



The HuT

Ongoing activities in the demonstrators n.2

Deliverable D1.7

DEVELOPED WITHIN

WP1 Demonstrators' Arena, T1.1 Fast-track implementation of DRR actions

AUTHORS

Jo-Ting Huang-Lachmann (HEREON), Anke Schlünsen-Rico (HEREON),
Cicilia Steffi Lukman (HEREON)

Version 1.0

(05 March 2025)



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
Project Coordinator	Michele Calvello UNIVERSITA DEGLI STUDI DI SALERNO mcalvello@unisa.it
Project Duration	October 2022 – September 2026 (48 months)

Deliverable No.	D1.7
Dissemination level*	PU
Work Package	WP1 - Demonstrators' Arena
Task	T1.1 - Fast-track implementation of DRR actions
Lead beneficiary	HEREON
Contributing beneficiary/ies	UPV, UPC, CMCC, CNR, CONFAGRICOLTURA, VU, IMO, KOTIVIZIG, BGS, UNIGE, UNISA

* 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	14.02.2025	Jo-Ting Huang-Lachmann, Anke Schünsen-Rico, Cicilia Steffi Lukman (HEREON)	First draft
0.2	28.02.2025	Stanislav Hroncek (GWP CEE)	Critical review and proofreading
0.3	03.03.2025	Jo-Ting Huang-Lachmann, Anke Schünsen-Rico (HEREON)	Edits for approval
1.0	05.03.2025	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. Figures.....	4
3. Introduction	5
4. “The HuT for Me and You” narrative co-creation and public engagement	6
5. Common ground for sharing and learning	9
5.1. Web portals.....	9
5.2. Monitoring	9
5.3. Modelling	11
6. Learning from early warning systems and end-to-end evaluation	12
7. Policymaking potentials.....	14
7.1. Nature-based solutions	14
7.2. Climate proofing.....	14
7.3. Multi-criteria decision analysis.....	14
7.4. Insurance	15
8. Conclusions	16

2.1. List of Tables

Table 1: Overview of stakeholder engagement in the ten demonstrators.	7
--	---

2.2. Figures

Figure 1: Art Basel Miami Beach 2024, ©Anke Schlünsen-Rico.....	6
Figure 2: Trial weather station at West Bay Dorset ©BGS.	10



3. Introduction

This deliverable captures demonstrator level activities from January 2024 to date. The demonstrators have been interacting among themselves, as well as across work packages and tasks, where the The HuT activities were co-developed and implemented at the demonstrator's level. Comparing to the first 18 months of the demonstrators' ongoing activities (reported as Deliverable 1.1), major evolutions have been developed that the interactions, discussions, mutual learnings, and reporting are more topic-driven and therefore the clusters are formed. The clusters are namely: (1) narratives co-creation and public engagement, (2) web-portals for effective early warning, (3) learning from early warning systems and end-to-end evaluation, and (4) policy making potentials. These clusters are user-driven and formed through the bottom-up demand process and with the support of the Coordinators and Work Package 1 Lead, and Task Leaders, these clusters are formed, and demonstrators devoting in these clusters can benefit from the exchange through the topic-driven clusters. The structure of the clusters is also formalized at our The HuT General Assembly in 2024 and implemented immediately. Therefore, this Deliverable follows this structure of topic-driven clusters to report, and explain the major progress based on these topics. The regular reporting from the demonstrators is based on the two The HuT tools 'Logbook' and 'Amplification' as well as the demonstrator pitches from the last General Assembly in 2024 and DMB and CDE local desk meetings are being implemented to avoid cross-reporting, which is the consensus and synergy to report ongoing activities from demonstrators. The Demonstrators Management Board and Communication, Dissemination, Exploitation (DMB & CDE) local desk meetings are being implemented after the first year of the The HuT project to combine the efforts of WP1 and WP6, which activities from across the demonstrators could present synergies in internal communication of ongoing activities and communication and dissemination of project outcomes. Therefore, the DMB and CDE local desk meetings are now organized jointly and take place every two months, as a platform for presenting progress of ongoing activities.



4. “The HuT for Me and You” narrative co-creation and public engagement

The demonstrators are pursuing what they have identified as their 'mission' in *The HuT for Me and You* template in different ways and formats.

Demonstrators 1 and 5 have been incorporating art as a format, which has been recommended as a narrative approach and highlight in The HuT activities.



Figure 1: Art Basel Miami Beach 2024, ©Anke Schlünsen-Rico.

More demonstrators have picked up this taking concrete examples. Demonstrator 1 developed a remarkable public exhibition format with 'Welcome in 2050', which generated 4 newspaper articles in a short period of time and was finally shown as a video at the Royal Academy of Buthan. Demonstrator 5 integrates art as a multiplier in the narrative finding process. Through the local art association, a collaboration with schools in the region will be established and citizens will be involved through art objects in public spaces, a final exhibition and a side exhibition programme. As part of the BGS Open Day, demonstrator 9 ran the 'What do you see' art and science activity, which involved creating artistic paintings of idealised beach scenes.

Science-art narratives co-creation activities at demonstrators' level have shown that it could reach to the general public and also groups of stakeholders which are usually not typical disaster risk reduction (DRR) or climate change adaptation (CCA) audiences. It is therefore considered an effective way of public engagement and raising awareness in society for DRR and CCA topics.

In addition to science-art formats, demonstrators are working with their respective city administrations to gain input when developing their narrative. Table 1 shows the overview of stakeholder engagement in ten demonstrators.

Table 1: Overview of stakeholder engagement in the ten demonstrators.

	Stakeholder groups
1 Valencia	Valencia City Council
2 Val d'Aran	Municipality and local administration, universities, high-school students and teachers
3 Monti Lattari	Local governments (Amalfi and Sorrento), Regional Civil Protection, Citizens' associations (e.g. hiking, territorial promotion, and tourist associations), local community
4 Vilnius	Vilnius municipality, civil Protection agency regional branch, Lithuanian agency of hydrometeorology, local communities, NGOs
5 Schleswig-Holstein	Glückstadt Mayor and municipality, local citizen groups, citizens, schools, art associations, media
6 East Fjord	Inhabitants of Seyðisfjörður, local government and municipality civil servants, the local police, the local search and rescue groups, etc.
7 Tisza River Basin	Municipalities, experts of water management, disaster management, spatial planning, engineers.
8 Ogliastro	Local administrations, Regional Forest Service and Forest management administrations, Civil Protection, Farmers and breeders, Managers of tourist-recreational services, Fire management researchers and experts, Org for the protection and representation of agricultural businesses
9 Dorset	Dorset Local Resilience Forum, Met Office Civil Contingency Advisors, tourists
10 Bern	Stakeholders involved in local DRM and emergency roles, Youth and schools, Local citizens, Regional/cantonal authorities, Local authorities

Specific activities carried out by the demonstrators with their stakeholders, for instance, demonstrators have engaged with their stakeholders to identify local needs for their research themes and to gain access to their networks (e.g. demonstrator 9 engaged with the Jurassic Coast Trust). In terms of stakeholder engagement, IIASA and UNIGE in particular have been consulted by some demonstrators (e.g. demonstrator 1).

Almost all the demonstrators have performed in public on behalf of The HuT, sharing knowledge about their research area related to The HuT. Depending on the demonstrator's target group, the exchange took place in different areas of society. Demonstrator 2 was particularly active in schools and universities. Demonstrator 3 has approached the Italian Alpine Club and the 'Montagna Amica' association, to explore their availability to act as human sentinels to assist local

stakeholders in identifying risks within its region and monitoring weather-related events. The Kobo Toolbox, tailored to the needs of the demonstrator, was also used and presented to mountain experts. Demonstrator 5 participated in several neighborhood festivals in its pilot city, where it presented 'The HuT in Glückstadt' to visitors and tested The HuT's serious game with citizens and the Mayor. Demonstrator 6 has been in dialogue with the municipalities of Seyðisfjörður and Neskaupstaður and IMO (Icelandic Meteorological Office) about the current landslide monitoring system in Seyðisfjörður and The HuT's potential contribution. Demonstrator 10 conducted interviews and stakeholder meetings with prior consultation of UCL.



5. Common ground for sharing and learning

5.1. Web portals

Demonstrators developing web portals have shared modelling and monitoring expertise with demonstrators and task leaders to learn from the expertise and experience within The HuT on how to develop effective early warning. This is an active and dynamic group sharing a variety of experiences in visualisation, usability and effectiveness.

Particularly noteworthy is the close collaboration between researchers from demonstrators 3 and 2, working hand in hand with ARANTEC to develop The HuT's data portal on EWS. This includes the use of freely available data from portals, the provision of data from sensors installed as part of the project, and a web GIS with information from the Civil Protection Plan. This local data portal is online and ready to display the various hazard maps along with all installed sensors and devices. It also integrates weather forecasts, including both the datasets and the visualisation as maps and graphs. The desktop version was presented to the municipality of Amalfi (demonstrator 3) and tested in early 2025, while work continues on the mobile version.

Other demonstrators have developed their own local databases. For other demonstrators, the storyline is more about developing an app or data platform that is accessible to all or their specific target group (demonstrator 6 - platform, demonstrator 7 VIZ24 mobile app). The HuT also benefits from exchanging in this cluster through the experience of demonstrators on other hazards, for instance, as part of the WATER4CAST project (Pulido-Velazquez et al., 2024), demonstrator 1 has developed an innovative web platform focused on environmental forecasting for the Jucar River Basin. This could result in synergies with The HuT: the platform offers valuable tools for various sectors, particularly agriculture and water management. Additionally, demonstrator 10 has developed its stakeholder data portal.

Demonstrator 6 is building a platform for Seyðisfjörður based on landslide interviews with Seyðisfjörður residents and hazard mapping. The platform is planned to enable more effective civil protection in times of extreme events. The exchange has benefited demonstrator 6 to learn how mobile Apps, and IoT monitoring could play a role in civil protection. For instance, demonstrator 7 has continued the developed of a VIZ24 app and a VIZ24 website. The local data portal is currently only accessible to stakeholders; work is underway on another website for the general public (<https://viz24.hu/>). Demonstrator 4 has developed a database of flooding and damage in Vilnius based on publicly available sources.

Multiple hazards are a key feature of The HuT, so it is not just limited to extreme hydrological and meteorological events, as Demonstrator 10's local data portal, installed in 2023 with meteorological data from the local weather station, is now fully operational, but demonstrator 9 also tested the BGS and BU internal portal in relation to the recent rockfall in the area.

5.2. Monitoring

The demonstrators were also very progressive in monitoring.



Demonstrator 1 has analysed Landsat satellite images to locate heat islands in the city of Valencia and their impact on the vulnerable population.

UPC Barcelona and ARANTEC have defined the specifications and locations of the new sensors for demonstrator 2. New sensors have been installed in the lower areas close to the river in the Aran Valley and more sensors, including rain gauges, will be installed in the higher areas of the demonstrator. These installations have two main objectives: to increase the regional monitoring coverage and to expand the range of variables studied.

Demonstrator 3 has installed IoT sensors for soil water content monitoring the water level in Amalfi and Sorrento. A pluviometer has also been installed in a mountainous area to check communication between sensors and remote gateways. Embedding the open-source platform Kobo Toolbox in this process to collect information regarding weather-induced events on various areas of the demonstrator.

Demonstrator 6 is relying on IMO's network of instruments to monitor landslides in Seyðisfjörður. Based on this, an automatic warning system will be designed. Cooperation with NGI Norway is under discussion.

Demonstrator 7 collected daily precipitation data for four gauge stations from 1970 to 2023 to identify the IDF curve by CMCC. They collected the soil moisture data from nine gauge stations to analyze the connection between soil water content and the occurrence of pluvial flood events in urban areas.

Demonstrator 9 has installed a trial weather station at West Bay Dorset, following an exchange between the BGS and Bournemouth University to translate computer science (data) and geological language. With immediate success, the project kit was installed in autumn 2024. The golf course and Dorset County Council have access to the weather station data and both organisations are now better informed about local conditions.

Mutual learning from monitoring activities could better explore end-to-end evaluation for effective early warning for all. This is therefore linked to the next key thematic cluster: how we could better learn from end-to-end evaluation to improve our early warning system.



Figure 2: Trial weather station at West Bay Dorset ©BGS.

5.3. Modelling

In the area of modelling, many demonstrators refer to existing models and adapt them to their research needs. Findings from modelling activities show that climate projections are useful and that stakeholders are interested in modelling results. The outcomes of the modelling will also be fed into the web portals to support early warning and decision making. Specific activities are described in detail in the following sections.

Demonstrator 1 worked on the climatic characterization of heatwaves by comparing different models and historical data. An analysis of the evolution of heatwaves was carried out. The results have been published in a journal. An analysis of the relationship between recent heatwaves and Valencia's neighborhoods was carried out, where a preliminary spatial model was created to characterize hot spots. An analysis of urban form and heat on vulnerable populations was also carried out. Currently, urban heat islands in Valencia are being identified and mapped using satellite imagery for the period 2020-2024.

Demonstrator 2 has implemented ensemble modelling to improve landslide prediction based on machine learning techniques and physically based models, and the multi-hazard (flood and landslide) modelling framework has already been defined. The proposed modelling system SCLAM (Snow 17-CREST-LAndslide Modelling) simulates multi-hazards suitable for snow dominated regions such as Vall d'Aran.

Demonstrator 3 explored the potential of EFAS (European Flood Awareness System) to support regional early warning systems. A paper on the use of freely available data from the EFAS initiative was finalised and submitted to a journal. Development of a regional technical map with swift methodology for the demonstration area.

Demonstrator 6 has formed a working group for The HuT's WP4 at IMO.

Demonstrator 8 carried out fire simulations with CMCC/CNR and IIASA models using downscaled climate models. The fire hazard maps were finalised after a joint analysis by CMCC and CNR using climate models for the demonstrator area under current and future climate conditions. At the level of Sardinia, IIASA's FLAM model has been calibrated for application over the whole island using data provided by local partners and shows a good fit with observations in terms of seasonal variation and spatial distribution of hotspots. Discussions are ongoing between the partners on possible joint papers.



6. Learning from early warning systems and end-to-end evaluation

Activities related to end-to-end evaluation to learn from working or failing early warning systems become particularly relevant and even urgent in the activities of our demonstrators after the extreme flood event in Valencia in 2024. Demonstrator 1 has given a presentation at the I-DRRnF in 2024 on reflections and lessons learned with regard to the early warning system under the titled Valencia floods 29/10/2024: Damage and characteristics of the area - What happened?. The presentation provided a detailed view of what has happened in terms of timeline before, during and after the flooding event. This has kicked off the discussion of using a powerful end-to-end evaluation in WP1, which was already developed and was ready for use. The demonstrators immediately took advantage of this rich resource, and this cluster was formed. The aim is to use the end-to-end evaluation warning value chain questionnaire to evaluate each event and for the demonstrators to learn from each event throughout the project.

Demonstrator 9 kicked off this activity by starting an evaluation on a previous end-to-end review of storm Eunice (2022) by reviewing the warning value chain for storm Ciaran (2023) and then carrying out a comparative analysis.

Demonstrator 2, in collaboration with UPC and ARANTEC, has developed the first prototype of an early warning system for the Garona basin. The modelling results have been presented at the scale of the Garona sub-basin, as this is considered the most appropriate approach to communicate potential hazards to stakeholders. Work is underway to automate the EWS platform in Python.

Demonstrator 3 carried out an evaluation of the Civil Protection Alert System in Campania under operational conditions. The demonstrator also analysed the state of the art in terms of precipitation thresholds for triggering landslides in the Lattari Mountains area in order to define the insurance tools. The demonstrator supported the in vivo research carried out by an expert from UCL. This was an opportunity to interview local and regional civil protection experts.

For the amplification process, the end-to-end evaluation of warning system will also be conducted in demonstrator 1, 4, 5, 6, and 9. In demonstrator 4, the purpose of end-to-end evaluation is to develop technical innovation in flood disaster management in the city and to provide recommendations for city planning.

Demonstrator 7 had an exchange with the Hungarian National Meteorological Service on the possible development of the VÍZ24 application warning system. In the VÍZ24 early warning system are built the national heavy rainfall alarm. Work is ongoing on the risk analysis of settlements and a new methodology for a warning system based on vulnerability and predicted rainfall.

Demonstrator 9 was visited by UCL and HY experts, who conducted joint interviews with the MO on operational warning systems.

Demonstrator 10 gathered its information on existing alert systems by analysing documents and minutes of meetings with stakeholders. On this basis, and with the guidance of UCL, it developed an interview guide for decision-makers to better understand the decision-making processes related to alerts. The Zuig Valley already has a well-functioning community-based warning system.

The outcomes of this activity will be scientific publications so that communities beyond The HuT may benefit from the lessons learned through the end-to-end evaluation for effective early warning systems. In addition, a contract between WMO, the Australian Bureau of Meteorology and



University College London will establish a permanent database of value chain assessments at the UCL Warnings Research Centre. The work to establish this will be linked to HuT WP2. This is a milestone for future users to benefit from shared knowledge through end-to-end evaluation.



7. Policymaking potentials

The ten demonstrators have established networks of stakeholders and policy-makers at local level. To achieve further impact, it is important to be creative and focused in consolidating collective efforts to influence policy-making. This is also mentioned by the evaluators in the first mid-term review. WP1 together with the Coordinators and WP5 have taken up this challenge to explore the potentials in policy making and we have identified and will continue to exploit the following potentials: (1) nature-based solutions, (2) climate proofing, (3) multi-criteria decision analysis and (4) insurance.

7.1. Nature-based solutions

WP3 leads the activities on nature-based solutions and the WP3 leader has a role in the EU level of nature-based solutions in policy making. Therefore, the results of the enablers and barriers of nature-based solutions (NbS) implemented at the demonstrator level could be presented and used as evidence-based outputs to advocate for policy making.

Specific activities include implementation, as multi-risk strategies are currently being analysed in demonstrator 1 with drought and heatwave risks, demonstrator 8 with wildfire risks, and demonstrator 10 with landslide and flood risks. The work is being carried out through focus group and workshop discussions and semi-structured interviews. Demonstrator 1 and 10 are currently analysing the results of the interviews. The next step will be to compile all the data from the three demonstrators and prepare the deliverable, which is due in May 2025.

7.2. Climate proofing

Climate proofing could play a role in mainstreaming climate-resilient design into infrastructure, which is particularly important to achieve the build back better principle after the extreme event. Therefore, the demonstrators are implementing this together with the climate proofing task leader. Progress to date is that the framework for estimating future IDF (Intensity-Duration-Frequency) has been completed by demonstrator 3. It has been applied to several case studies and a paper on this topic has been submitted in summer 2024. As part of the climate-proofing planning process, demonstrator 4, as a pilot city, is carrying out the precipitation impact analysis and redesigning the drainage system pipelines. The next steps would be to carry out the analysis and, through the iterative process, to present the results to policy makers and stakeholders in the demonstrators.

7.3. Multi-criteria decision analysis

A participatory multi-criteria decision analysis was conducted in demonstrator 5 in its pilot city of Glückstadt and the results were submitted with D.3.4. A very concrete outcome that has an impact on policy making is that citizens and stakeholder groups are working on forming a climate assembly as an active group to implement DDR and CCA solutions and the local level and to upscale it further. Based on this experience, the next step is to find out how this can be implemented in demonstrators 4 and 1. Demonstrator 8 and 7 have also expressed interest in sharing information.



Demonstrator 4 had already designed a questionnaire for The HuT focus group in Vilnius, consisting of decision makers. A meeting was held with the Lithuanian Hydrometeorological Service (LHMS) to identify their needs.

Demonstrator 8 collected and analysed stakeholders' perceptions and knowledge of enablers and barriers to the success of land management strategies (including NbS) for fire risk management and mitigation. There is also a lively exchange with IIASA, UNIGE and UPV on the coding structure for the analysis of the focus group interviews.

7.4. Insurance

In the insurance sector, there is significant cross-demonstrator/institution activity. The role of insurance and the messages it conveys in personal decision-making and higher-level policymaking is a relevant discussion following the major floods in Germany and Spain and the wildfires in the USA. We are therefore exploiting the policymaking potential of our insurance activities.

Demonstrator 3 has been in dialogue with Leithà S.r.l. | Unipol S.p.A. on the definition of insurance tools based on specific precipitation thresholds. The definition of precipitation thresholds for the demonstrator area and the creation of an 'oracle', i.e. a source from which observed precipitation data can be extracted, were discussed. The demonstrator contributed to D.3.6 with Landslide First Rescue, a semi-parametric product designed to address the immediate economic needs following a landslide event.

On the initiative of demonstrator 8, meetings were organised with Leithà, CNR, CMCC and IIASA to discuss the status of the developed NATCAT model and its possible integration with fire simulation (WP4). IIASA provided an update on possible links with the NATURANCE project and with Willis Towers Watson Insurance.

Further exchange with Leithà to discuss the integration of burn probability and vulnerability maps (WP4) into Community Based Catastrophe Insurance.

The Community Based Catastrophe Insurance models developed by CNR and CMCC form the basis of deliverable 3.6, a prototype of an innovative insurance product validated by user groups. The draft was released at the end of 2024 including a product specifically designed to address the risk of forest fires in the demonstrator 8 area. This product, called 'Fire Safe Community', provides business coverage against damage to buildings and their contents caused by forest fires. It represents an initial exploration of insurance models that reward communities for implementing forest management and wildfire mitigation activities within a designated area.

8. Conclusions

In summary, this deliverable has documented demonstrator level activities from January 2024 to date, highlighting the evolving interactions between demonstrators, work packages and tasks. Compared to the first 18 months of activities reported in deliverable 1.1, significant progress has been made in fostering topic-driven discussions, mutual learning and structured reporting. The formation of the four key clusters (1) narrative co-creation and public engagement, (2) web portals for effective early warning, (3) learning from early warning systems and end-to-end evaluation, and (4) policy-making potentials) has been a pivotal development, shaped by a bottom-up demand process with the support of coordinators, work package leaders and task leaders. The topic-driven clusters also bring together discussions and exchanges beyond the demonstrator level, and this new format stimulates dynamic peer learning and implements the HuT spirit.

