



The HuT

How warnings can be better integrated within society

Deliverable D2.3

DEVELOPED WITHIN
WP2 Human Behaviours, T2.2 Operational warning systems

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Version 0.3
(02 April 2026)



This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101073957

1. Technical references

Project Acronym	The HuT
Project Title	The Human-Tech Nexus - Building a Safe Haven to cope with Climate Extremes
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Project Duration	October 2022 – September 2026 (48 months)

Deliverable No.	D3.5
Dissemination level*	PU
Work Package	WP2 - Human Behaviours
Task	T2.2 – Operational warning systems
Lead beneficiary	UCL
Contributing beneficiary/ies	

- * PU = Public
PP = Restricted to other programme participants (including the Commission Services)
RE = Restricted to a group specified by the consortium (including the Commission Services)
CO = Confidential, only for members of the consortium (including the Commission Services)



1.1. Document history

Version	Date	Lead contributor	Description
0.1	25.03.2026	Maryam Rokhideh (UCL)	First draft
0.2	31.03.2026	Stanislav Hroncek (GWP CEE)	Critical review and proofreading
0.3	02.04.2026	Maryam Rokhideh (UCL)	Edits for approval
1.0	03.04.2026	Michele Calvello (UNISA)	Final version



2. Table of contents

1. Technical references	2
1.1. Document history	3
2. Table of contents	4
2.1. List of Tables	4
2.2. List of Figures	5
3. Policy Note: Engaging people in managing climate and disaster risks: Lessons from European communities	6
3.1. Overview.....	6
3.2. Why public engagement and co-creation are essential in Disaster Risk Reduction and warnings	6
3.3. Lessons from European communities	7
3.4. Moving forward by strengthening public engagement.....	8
4. Policy Note: Enhancing community engagement in managing climate and disaster risks: Lessons from European authorities ..	9
4.1. Overview.....	9
4.2. Lessons from European authorities.....	9
4.3. Moving forward by strengthening authorities	11
5. Policy Note: Empowering the European public for weather and climate warnings.....	12
5.1. Overview.....	12
5.2. Weather and climate warnings for everyone	12
5.3. Moving forward by empowering the European public	12

2.1. List of Tables

None



2.2. List of Figures

Figure 1: National Civil Protection Simulation Exercise- Exe Flegrei 2025 in Campania Region, Italy.
(Photo by NTR 24 [https://www.ntr24.tv/2024/10/10/esercitazione-exe-flegrei-2024-
associazioni-sannite-in-campo/](https://www.ntr24.tv/2024/10/10/esercitazione-exe-flegrei-2024-
associazioni-sannite-in-campo/)). 8

Figure 2: Educational demonstration of nature-based solutions to flood risks during the Dorset Coast
Forum (photos by Maryam Rokhideh). 10

Figure 3: Child playing with an interactive game about landslips at the Weymouth Discovery Centre,
Dorset, UK (photos by Maryam Rokhideh). 10

Figure 4: First aid training and practice (photo: Ilan Kelman)..... 11

Figure 5: Examples of what every household must have to be empowered for weather and climate
warnings – but it must be affordable (photo by Ilan Kelman). 13



3. Policy Note: Engaging people in managing climate and disaster risks: Lessons from European communities

3.1. Overview

Public engagement is a cornerstone of effective disaster risk reduction (DRR), making communities key for prevention, warnings, and response. Research consistently shows that collaboration and co-creation with communities strengthens trust, enhances coordination, and produces solutions that are better aligned with local needs and realities. Participatory approaches that involve everyone locally help to ensure that climate and disaster risk policies and warnings are relevant, understood, and actionable, to shift from reacting to disaster risks to anticipating and preventing them.

KEY TERMS

Public or citizen engagement refers to the active participation of individuals and communities in governance processes, encompassing decision-making, implementation, monitoring, and evaluation.

Co-creation can be defined as a collaborative approach where diverse actors, expertise, and knowledge actively engage to produce mutual solutions.

3.2. Why public engagement and co-creation are essential in Disaster Risk Reduction and warnings

- **Risk awareness shapes protective behavior**
People act when they understand hazards, impacts, and trust warning information.
- **Community knowledge and input strengthen observation, monitoring, risk assessments, and response**
Local knowledge often reveals contextual insights and capacities that formal and technical capacities might miss.
- **Engagement strengthens legitimacy and trust**
Transparent, multi-way communication increases trust in warnings and DRR measures.
- **Warnings must reach everyone**
Inclusivity and accessibility across all groups, including migrants, older adults, people with disabilities, and low-connectivity communities help to ensure broad reach.



3.3. Lessons from European communities

- **Co-creation of solutions and Disaster Risk Education- Lessons from Iceland**

During research in Iceland and the East Fjords, long-term public engagement and co-creation of solutions with communities in the aftermath of the landslides in Seyðisfjörður was identified as a key strength. Following the devastating landslides in Seyðisfjörður in 2020, multiple meetings over the past years have been held between the Icelandic Meteorological Office (IMO), Department of Civil Protection and Emergency Management, municipal authorities, community groups like Austurbru, and residents to address the needs of affected residents and develop co-produced solutions. Together, they co-created solutions for better warning mechanisms and monitoring of landslide triggers, such as installing localised rainfall sensors. They have also co-designed an online platform where all hazard information about the area, warnings, and measures are publicised. In addition, Múlaþing municipal authorities in collaboration with the IMO hold education workshops for the community on potential cascading drivers of disaster risks and climate extremes, such as glacier melts. This informs a large part of disaster risk education, promoting awareness and preparedness amongst affected residents.

- **Volunteer networks and simulation exercises – Lessons from Italy**

Italy boasts an extensive network of volunteers and citizen participation through the volunteer roles in the Italian Department of Civil Protection and participation in national disaster risk awareness campaigns and simulation exercises. Simulation exercises help communities and decision-makers experience different disaster scenarios in a safe environment, improving understanding of risks, response measures, and the consequences of decisions and plans. In Italy, annual exercises are conducted and organised by the Italian Department of Civil Protection with partners on different risks, and specifically the testing of national planning for volcanic risks. The Department of Civil Protection, the National Institute of Geophysics and Volcanology (INGV), officials from the Campania Region, municipal authorities, schools, and volunteers participated in the national volcanic risk exercise, “Campi Flegrei 2025.” Organized by the Department of Civil Protection as part of their disaster risk reduction outreach aimed at preparing both the public and authorities for the potential eruption of Vesuvius and the Phlegraean Fields and subsequent evacuations (see Figure 1). The exercise tested the evacuation plan, population registration systems, transportation, and waiting areas with over 120 students and teachers from the Bernini-De Sanctis State Institute participating. Involving the public in such exercises strengthens preparedness across sectors and society, fosters collaboration between authorities and communities, and encourages better disaster risk reduction planning.





Figure 1: National Civil Protection Simulation Exercise- Exe Flegrei 2025 in Campania Region, Italy. (Photo by NTR 24 <https://www.ntr24.tv/2024/10/10/esercitazione-exe-flegrei-2024-associazioni-sannite-in-campo/>).

3.4. Moving forward by strengthening public engagement

- Establish national guidelines for public engagement in DRR and warning systems, with minimum standards for communication, accessibility, and community involvement.
- Fund local-level capacity building so municipalities and local authorities can maintain communication channels, run drills, and engage residents year-round.
- Create monitoring and evaluation frameworks to assess warning reach, accessibility inclusivity, comprehension, and behavioral responses.
- Promote cross-sector collaboration for inclusive, adaptive policy creation among meteorological agencies, emergency services, telecom providers, NGOs, research institutes and universities, and community groups.
- Foster citizen science and crowd sourcing to include local knowledge in risk mapping, hazard assessments, warnings, and preparedness measures.

4. Policy Note: Enhancing community engagement in managing climate and disaster risks: Lessons from European authorities

4.1. Overview

Public authorities must be part of effective disaster risk reduction (DRR), supporting communities and filling in gaps for which communities lack resources, in order to ensure effective prevention, warnings, and response. Research consistently shows that authorities that are managed and run well, especially when working the people they represent, can strengthen trust, galvanise successful action, and lead to solutions that are developed with and for local needs and realities. Participatory and educational approaches that involve everyone locally help to ensure that climate and disaster risk policies and warnings are relevant, understood, and actionable, to shift from reacting to disaster risks to anticipating and preventing them.

4.2. Lessons from European authorities

- **Community outreach through interactive risk education and communication - Lessons from the UK**

During research in the Dorset Coast with partners, including the British Geological Survey (BGS), MET Office, local councils, and regional partners, a broad range of activities were identified that aimed at raising community awareness and risk education about disaster and climate-related risks, including coastal erosion, floods, and landslides. Collaborative partnerships and regional conferences like Dorset Coast Forum serve as critical platforms for cross-sector engagement, enabling diverse actors to share knowledge, align priorities, and jointly develop risk mitigation strategies.

Interactive educational demonstrations, informative signs and games about coastal geology, landslides, and climate extremes such as those at the Weymouth Discovery Centre have been used to engage the public and promote greater awareness of climate-related and disaster risks. Outdoor classrooms and field-based learning are also another way to encourage participatory learning where all levels of society from children to adults can learn, participate, and develop a shared understanding of disaster risks and preparedness (see Figures 2 and 3).





Figure 2: Educational demonstration of nature-based solutions to flood risks during the Dorset Coast Forum (photos by Maryam Rokhdeh).



Figure 3: Child playing with an interactive game about landslips at the Weymouth Discovery Centre, Dorset, UK (photos by Maryam Rokhdeh).

- **Local knowledge and expertise via local natural hazard advisors - Lessons from Switzerland**

One of the most effective strategies identified during research on the natural hazard management of the Swiss system is the use of citizen science through local natural hazard advisors. Given the extensive contextual knowledge of local experts, a project in 2010 formalised and trained local volunteers, known as local natural hazard advisors (LNHA) within the Swiss system. LNHAs observe climate-related risks and monitor measurement data in their area, interpret and contextualise warnings, and help advise and support municipal and cantonal staff units and emergency services during events. They also assist local authorities with emergency planning and management of natural hazard events. Local knowledge and expertise contributes important place-based knowledge about hazards, risks, and community dynamics that may not be captured through technical assessments alone. Institutionalising the role of local experts within policy and decision-making structures ensures their insights systematically inform disaster risk reduction strategies instead of being sought only in emergency situations.

4.3. Moving forward by strengthening authorities

- Establish guidelines for responsibilities and power of each authority level for DRR and warning systems, with the obligations and duties balanced with public engagement.
- Test, maintain, and update communication channels and systems checking to see who is included and who is excluded in order to rectify the latter.
- Use training, drills, and exercises (Figure 3) to keep skills and interest up-to-date, checking to see that involvement by authorities ripples out to the public.
- Support cross-sector cooperation and action, connecting researchers, authorities, the private sector, non-profits, and public, so that DRR and warning actions are completed together.
- Institutionalize mechanisms to identify, assess, and redress vulnerability drivers and conditions so that authorities can lead in highlighting the importance of everyone being involved in vulnerability reduction.



Figure 4: First aid training and practice (photo: Ilan Kelman).

5. Policy Note: Empowering the European public for weather and climate warnings

5.1. Overview

Numerous initiatives across Europe aim to support and engage the public in weather and climate warnings. They range from organizations such as the European Emergency Number Association to legislation such as EU Directive 2018/1972 establishing the European Electronic Communications Code, notably clauses 293-295. All are essential. They must combine with other initiatives empowering the European public to develop, understand, and safely act on warnings which work for themselves, ensuring that everyone in a community is involved.

KEY TERMS

Warning is a process of ensuring that everyone has the information, resources, and abilities they need to act safely on the possibility of a threat manifesting.

Empowering means people and communities being able to decide and act for themselves, without leading to problems for others.

5.2. Weather and climate warnings for everyone

- Valencia, Spain for heat, drought, and floods: Residents join authorities to reimagine urban life through theatre, storytelling, and digital twins while implementing actions.
- Schleswig-Holstein, Germany for precipitation, floods, and extreme temperatures: A Climate Council fosters open, collaborative dialogue and solution-making bridges science, governance, and community.
- Vilnius, Lithuania for pluvial flooding: Fragmented work is linked for data collection, planning, modelling, warning, and drainage improvements.

5.3. Moving forward by empowering the European public

- The entire warning process must be empowered, starting long before a potential threat manifests. Understanding and readiness for action begin now, to be enfolded into regular lives and routines. Then, warning empowerment is the standard rather than the exception.
- Affordability is a major impediment to empowerment for warnings. Empowering everyone for warnings must include society-wide measures about wages and cost-of-living.
- Many people in Europe remain outside typical information and action networks. Significant groups are people without documents, people who are unhoused, people with disabilities,



and people who do not speak local languages instead relying on family members. Specific initiatives must reach out and involve all these groups.

- Existing mechanisms can be a springboard for local empowerment. Many buildings have a manager, cooperative organization, or board of directors in charge of facilities and common areas. They could be the starting point for connecting people about warnings.
- Empowering for warnings should feedback into Europe-wide work to improve it.



Figure 5: Examples of what every household must have to be empowered for weather and climate warnings – but it must be affordable (photo by Ilan Kelman).