola (2016) explain, can generate stronger negative emotions and hinder adaptive behaviour. Thus, while raising risk awareness is crucial, it is equally important to address its potential mental health impacts. Specific mental health support and prevention tools should also be introduced for volunteers.

Symptoms of **PTSD can affect not only direct victims but also those exposed indirectly**, such as through family members or media coverage. Mental health strategies must therefore extend support to both groups.

Finally, the survey showed that **greater trust in institutions was associated with fewer PTSD symptoms**. Moreover, trust in healthcare services and scientists was linked to higher levels of post-traumatic growth (PTG). **Building trust in institutions thus plays a vital role** in supporting mental health after disasters.

Core Lab

Naturtejo
PORTUGAL

NATURTEJO CORE LAB

www.resiliage.eu

COMMUNICATING THE RISK BEFORE DISASTER

Core Lab
Naturtejo
PORTUGAL

Impact of visual communication

Posters showing behaviours to adopt in natural hazard situations were found to **promote risk perception and help regulate emotions**. After viewing the posters, both positive and negative emotions decreased, suggesting that simple and concise visual communication can support more adaptive behaviour during disasters.

However, a strong sense of risk and emotional changes alone **are not enough to drive people to take action**. Therefore, visual communication using posters should be **combined with more engaging and participatory methods**, such as exercises, workshops, and training sessions, to encourage real behavioural adaptation.

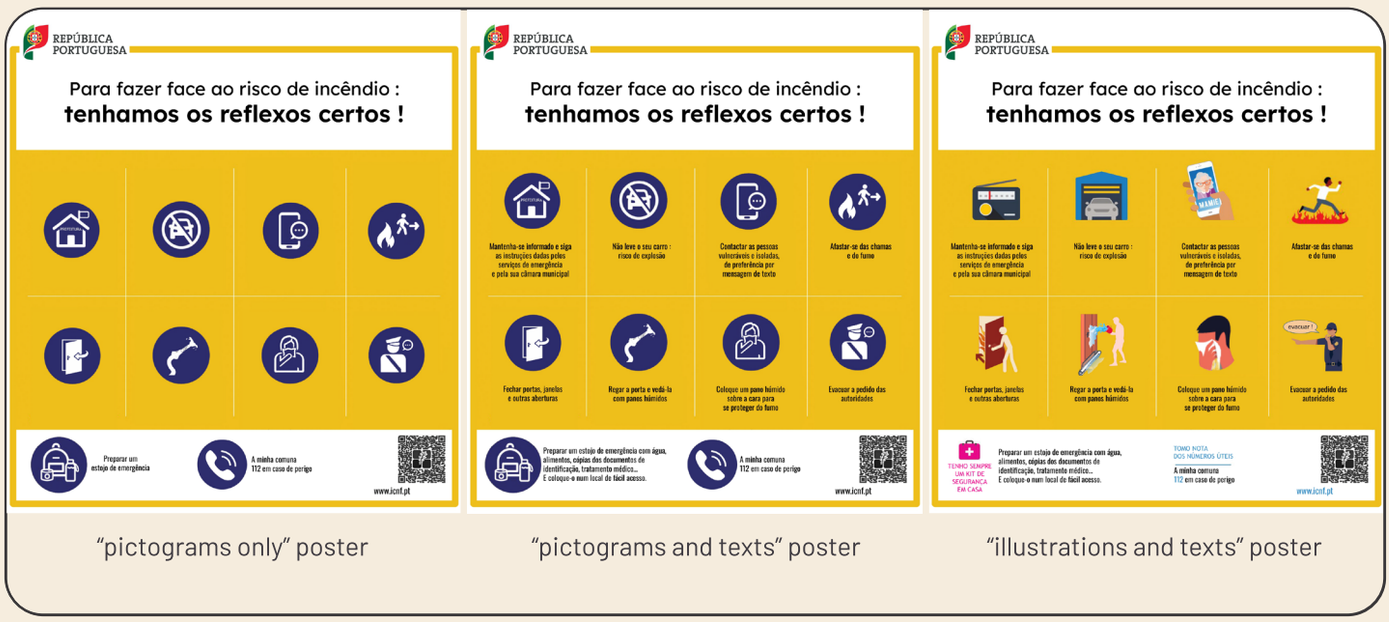
Characteristics of visual communication media

Eye-tracking studies showed that the level of detail in a poster should be adapted depending on the communication goal:

- The **‘pictograms only’** poster is the most basic and the fastest to interpret, but it might not offer enough information to build deeper understanding.
- The **‘pictograms and texts’** poster, combining simple images and explanatory text, is processed the quickest and appears to be the most appropriate for emergency situations. It provides a clear and immediate understanding without being too complex.
- The **‘illustrations and texts’** poster, although detailed, takes longer to process visually. This makes it less suitable for use during emergencies. However, it helps individuals feel more knowledgeable about disaster risks, which can strengthen their sense of control and improve preparedness.

In conclusion, **a more detailed presentation is advisable** before a disaster to build risk awareness, while a simpler, quicker format is better during an emergency.

Participants also recommended that **posters be made accessible to visually impaired individuals by including hearing aids, Braille signage, and adapted colour codes**.



“pictograms only” poster | “pictograms and texts” poster | “illustrations and texts” poster

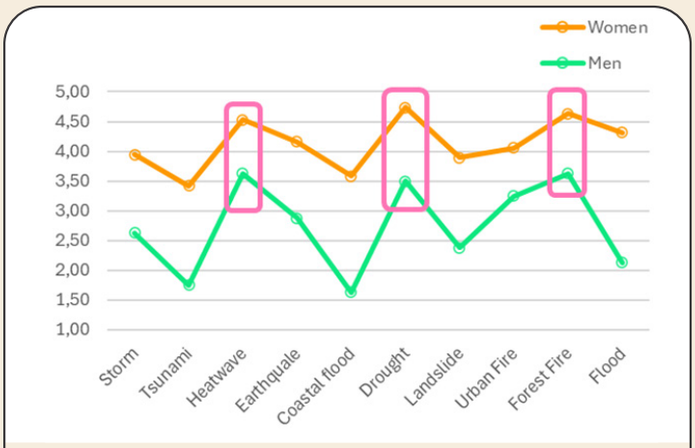
Online survey on risk perception and psychological impacts of past disasters

Perception of the risk of natural hazard

Participants from the CORE Labs generally perceived **environmental disasters as more dangerous for others than for themselves**, reflecting comparative optimism (Weinstein, 1980). This can hinder preparedness efforts, highlighting the need to emphasise local vulnerabilities in communication campaigns.

Previous experience of natural hazards did not appear to influence current risk perception. Among the risks, participants identified wildfires as the greatest threat, closely followed by drought and heatwaves. These are all heat-related disasters strongly linked to climate change, with increasing media coverage.

As observed in previous findings, women tended to perceive most disaster risks as more threatening than men.



Level of risk perception of different natural hazards (out of 5)

Trust in institutions

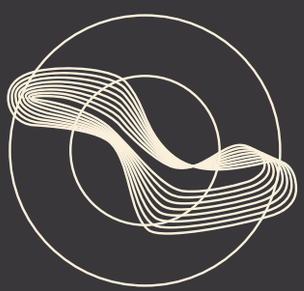
For disaster risk management, participants considered **scientists, civil defence services, and the European Union as the most reliable sources**. Religious organisations and local authorities were seen as the least reliable.

When it came to providing reliable information, scientists, civil defence, and the European Union were again trusted most, while religious organisations and neighbourhood networks were trusted least.

Psychological impacts of natural hazards

Across the entire sample, **9% of participants reported symptoms of PTSD — all of them women**. This confirms broader research showing that women are more vulnerable to developing psychological disorders after natural hazards.

Women's greater vulnerability may partly result from their higher perception of disaster risks (see previous findings). As Blondé and Girandola (2016) suggest, perceiving a significant threat can generate strong negative emotions and also limit adaptive behaviours. Thus, while promoting risk perception is important, it is **equally crucial to consider its impact on mental health.**
PTSD symptoms can affect not only those directly involved in disasters but also people who experience them indirectly through relatives or media exposure. It is essential that **mental health support strategies extend to indirect victims** as well.
However, there is also a positive side: **PTSD symptoms and high-risk perception can be associated with post-traumatic growth (PTG)**. This shows the importance of encouraging positive psychological changes following traumatic events.
Finally, the survey found that participants who had **greater trust in institutions reported fewer PTSD symptoms**. Those with higher trust in health and safety services and scientists also showed greater levels of PTG. This highlights that trust in institutions is a key factor in supporting mental health and resilience following natural hazards.



Core Lab
Trondheim
NORWAY

TRONDHEIM NORWAY CORE LAB

www.resiliage.eu

COMMUNICATING THE RISK BEFORE DISASTER

Core Lab
Trondheim
NORWAY

Impact of visual communication

Posters depicting behaviours to adopt in **natural hazard situations have been shown to promote risk perception** and support emotional regulation. After viewing these posters, both positive and negative emotions decreased. This suggests that **simple and concise visual communication is effective** in fostering adaptive behaviour when facing disasters.
However, increasing risk perception and emotional awareness **alone is not sufficient to ensure active adaptation**. Therefore, visual materials should be supported by more engaging methods such as exercises, workshops, and training sessions.

Characteristics of visual communication media

Eye-tracking studies indicated that the degree of detail in a poster should match the communication objective:

- The **‘pictograms only’** poster is the simplest and quickest to interpret, but may not provide sufficient information for deeper understanding.
- The **‘pictograms and texts’** poster strikes a balance between clarity and quick processing, making it the most effective in emergency situations.
- The **‘illustrations and texts’** poster, although informative, is slower to process visually and therefore less suitable during emergencies. However, it helps individuals feel more knowledgeable about risks, potentially improving their sense of control and preparedness.

Thus, it is advisable to use **more detailed posters** in preparedness phases and quicker, clearer materials during a disaster.

Participants also emphasised the need for **high-contrast colours, large illustrations, tactile descriptions, and sound aids to make posters accessible for visually impaired individuals**. One participant suggested assigning letters to each warning sign, forming a mosaic word to help citizens memorise basic instructions, particularly in case of a landslide.

“pictograms only” poster

“pictograms and texts” poster

“illustrations and texts” poster

Online survey on risk perception and psychological impacts of past disasters

Perception of the risk of natural hazard

Participants generally perceived **environmental disasters as more dangerous for others than for themselves**, illustrating comparative optimism (Weinstein, 1980), which can limit disaster preparedness. Communication efforts should therefore stress the specific vulnerabilities of local populations.

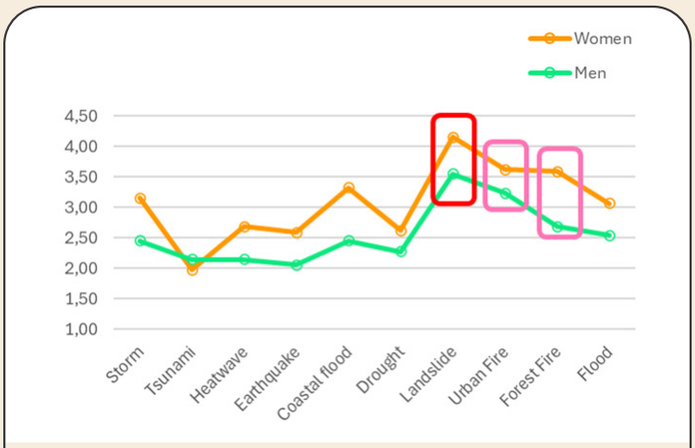
Past experience of natural hazards did not appear to influence risk perception. Among the different hazards, landslides were seen as the greatest threat, followed by urban fires and wildfires — risks linked to rising temperatures and climate change, often highlighted by media coverage.

Women tended to perceive most disaster risks as more threatening than men. Interestingly, overall risk perception in this group (excluding landslides) was lower than in other CORE Labs, which may indicate that **participants are well informed, better prepared**, or simply perceive these risks as more manageable.

Trust in institutions

For disaster management, participants considered **rescue organisations, civil defence, and healthcare services the most reliable**. Religious organisations were seen as the least reliable.

In terms of providing reliable information, participants **trusted national governments, police, healthcare services, and local authorities the most**, while religious organisations, neighbourhood groups, and family and friends were trusted the least.



Level of risk perception of different natural hazards (out of 5)

Psychological impacts of natural hazards

No participants showed symptoms of PTSD, suggesting a generally **good level of mental health** regarding disaster risk management.
Nonetheless, the observation that women perceive greater disaster risks is important. As Blondé and Girandola (2016) explain, heightened risk perception can generate stronger negative emotions and may hinder adaptive behaviour. Therefore, while developing risk perception is critical for preparedness, it must be balanced carefully to avoid negative mental health outcomes.
It is also important to remember that PTSD symptoms can affect not only direct victims but also those indirectly exposed through relatives or the media. Mental health support strategies should therefore extend to indirect victims.
Finally, findings showed that greater trust in institutions correlated with fewer PTSD symptoms. Moreover, higher trust in healthcare services and scientists was associated with greater post-traumatic growth (PTG). This highlights trust in institutions as a key factor in supporting mental health and resilience after natural hazards.

Core Lab
Karsiyaka
TURKEY

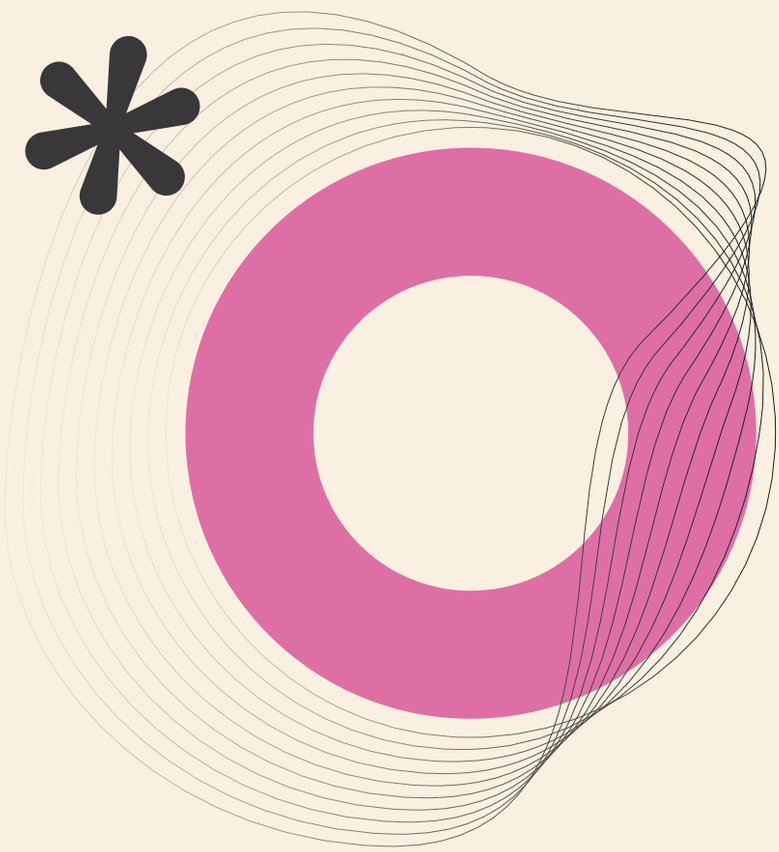
KARSIYAKA CORE LAB

COMMUNICATING THE RISK BEFORE DISASTER

Core Lab
Karsiyaka
TURKEY

Impact of visual communication

Posters showing what actions to take during natural hazards have **proven effective in promoting** both risk awareness and emotional regulation. After viewing the posters, participants reported a **decrease in both positive and negative emotions**. This suggests that **simple, clear visual communication can help encourage adaptive behaviour** during crises by calming emotions and increasing awareness.
However, feeling emotionally affected or aware of risks **does not always lead to action**. To truly support behavioural change, posters should be combined with more engaging and participatory methods such as workshops, practical exercises, or training sessions.



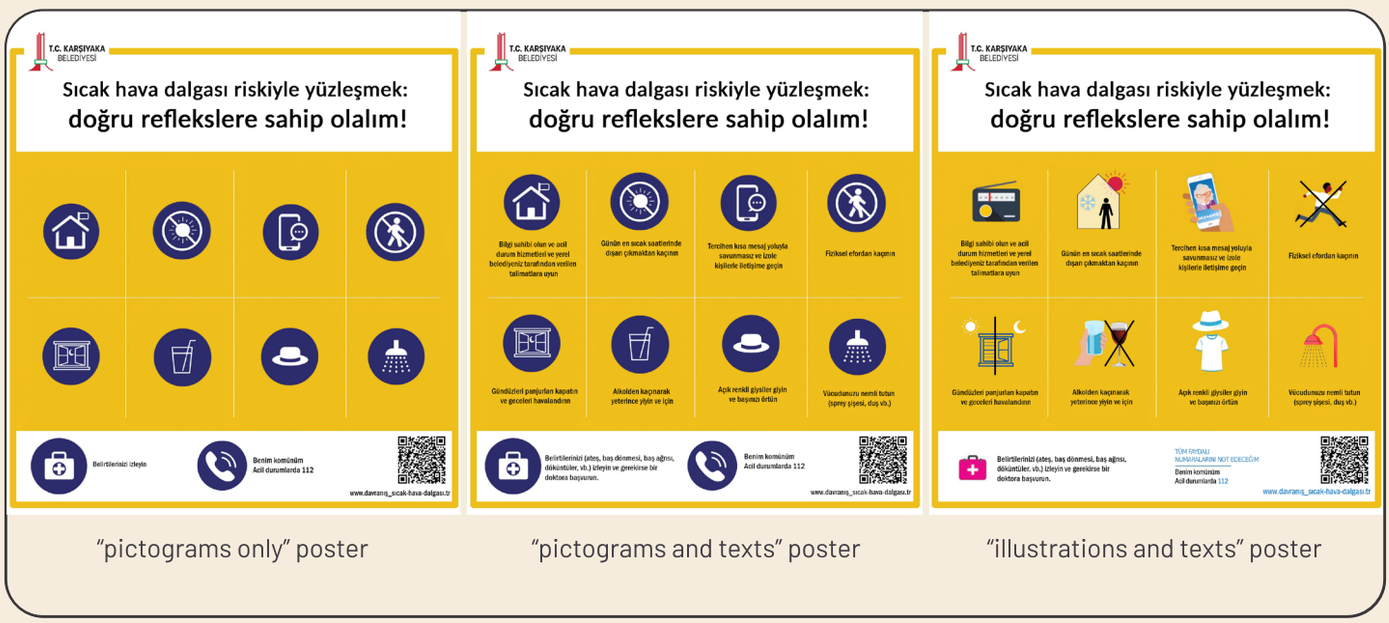
Characteristics of visual communication media

Eye-tracking results showed that the effectiveness of a poster depends on how detailed it is and when it is used:

- The **‘pictograms only’** poster is the quickest to understand, but may lack enough detail to support informed decision-making.
- The **‘pictograms and texts’** poster offers a balance between clarity and speed of understanding. It appears best suited to emergencies, as it allows fast information processing.
- The **‘illustrations and texts’** poster, while informative, takes the longest to read and process. It is less suitable for use during emergencies but can help people feel more prepared and confident when used beforehand.

In short, **detailed materials should be used** in preparedness phases, while concise, easy-to-read formats should be used during actual emergencies.

Participants also emphasised the importance of **inclusive design**. Suggestions included **high-contrast colours, large illustrations, tactile elements, and sound-based alerts to support visually impaired people**. One participant proposed turning each sign into a letter that, when combined, forms a keyword, helping citizens remember basic instructions. Another idea was to make warning signs interactive – allowing people to ask questions using a keyboard or voice commands.



“pictograms only” poster | “pictograms and texts” poster | “illustrations and texts” poster

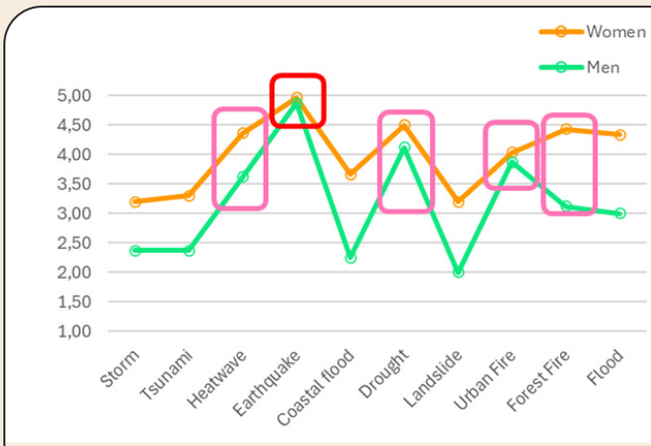
Online survey on risk perception and psychological impacts of past disasters

Perception of the risk of natural hazard

In general, participants from the Karsiyaka CORE Lab saw **environmental disasters as more dangerous to others than to themselves** – a common bias known as comparative optimism (Weinstein, 1980). This can reduce personal motivation to prepare. Risk communication should therefore highlight the specific vulnerabilities of the local population.

Earthquakes were perceived as the most serious threat, followed by heatwaves, droughts, urban fires, and forest fires. Many of these are heat-related and may be influenced by media coverage of climate change. The recent 2023 earthquake in Turkey likely explains the strong focus on earthquake risk in Karsiyaka. However, this may lead **residents to concentrate more on earthquake preparedness, potentially overlooking heat-related risks**.

It is also notable that many disaster risks were rated highly overall. This can be a **concern for mental health**, as constant awareness of multiple threats may increase stress, anxiety, and depression. As in other CORE Labs, **women tended to view most disaster risks as more threatening than men**.



Level of risk perception of different natural hazards (out of 5)

Trust in institutions

When it comes to managing disaster risks, participants placed the **most trust in their relatives, neighbours, and scientists**. Religious organisations, the police, and local authorities were seen as the least reliable.

In terms of providing trustworthy information, **scientists, the European Union, and relatives were considered the most reliable sources**. Religious organisations, the national government, and the police ranked lowest.

Psychological impacts of natural hazards

A concerning **51.5% of participants showed signs of post-traumatic stress disorder (PTSD)**. Of these, 88% were women and 12% were volunteers — identifying both as particularly vulnerable groups. This suggests an urgent mental health challenge in Karsiyaka that demands immediate attention. Women's greater vulnerability may be linked to their higher risk perception, which, according to Blondé and Girandola (2016), **can intensify negative emotions and hinder adaptive behaviour**. While fostering risk awareness is important for disaster preparedness, it must be balanced with support for emotional wellbeing.

Volunteers also require targeted psychological support, given their exposure to disasters and their elevated risk.

PTSD symptoms can affect not only direct victims but also those indirectly exposed through relatives, the media, or the community. **Mental health support must therefore be extended** to include these indirect victims as well.

Lastly, survey results showed that participants with **greater trust in institutions had fewer PTSD symptoms**. Those with strong confidence in healthcare providers and scientists also reported more signs of post-traumatic growth (PTG) — the positive psychological changes that can follow trauma. This highlights how **building public trust in institutions plays a vital role in protecting mental health and promoting resilience**.

WEBSITE
www.resiliage.eu

CONTACT US
info@resiliage.eu

FOLLOW US
@ResiliageEU

OUR CONSORTIUM

Politecnico di Torino
unesco
deepblue
SINTEF
VICESSE
unîmes UNIVERSITÉ
LOBA®
DemirEnerji
VEXIZA
almende
ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ UNIVERSITY OF CRETE
Røde Kors Trondheim
T.C. KARŞIYAKA BELEDİYESİ
Famenne Ardenne Geopark unesco Global Geopark
naturtejo GEOPARK unesco Global Geopark
ESCOLA NACIONAL DE BOMBEIROS
CITTADINANZATTIVA
volies Voluntariado y Estrategia

Funded by the European Union