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LOCALIENCE

Conclusion Conference

for „Developing resilience against extreme weather threats caused by climate change at local level in Central Europe – LOCALIENCE project”

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Ladies and Gentlemen,
Dear Project Partners,
Dear Colleagues,

It is a great honour for me to welcome you to Szombathely and to the closing conference of the Localience project.

As a firefighter, I like clear situations, clear risks and clear responsibilities. Unfortunately, climate change does not always follow these rules. What we see today is more heat, more sudden rain, and more extreme events. In disaster management, we usually say: hope for the best, prepare for the worst. With climate change, the "worst" is becoming more creative every year.

Szombathely is more than 2,000 years old. The city has survived fires, floods and many historical challenges. Today, the challenge is adaptation. As a regional centre in Western Hungary, we are directly exposed to climate-related risks. For us, disaster risk reduction is not theory. It is daily work.

This is why the Localience project is important. It did not stay on paper. It focused on prevention, preparedness and cooperation. It helped institutions work together better, involved local communities, and strengthened resilience where it matters most – at the local level.

In Vas County, the project delivered real, practical results. People are more aware of risks. Organisations cooperate more effectively. Decision-makers think more in terms of prevention. From a firefighter's point of view, this is good news. The best emergency is the one that never happens.

One of the strongest elements of Localience was transnational cooperation. Risks do not stop at borders, and neither should our professional knowledge. Working with our Central European partners showed us that while we may use different words, we face the same fires, the same floods, and the same challenges.

Today is not just about closing a project. It is about taking the results forward. The tools and experiences of Localience are ready to be used, adapted and further developed. We are already planning to build on them in future projects, including BETTHER.

I would like to thank all project partners, experts, the Joint Secretariat and the Managing Authority for their professional work and support. Cooperation like this makes our job easier – and our communities safer.

I wish you strong discussions, clear conclusions and good cooperation.
And finally, I hope today will be calm and uneventful – which, in disaster management, is always the best outcome.

Thank you for your attention.

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LOCALIENCE- Developing resilience against extreme weather threats caused by climate change at local level in Central Europe

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Climate change is increasing the frequency and intensity of extreme weather events across Central Europe, placing growing pressure on local communities, municipalities, and disaster-management systems. While national-level monitoring and response capacities are often well developed, local actors frequently face limitations in preparedness, communication, and coordination.

These limitations are particularly evident during rapidly evolving or compound hazard situations, where decision-making must take place under time pressure, incomplete information and constrained local resources. As a result, municipalities and first responders often rely on informal practices and personal experience rather than structured, interoperable procedures.

The Interreg Central Europe Programme's LOCALIENCE project addresses this gap by strengthening cooperation between disaster-management authorities, municipalities, civil society organisations and local communities. The project explicitly focuses on the local level as the critical interface where national warning systems, institutional responsibilities and community responses converge.

LOCALIENCE applies a multi-level and participatory approach, combining analytical tools, capacity-building activities and real-life pilot actions. This approach recognises that local resilience cannot be improved through isolated interventions, but requires the parallel development of knowledge, skills, governance arrangements and practical cooperation mechanisms.

Core project outputs include the development of an Extreme Weather Catalogue, a performance appraisal system for evaluating local cooperation, tailored training syllabuses on multi-hazard events and nature-based solutions, and a structured coaching process supporting municipalities. Together, these outputs form an integrated toolkit supporting both preventive planning and operational preparedness at local and regional level.

These tools are complemented by five pilot actions implemented in Austria, Czechia, Hungary, Slovenia and Poland, testing locally adapted solutions for improving early warning, risk communication, community-based preparedness, decision-support and crisis management through participatory methods, technological tools and experiential learning approaches. The pilots function as real-world laboratories, enabling the testing of concepts under actual institutional, legal and societal constraints.

A key innovation of LOCALIENCE lies in its emphasis on user-centred design and co-creation. Local stakeholders are actively involved in analysing risks, designing solutions and evaluating their effectiveness, ensuring that tools respond to real operational needs. This participatory methodology strengthens ownership, improves trust between institutions and communities, and increases the likelihood that newly developed tools will be adopted beyond the project duration.

Transnational peer-review visits and transfer workshops further support learning across borders and promote the replication of successful practices beyond pilot regions. These mechanisms also enable the identification of common structural challenges and transferable governance solutions across different national disaster-management systems.

The project demonstrates that strengthening local resilience requires more than technological solutions: effective communication, trust-building, capacity development and inclusive governance are equally critical. In particular, the findings highlight the importance of aligning national warning and response frameworks with the decision-making capacities and responsibilities of municipalities.

By bridging the gap between national systems and local capacities, LOCALIENCE provides practical, transferable insights for disaster risk reduction policies and contributes to more resilient communities across Central Europe. The project's results offer valuable input for policymakers, training institutions and disaster-management authorities seeking to enhance preparedness for extreme weather events in a changing climate.

Keywords: disaster management; extreme weather events; local resilience; municipalities; civil protection; multi-level governance; community-based approaches

Impacts of Extreme Weather Events on the Water Sector: Challenges and Preparedness Needs

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Water management and disaster preparedness in Hungary: institutional framework, practice, and lessons learned

Water management in Hungary represents a strategically critical public function due to the country's hydrological characteristics and exposure to climate-related extremes. The majority of Hungary's surface waters originate outside national borders, while extensive lowland areas remain highly vulnerable to floods, inland excess water, and droughts. As a result, water management plays a central role not only in environmental protection and resource management, but also in disaster preparedness, response, and recovery.

The Hungarian water management system operates as a state responsibility, with operational tasks carried out by a national authority and its regional directorates organised on a river basin basis. Core responsibilities include flood protection, inland water management, prevention and mitigation of water damage, operation and maintenance of state-owned water infrastructure, hydrological monitoring, and technical support for local flood defence activities. This institutional structure ensures nationwide operational coverage, from major transboundary rivers to small watercourses affected by flash floods.

A defining feature of the system is the distribution of responsibilities across governance levels. National and regional water authorities are primarily responsible for fluvial flood protection and large-scale infrastructure, while municipalities play a key role in managing local water damage events and flash floods. This division places particular emphasis on preparedness, coordination, and clearly defined institutional roles, especially during rapidly evolving extreme weather events.

Since 2025, the water management sector has been integrated under the Energy Ministry, reflecting an evolving governance approach that increasingly links water management with energy policy, climate adaptation, and infrastructure resilience. This institutional positioning highlights the strategic relevance of water management in addressing interconnected challenges related to climate change, resource security, and sustainable development.

Operational challenges under increasing hydrological extremes

In recent decades, Hungary has experienced a marked increase in the frequency and intensity of hydrological extremes. Record and near-record flood levels, prolonged drought periods, and locally concentrated heavy rainfall events have become recurring phenomena. These processes place simultaneous pressure on flood protection systems, water retention capacities, and water quality management.

Operational experience confirms that water-related risks are no longer confined to large rivers. Local water damage events, flash floods on small catchments, and inland excess water increasingly cause significant impacts at settlement level. Such events often develop rapidly, leaving limited time for ad hoc decision-making and reinforcing the importance of prior preparedness, trained personnel, and tested procedures.

Although the availability of hydrological, meteorological, and spatial data has increased substantially through monitoring networks and digital platforms, operational challenges persist. The primary

constraint is no longer data availability, but rather the integration, interpretation, and timely use of data to support decision-making under pressure. This underscores the importance of institutional capacity, experience, and training alongside technical solutions.

Preparedness, training, and practical experience

Hungarian water management practice emphasises preparedness as a continuous process encompassing prevention, preparedness, response, and recovery. Flood risk management planning, river basin–scale assessments, and infrastructure maintenance provide the preventive foundation of the system. However, experience from extreme events demonstrates that operational effectiveness depends largely on human capacities, institutional coordination, and practical preparedness.

Training programmes, exercises, and simulation-based activities play a decisive role in translating plans into action. Practice-oriented preparedness enables professionals to rehearse coordination mechanisms, clarify roles and responsibilities, and identify operational gaps before real emergencies occur. Such activities strengthen decision-making, communication, and cooperation under time pressure, thereby increasing overall system resilience.

Volunteer involvement constitutes an additional pillar of effective preparedness. During major flood events and local water damage incidents, volunteers frequently support professional water management and disaster response organisations, particularly when institutional capacities are temporarily overstretched. Their effective contribution depends on prior training, clear integration into response frameworks, and mutual understanding between professional and volunteer actors. Strengthening these linkages enhances both operational readiness and community-level resilience.

From response to recovery: institutional learning and resilience

Water-related disasters extend well beyond the immediate response phase. Recovery involves damage assessment, restoration of infrastructure, and the implementation of long-term risk reduction measures. Experience shows that recovery processes are significantly more effective where preparedness measures, trained personnel, and coordination mechanisms were established before the event.

Institutional learning plays a critical role in this process. Lessons identified during response and recovery phases must be systematically integrated into planning, training, and operational procedures. In this way, water management functions not only as a response mechanism, but as a key driver of long-term disaster risk reduction and climate adaptation.

Overall, water management in Hungary illustrates that effective disaster preparedness relies on a balanced combination of institutional stability, technical capacity, continuous training, practical experience, and community engagement. As hydrological extremes become more frequent and complex, strengthening these interconnected elements remains essential for safeguarding communities and supporting resilient development.

Keywords: water management; flood protection; disaster preparedness; institutional framework; local water damage; training and exercises; volunteer engagement; recovery and resilience; climate change adaptation

Knowledge sharing on environmental and social sustainability issues
A nature-positive and security-oriented perspective

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A sustainable, secure future is inherently nature-positive.

The health and well-being of human populations, economies, and communities are fundamentally reliant on robust ecosystems. Nature underpins essential resources such as clean water, climate stability, flood mitigation, food security, raw materials, and cultural services. When ecosystems are degraded, it heightens risks, diminishes resilience, and amplifies vulnerability—particularly in the context of climate change.

Nature-based solutions (NbS), which enhance ecological functions, provide effective responses to water-related challenges while yielding numerous environmental, social, and economic benefits. Sharing knowledge is crucial for promoting environmental and social sustainability through NbS in integrated water management; this effort should be paired with skill development—including systemic thinking, collaboration, and accountability—to achieve enduring resilience through education.

Humanity's reliance on ecosystem services is critical for ensuring water availability and quality; these services can mitigate extreme water events such as droughts and floods while supporting biodiversity and economic prosperity. Healthy watersheds and wetlands play vital roles by performing natural filtration, retaining soil, and regulating the climate—functions that lower the risks associated with traditional infrastructure.

The International Union for Conservation of Nature (IUCN) defines Nature-based Solutions as actions aimed at protecting, sustainably managing, and restoring natural or modified ecosystems to effectively tackle societal challenges while simultaneously providing benefits to human well-being and biodiversity. This standard highlights co-benefits, inclusive governance practices, and adaptive learning as fundamental elements for sustainable application.

Social sustainability hinges on the collaborative generation and dissemination of knowledge among various stakeholders including public authorities, practitioners, local communities, researchers, and NGOs. Inclusive governance processes enhance legitimacy while fostering a collective understanding of issues and potential solutions—thereby increasing acceptance of interventions.

Knowledge exchange must be a continuous two-way process: moving from scientific research to practical application as well as from lived experiences to policymaking. Structured knowledge sharing enhances awareness alongside decision-making processes. Water-related challenges are multifaceted—integrated across sectors—and thus require stakeholders to possess the skills necessary to navigate complexity while maintaining collaborative governance.

Systemic thinking equips stakeholders to grasp feedback loops along with interdependencies across ecological systems as well as socio-economic frameworks. Competency models in sustainability like GreenComp underscore the significance of embracing complexity to tackle challenging problems effectively. The implementation of NbS encompasses various sectors (including water management authorities, urban planning agencies, agriculture sectors) across different governance levels (local to regional).

Effective collaboration necessitates negotiation skills along with shared objectives and collective problem-solving approaches. Competencies in cooperation ensure that multi-stakeholder groups evolve beyond mere transactional interactions into lasting partnerships. Adaptive learning allows practitioners to refine their strategies based on feedback mechanisms thereby enhancing resilience in unpredictable contexts.

Fostering responsibility encourages long-term stewardship that transcends project timelines. Framing initiatives within a nature-positive context emphasizes that water resources, ecosystems, and societies are interconnected; ensuring this integration relies on shared comprehension coupled with sustained capacity for learning.

Incorporating knowledge sharing into organizational practices along with governance structures boosts resilience supports equitable outcomes—and facilitates the scaling up of NbS across diverse regions.

References

IUCN. Global Standard for Nature-based Solutions™. International Union for Conservation of Nature. Link, 26/01/2026

Bianchi G., Pisiotis U., Cabrera Giraldez M., GreenComp: The European Sustainability Competence Framework , Punie Y., Bacigalupo M., eds., EUR 30955 EN , Publications Office of the European Union, Luxembourg, 2022 . Link, 26/01/2026

Lambertini M., Becoming Nature Positive: Transitioning to a Safe and Just Future , Routledge , New York , 2025 . Link, 26/01/2026

Glińska-Lewczuk K., et al., "Nature-Based Solutions for Sustainable Agricultural Water Management." In Nature-Based Solutions in Practice, Taylor & Francis. Link 26/01/2026

United Nations Environment Programme & DHI . Nature-Based Solutions for Water Management Primer . UNEP-DHI . Link 26/01/2026

Keywords: water management knowledge-sharing, competencies, nature-positive future, nature-based solutions, systems thinking

EXTHERENCE Climate Living Lab, testing interactive preparedness and disaster management activities – Extreme Weather Catalogue

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The EXTHERENCE Climate Living Lab was implemented within the framework of the Interreg Central Europe LOCALIENCE (LOCAL + RESILIENCE) project, aiming to strengthen local and regional resilience to extreme weather events through the testing of interactive preparedness and disaster management activities and the practical application of the Extreme Weather Catalogue (EWC). The Living Lab approach provided a real-life testing environment in Vas County, Hungary, enabling public authorities, professional responders, civil society actors and local communities to jointly develop, test and evaluate preparedness and response solutions.

Due to its geographical location, settlement structure, transport networks and industrial characteristics, Vas County is exposed to both natural and man-made hazards. While long-lasting large-scale floods are not typical, flash floods may develop rapidly in narrow valleys, leaving very limited time for defence and evacuation. In addition, extreme weather phenomena such as heatwaves, cold spells, windstorms, hailstorms and icing can occur across the entire county. These challenges highlighted the need to improve preparedness, coordination and adaptive response capacities at local and regional level.

The main objective of the EXTHERENCE Climate Living Lab was to reduce vulnerability to extreme weather events by testing risk management methodologies, strengthening institutional cooperation and enhancing the preparedness of both professional organisations and the population. The pilot action sought to identify locally applicable intervention guidelines and a risk management approach that can be adapted to other Central European regions, in line with existing international disaster risk reduction initiatives.

The Hungarian pilot was implemented through five thematic working groups: Water Damage Prevention, Industrial Safety, Fire Protection, Population Protection and a Supporting Working Group. These groups operated in a small-group task-based structure, involving experts from disaster management authorities, partner organisations and external specialists. During the pilot period, location-specific data collection was carried out in municipalities across Vas County, focusing on extreme weather risks, vulnerabilities, existing capacities and identified gaps. The collected data were analysed using both qualitative methods (workshops, expert consultations) and quantitative assessments.

Between 2024 and 2025, a series of interactive preparedness and disaster management activities were organised, including table-top exercises, command post (staff) exercises, field exercises and workshops. Field exercises were conducted in Bajánsenye (26 October 2024) and in the Kőszeg Mountains (18

October 2025), while table-top exercises took place in November 2024 and September 2025. Workshops were organised in Bükfürdő in December 2024 and November 2025. These activities tested early warning systems, public alerting and information mechanisms, drone-based reconnaissance, logistics and cross-border cooperation, including the involvement of Austrian and Slovenian rescue forces.

The Extreme Weather Catalogue played a key role throughout the Living Lab activities. The EWC is a web-based database developed within the LOCALIENCE project, combining typical extreme weather events with locally applicable measures, capacities and resources. During the pilot, the EWC supported scenario development, exercise planning and post-event evaluation, allowing participants to link hazards with concrete response options and available resources. The Living Lab provided valuable feedback on the practical usability of the EWC and its relevance for local decision-making.

Stakeholder involvement was a central element of the pilot action. Local governments, mayors, public utilities, law enforcement agencies, the Hungarian Defence Forces, emergency medical services, voluntary rescue organisations and civil protection units were actively engaged in planning, implementation and evaluation. This multi-level and cross-sectoral cooperation ensured a comprehensive approach and reinforced the Living Lab as an operational environment for joint learning and adaptive preparedness.

The results of the EXTHERENCE Climate Living Lab demonstrated that interactive, practice-oriented testing significantly improves coordination, communication and situational awareness among stakeholders. The pilot confirmed the added value of combining field-based exercises with structured tools such as the Extreme Weather Catalogue. The developed methodologies and tested solutions are transferable to other regions with similar characteristics and contribute to strengthening long-term resilience to extreme weather events in Central Europe.

Keywords: disaster management, extreme weather, responses, resilience, project

Flood Warning System for Small Catchments in Styria Austrian Pilot action under the Interreg CENTRAL EUROPE project LOCALIENCE

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The Sulm catchment area (approx. 1,100 km²) in southern Styria is increasingly affected by intense thunderstorms and heavy rainfall. Recurrent fluvial and pluvial flood events—most recently in August 2023—have caused significant damage to settlements, infrastructure, and public facilities. Existing warning mechanisms do not always provide sufficiently localised or timely information for small catchments, limiting the effectiveness of emergency response and disaster preparedness.

The pilot action develops a multi-stage flood warning system tailored to the Sulm catchment area and selected sub-catchments. It builds on the proven KAMPUS hydrological model and combines real-time measurement data with forecasts, depending on local conditions. New water-level sensors complement existing gauging stations to improve data coverage and response times. Several available two-dimensional runoff models along the tributaries and the main river Sulm are combined to one single model, which is sequentially coupled with the hydrological model to provide inundation forecasts in real-time. An interactive visualisation tool allows authorised users to view forecasts and warnings and share local observations, images, and short reports during flood events. This operational forecasting model, which was developed by JR Aquaconsol and Flowengineering as part of the LOCALIENCE project, has won the **2025 Austrian State Prize for Consulting – Engineering Consulting**, awarded by the Federal Ministry of Economy, Energy and Tourism.

The pilot action is implemented in close cooperation with key local and regional stakeholders involved in flood risk management. Municipalities and water boards contribute operational responsibility and local knowledge, while district administrations and building authorities provide technical expertise.

Disaster control institutions participate in system development and testing to ensure practical usability. The local population is informed through public events and communication activities, supporting awareness and acceptance of the warning system.

The pilot action is expected to improve the timeliness and accuracy of flood warnings in the Sulm catchment area. More localised and actionable information will support better preparedness and coordination among emergency services. As a result, faster response times and reduced damage to infrastructure and property are anticipated. In the longer term, the action strengthens community resilience and offers a transferable approach for other flood-prone regions.

The warning system is designed for **long-term operation beyond the project lifetime**, with defined ownership, maintenance arrangements, and continuous evaluation. Its **modular structure** allows easy adaptation to other regions and transfer to additional target groups across Central Europe.

Project information

Project: LOCALIENCE (CE0100182)
Pilot location: Sulm catchment, Styria (Austria)
Implementation period: April 2024 – December 2025
Lead partner: Office of the Styrian Government, Department 14 – Water Management, Resources and Sustainability
Website: www.interreg-central.eu/projects/localience

Keywords: flood warning system, flood risk management, local preparedness, transferability to other regions

Enhanced Warning System for Mayors: A Mobile Decision-Support Tool for Extreme Weather Events

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The Czech pilot action under the Interreg Central Europe project LOCALIENCE focuses on strengthening local preparedness and response to floods and other extreme weather events through an enhanced warning and decision-support system designed specifically for mayors and municipal crisis managers. The pilot's core output is a mobile application that supports local decision-making during emergencies by providing structured guidance, timely alerts, and access to reliable information in one place.

LOCALIENCE aims to improve the response capacity and resilience of Central European regions against extreme weather by strengthening cooperation among disaster management, water management, fire and rescue services, and local-level stakeholders. The Czech pilot contributes to these objectives by addressing a common challenge across municipalities: smaller towns and villages often lack sufficient capacity, clear procedures, or fast communication channels, which increases their vulnerability to sudden events such as flash floods.

The enhanced warning system is designed as a practical and user-friendly tool that supports municipalities in crisis situations by ensuring rapid access to clear, step-by-step instructions and verified warnings. Its main goal is to empower local leaders to react faster, coordinate more effectively, and avoid delays caused by uncertainty, lack of experience, or missing information. The pilot combines prevention, digitalisation, and stakeholder involvement, making it an example of how local governance can be strengthened through innovation while remaining aligned with national disaster-risk-reduction policies and broader European climate adaptation priorities.

The pilot is led by the Fire Rescue Service of the Czech Republic in close cooperation with the University of Ostrava and associated partners. Key stakeholders include the Union of Towns and Municipalities, the Czech Hydrometeorological Institute, and the Ministry of Environment, ensuring that the solution reflects both municipal needs and expert knowledge on warnings and crisis-management procedures.

The development followed a structured sequence of activities: defining typical emergencies relevant to municipalities, preparing and validating guidance content for integration into the app, designing the technical layout, and preparing procurement documentation for an IT provider. Stakeholder involvement was ensured through a dedicated working group, consultations, and feedback loops, with the Union of Towns and Municipalities acting as a key intermediary to gather input from end users and support dissemination.

The application will be publicly available via Google Play and the App Store, supporting long-term usability and ensuring broad accessibility.

Keywords: extreme weather, floods, mayors, decision support, crisis management, mobile application, CAP warning system, resilience, stakeholder cooperation, digitalisation

Selected aspects of the methodology of creating dedicated decision-making games.

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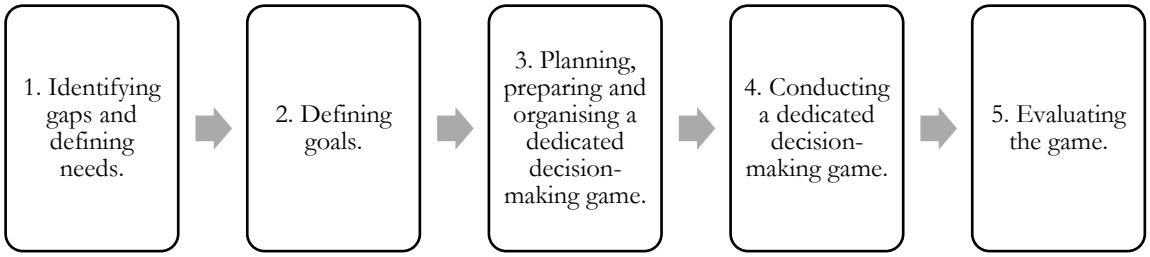
Crisis management and civil protection are complex and multifaceted processes requiring a complex approach and interdisciplinary knowledge combining specialist, organisational, managerial, and crisis communication expertise. It is imperative to acknowledge that all of these elements are of paramount importance and must be cultivated through meticulous training and exercises. It is evident that one of the most efficacious forms of civil protection exercises is that of decision-making training. One of the preliminary activities undertaken as part of the LOCALIENCE project yielded a methodology for the creation of dedicated decision-making games. Previously utilised approaches generally presupposed the implementation of decision-making games within a pre-defined scenario. The analysis of the entities and areas for which the game was to be developed was neglected. The gaps and procedural shortcomings resulting from the specific characteristics of the region in question were ignored. The methodology developed within the LOCALIENCE project addressed these gaps.

The developed methodology is predicated on five principal steps in the process of creating a dedicated decision-making game (see Figure 1). It is imperative to note that each step is executed in a sequential manner, with the omission of any step constituting a substantial deviation from the prescribed methodology.



Picture 1. Methodology of dedicated symulation game.
Source. Own elaboration.

The methodology developed in the project is currently being implemented in Poland. Its main areas of application include games implemented in local government units, student classes within a subject dedicated to decision-making games, and advanced civil protection courses, which represent the actual implementation of the Civil Protection Act in Polish realities. The approach can be scaled to various levels of governance and used in other countries.

Keywords: simulation game, civil protection, crisis management, training, exercise

Key points of gap analysis for the development of dedicated decision-making games.

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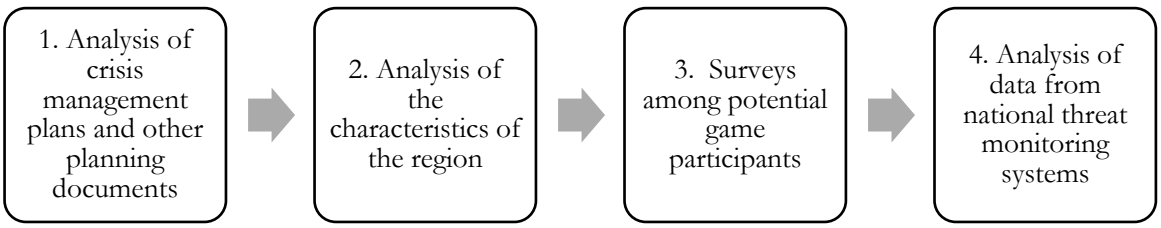
The process of creating dedicated decision-making games necessitates a comprehensive understanding of the elements that characterise the crisis management and civil protection system within the geographical area encompassed by the game. As part of the LOCALIENCE project, a thorough analysis of gaps was conducted, which are worthy of consideration in the context of creating dedicated decision-making games. Gap analysis and needs identification are recognised as fundamental components of the game development process. This element determines scenario selection, the gathering of knowledge about the entity for which the game is being organised, and the determination of the elements of individual sub-games closely related to the identified gaps. From the perspective of the repeatability of the method used, it is important that the gap identification process be repeatable across different entities or administrative units of the country and take into account the possibility of international application of the method.

The gap analysis method employed in the LOCALIENCE project was predicated on four principal elements of analysis (Fig. 1).



Picture 2. Step of gaps analysis for preparation dedicated symulation game.
Source. Own elaboration

Crisis management plans are considered to be a fundamental document, as they determine the approach to crisis management at a given level of national administration (national, provincial, district, municipal). They provide a wealth of information on the structure of the crisis management system, including information on existing threats and their risk, a list of entities responsible for crisis management tasks related to threats, and a detailed description of crisis management procedures. The analysis of these elements enables the identification of fundamental inconsistencies that can be exploited during gameplay.

A regional analysis is the place to gather all necessary information about the region. The nature of a given region is often a determining factor in the threats that exist or may exist in that area. Furthermore, it frequently dictates the allocation of resources and the potential for threat transfer. This step in the gap analysis is of particular importance to game organisers, as it facilitates a comprehensive understanding of the given region, which is imperative when organisers are not native to the game's territory, as is typically the case.

Survey research, as part of a gap analysis, serves to determine the expectations of potential players regarding the planned decision-making game. Survey research utilised for the purpose of conducting a gap analysis can be categorised into two distinct domains. The primary domain pertains to the evaluation of the competencies exhibited by the individuals involved, including their understanding of crisis management. The secondary domain encompasses the identification of expectations concerning the game, such as the necessity for enhanced training in procedures or crisis communication.

The final element of gap analysis is the analysis of data from threat monitoring systems. Many institutions monitor and publicly share threat data (e.g., information on water levels or current forest fire conditions). It is possible to determine the trend of threat occurrence in a given area, and to ascertain which threats are more likely and their potential scale, based on the available data.

The integration of all four elements of the gap assessment developed in the LOCALIENCE project facilitates comprehensive preparation for the process of creating a dedicated decision-making game. This approach considers the expectations of players and potential critical areas and inconsistencies in the applicable procedures.

Keywords: simulation game, civil protection, crisis management, gap analysis.

The role of the evaluation process in implementing dedicated decision-making games

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The contemporary development and implementation of decision-making games as a means of building civil protection competencies requires commitment and verification of goal achievement. Well-trained individuals who are responsible for carrying out civil protection tasks can guarantee the safety of citizens. This is particularly important in an era of increasing frequency of extreme weather events and other crisis situations. Evaluating the actions and steps taken provides an opportunity to verify whether they meet their goals and objectives.

As part of the LOCALIENCE project, a decision-making game designed specifically for this purpose was evaluated in the Lubuskie Voivodeship. This evaluation determined the extent to which the implemented solutions support effective decision-making and communication in stressful situations. The evaluation was conducted in three areas:

1) Evaluation based on a participant survey.

2) Evaluation of game injects – verifying the achievement of simulation goals.

3) Evaluation of the IT communication tool.

A fundamental component of the evaluation of the efficacy of the decision-making training pertained to the administration of an evaluation survey among the participants of the simulation. The objective of the survey was to gather feedback on the level of training objective achievement, the adequacy of the scenario, the usefulness of the tools used, and the overall assessment of the exercise's organisation. The survey identified the strengths of the game, including the realism of the crisis situation and the effectiveness of team communication, as well as areas requiring improvement. The collation of qualitative and quantitative data will inform the formulation of recommendations for future decision-making training in the region.

A key part of the evaluation process was assessing the simulations, i.e. crisis situation elements. Those responsible for their preparation analysed how well each simulation met the set objectives. This included how realistic the content was, the information pressure on participants and how effective it was at getting the desired responses. Feedback allowed us to see which simulation elements most supported the learning and collaboration process and which needed adjusting in future implementations.

A dedicated communication tool was developed to facilitate interaction between teams in the decision-making game, simulating various communication channels. User feedback was collected regarding the system's functionality, intuitiveness, and usefulness, leading to refinement of message templates, information flow logic, and the tool's interface. The goal is to enhance the realism of future exercises and improve crisis management tools.

The conclusions obtained constitute the basis for further improvement of the methodology for creating decision-making games, training tools and crisis management strategies in the region, thereby strengthening the safety of the voivodeship's inhabitants.

Keywords: simulation game, evaluation, civil protection, training.

Responsive urban warning system for extreme weather threats built on feedback and interaction

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The Slovenian pilot action, implemented within the Interreg Central Europe LOCALIENCE project, focused on strengthening local preparedness and response capacities to extreme meteorological and hydrological events in the urban environment of Municipality of Ljubljana. Led by the Slovenian Environment Agency in cooperation with the Ljubljana Fire Brigade and civil protection authorities, the pilot developed and tested an integrated, user-oriented warning and communication framework tailored to the operational needs of emergency responders. The pilot was structured around four interlinked sub-actions designed to enhance situational awareness, decision-making, and timely response under rapidly evolving extreme weather conditions.

The first sub-action resulted in the development of a dedicated web-based platform that consolidates key meteorological and hydrological measurements, forecasts, and warnings into a single access point for local emergency response units. The platform complements existing national information systems and protocols by providing selected products according to local operational relevance and time horizons before anticipated extreme events. While the platform builds on established data streams and forecasting capabilities, its primary added value lies in improving accessibility, clarity, and speed of information use during critical phases of preparedness and response.

The second sub-action formalised direct consultation procedures between operational emergency services and duty forecasters. A structured agreement enables shift leaders and commanders of the Ljubljana Fire Brigade to consult meteorological and hydrological forecasters by telephone during periods of increased risk. This measure strengthens real-time interpretation of forecasts and warnings, reduces uncertainty in operational decision-making, and improved alignment between forecast information and field-level response planning.

The third and fourth sub-actions addressed feedback and alerting mechanisms. A real-time media monitoring tool was introduced to support rapid situational feedback from the field and public media, enhancing awareness of emerging impacts. In parallel, an automated alerting system was developed to disseminate SMS and email notifications when predefined hydrological and meteorological thresholds are exceeded. The system, implemented using selected monitoring stations in Ljubljana and its

surroundings, supports early detection of potentially hazardous conditions while ongoing threshold optimisation aims to minimise false alarms.

Overall, the Slovenian pilot demonstrated that targeted procedural improvements, combined with technical tools and structured communication channels, can significantly enhance urban resilience to extreme weather events by improving the functional integration of forecasting and monitoring services with local emergency response units. For the Municipality of Ljubljana, the pilot provides a practical framework for integrating environmental data, expert interpretation, and operational response into daily preparedness and emergency management practices. Moving forward, the pilot outcomes offer a solid basis for further refinement, wider stakeholder inclusion, and long-term institutional embedding, while also representing a transferable model for other municipalities facing similar climate-related challenges.

Keywords: early warning system, disaster management, extreme weather, emergency response, forecasting service, resilience, project.

Appraisal methodology and the results of the research

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This partner update within the Localience (Interreg Europe) project summarises progress and key findings on Disaster Risk Reduction (DRR) at the local level. The Live Testing of the Appraisal tool provided an evidence base on cooperation patterns between professional and civic actors, highlighting strengths as well as recurring limitations in cross-actor coordination. Building on these results, the Policy Gap Analysis identified systemic barriers that prevent DRR strategies from being consistently translated into effective local delivery.

The analysis shows that gaps repeatedly concentrate in vertical disconnections between governance levels, horizontal fragmentation across sectors, and weak implementation mechanisms linking policy intent to operational practice. To move from diagnosis to action, these findings were translated into policy dilemmas that partners must address, including governance responsibilities, long-term resourcing and delivery capacity, and sustainable participation and trust-building.

A key practical implication is the need for stable enabling structures at local level. In this context, local multi-stakeholder DRR platforms are presented as a concrete mechanism to institutionalise cooperation, improve shared situational awareness, and support continuous learning and follow-up actions. The White Paper provides the project's solution-oriented direction, translating these insights into transferable measures and recommendations for partner implementation and policy improvement.

Keywords: Disaster Risk Reduction (DRR), professional and civic actors, Appraisla tool, Live Testing, Policy Gap Analysis, resilience.

Tailored training programmes for professional stakeholders and local actors to enhance resilience against extreme weather events

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Within the Interreg Central Europe LOCALIENCE project two training programmes on multi-hazard extreme weather events (MHE) and nature-based solutions (NBS) were developed to enhance the resilience of professional stakeholders and local actors against extreme weather events.

The training programmes were based on jointly prepared training materials, designed to equip local leaders and disaster management professionals with the necessary knowledge and skills required to address extreme weather risks at local level. The training materials were prepared in English and translated into national languages, providing a shared methodological framework for all partner countries, while allowing for national adaptation to local contexts and incorporation of relevant case studies.

The focus of the training programmes were on two thematic areas. The MHE training programme addressed preparedness and response to multiple, often concurrent extreme weather hazards, such as storms, floods and wildfires, to equip disaster management professionals and local decision makers with strategies to enhance resilience and mitigate risks associated with complex disaster scenarios. The NBS training programme focused on nature-based approaches to water retention, sediment management and other effects of extreme weather events within the landscape and urban community. The training were tailored for mayors, municipal officials and engaged citizens and guided them through the use of NBS as sustainable risk-reduction measures. For example, how flooding, heatwaves or erosion damages can be mitigated or managed more effectively through the implementation of water retention in the landscape or urban green spaces.

Each of the two training programmes were implemented through practical training sessions across all five partner countries. As the training programmes were locally adapted, they combined expert presentations with case study analyses, structured group discussions, practical exercises and where relevant field visits demonstrating NBS in practice. Most training sessions were held in-person, however some were also held online or made use of a hybrid training format to increase participant accessability and outreach. A wide range of stakeholders participated in the training sessions including disaster management professionals, fire brigade personnel, municipal representatives, mayors, public authorities, farmers and interested citizens. Depending on the required expertise to lead the training sessions, trainers were recruited from partner institutions or from external expert organisations. To ensure continuous improvement and quality assurance, participant feedback was gathered through surveys conducted after

each training session. Insights from these evaluations showed that participant satisfaction was generally very high and highlighted a strong demand for further training activities among stakeholders.

Key outcomes of the practical training included increased application of MHE knowledge during real events among disaster management professionals, a growing municipal interest in integrating NBS into planning processes and improved cooperation among stakeholders for increased community resilience. In this way, the training successfully achieved its goals of raising awareness and enhancing stakeholder knowledge on MHE and NBS related to extreme weather events. By bringing together a diverse group of stakeholders, the training fostered effective knowledge sharing and encouraged collaboration at local level. The training sessions highlighted the value of proactively engaging stakeholders, integrating practical applications, and involving expert trainers to ensure impactful learning experiences. Moreover, the variations in training formats and thematic focus demonstrated the flexibility of the materials to address specific local needs and the transferability potential of the training programmes. Building on these lessons, future training initiatives can further strengthen stakeholder understanding and preparedness for managing multi-hazard events and applying nature-based solutions in response to extreme weather challenges.

All language versions of the training materials are available for download on the project website: https://www.interreg-central.eu/news/localience-project-launches-training-materials-to-boost-climate-resilience-in-communities-and-disaster-preparedness/

Keywords: training, extreme weather, multi-hazard events, nature-based solutions, resilience

Training of Trainers as a Preparedness-Building Tool: Evidence from the LOCALIENCE Project

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The LOCALIENCE project: background and objectives

The LOCALIENCE project is a transnational cooperation initiative implemented under the Interreg Central Europe Programme, addressing the growing challenges posed by climate change–driven extreme weather events and related disasters. The project focuses on strengthening disaster preparedness, risk awareness, and response capacities at local and regional levels, with particular attention to flood-related and multi-hazard risks.

LOCALIENCE aims to bridge the gap between strategic disaster risk reduction frameworks and operational practice by promoting knowledge exchange, capacity building, and the testing of innovative preparedness approaches. A key emphasis of the project is the integration of scientific knowledge, institutional experience, and community-based action, enabling authorities and practitioners to better anticipate, prepare for, and respond to climate-induced hazards.

Through pilot actions, training activities, and cross-sectoral cooperation, the project seeks to enhance institutional resilience and support the transferability of effective preparedness solutions across Central European regions.

Role of the Hungarian Water Management Directorate (OVF) in the LOCALIENCE project

Within the LOCALIENCE project, the Hungarian Water Management Directorate (OVF) participated as a national-level competent authority responsible for water management, flood protection, and disaster risk reduction. As Project Partner 2, OVF contributed its operational and institutional expertise to the development and testing of practice-oriented preparedness tools, with a particular focus on flood-related and multi-hazard risks.

The involvement of OVF ensured a strong link between strategic project objectives and real-world implementation, allowing project outputs to be aligned with existing national preparedness frameworks and civil protection practices. Through its participation, OVF supported the integration of scientific knowledge, operational experience, and capacity-building activities, thereby strengthening the applicability and transferability of project results beyond the project lifecycle.

Training of Trainers activity as a preparedness-building tool

The Training of Trainers (ToT) activity implemented within the framework of the LOCALIENCE project served as a key capacity-building instrument aimed at strengthening disaster preparedness at local and institutional levels. The ToT programme was designed to enhance both technical knowledge and training competencies, enabling participants to act as multipliers within their respective organisations and professional networks.

The training combined adult education principles with scenario-based and practice-oriented learning, addressing topics such as flood risk management, climate-related hazards, and international disaster response mechanisms. By linking theoretical frameworks with pilot actions and structured peer feedback, the ToT activity contributed to the development of operational preparedness, trainer confidence, and institutional learning capacities.

As such, the ToT approach within LOCALIENCE functioned not only as a training event, but as an applied preparedness-building process supporting the long-term strengthening of disaster risk management and response capabilities.

Training of Trainers Programme within the LOCALIENCE Project

As part of the LOCALIENCE project, a three-day Training of Trainers (ToT) programme was implemented as a core capacity-building activity aimed at strengthening disaster preparedness and local response capabilities. The training supported the development of professional competencies required for effective disaster risk reduction, flood protection, and civil protection activities at local and regional levels. The programme was conceived as a professional continuing education course, combining adult education methodologies with technical disaster risk management content. Its primary objective was to prepare participants to act as competent trainers and facilitators capable of supporting preparedness-oriented actions, stakeholder engagement, and knowledge transfer within their respective institutions and communities. Particular emphasis was placed on the multiplier effect of training, enabling participants to further disseminate knowledge and skills and thereby enhance institutional preparedness.

Structure and methodological approach

The Training of Trainers programme was delivered in an in-person format over three consecutive days and followed a structured progression from training methodology to technical preparedness content and practical application. The curriculum combined theoretical inputs, interactive exercises, scenario-based learning, and structured peer feedback to support experiential and reflective learning processes.

The first day focused on foundational training and facilitation skills. Participants were introduced to adult learning principles, intercultural communication, active listening, feedback techniques, and effective presentation methods. These sessions aimed to strengthen trainer confidence and pedagogical competence, which are essential for delivering preparedness-related training in diverse institutional and cultural contexts.

The second day addressed technical aspects of disaster preparedness, with particular attention to climate change–related risks and flood management. Sessions covered climate risk awareness, flood types and protection measures, and international disaster response frameworks, including mechanisms for cross-border cooperation. Scenario-based exercises were used to connect theoretical concepts with practical coordination challenges, supporting participants' understanding of multi-level disaster response dynamics.

The third day was dedicated to the presentation and evaluation of pilot actions developed within the project framework. Participants presented their pilot initiatives related to flood preparedness, early warning, and emergency response, followed by structured peer feedback. This process facilitated reflective learning, critical assessment, and the identification of transferable elements applicable across different national and institutional contexts.

Contribution to preparedness and capacity building

The Training of Trainers programme functioned as an applied preparedness-building instrument rather than a standalone educational event. By integrating methodological training with technical disaster risk management content and pilot-based learning, the programme supported the development of operational preparedness, institutional learning, and cross-sectoral cooperation.

Participants acquired both subject-matter expertise and facilitation skills, enabling them to support local preparedness initiatives, guide stakeholder engagement, and contribute to the sustainability of preparedness actions beyond the project lifecycle. The Training of Trainers approach thus provided a practical mechanism for translating disaster risk reduction frameworks into locally applicable preparedness measures.

Summary: Preparedness, practice, and lessons from recent local flood events

The relevance of the Training of Trainers programme and practice-oriented preparedness activities was further underscored by recent local flood events experienced in Hungary during the summer of 2020. In July and August of that year, several regions, including parts of Somogy County and Northern Borsod, were affected by intense rainfall events leading to severe local flooding, flash floods, and widespread water damage. These events highlighted the vulnerability of settlements to climate-induced hydrological extremes and the increasing frequency of locally concentrated water damage incidents.

The observed flood events demonstrated that effective disaster risk management must address the full preparedness cycle, encompassing prevention, preparedness, response, and recovery. In many cases, the rapid onset of flooding left limited time for ad hoc decision-making, emphasising the importance of prior planning, trained personnel, and clearly defined roles at local level. Where preparedness measures, training, and coordination mechanisms were in place, response actions proved more efficient and damage mitigation more effective.

The events also revealed the critical role of practice and exercises in strengthening preparedness. Simulated scenarios and pilot-based learning, as applied in the Training of Trainers programme, closely reflect the real challenges encountered during local water damage events, including coordination under time pressure, communication with stakeholders, and mobilisation of available resources. Such exercises contribute directly to operational readiness by allowing participants to test and refine response procedures before real emergencies occur.

Local flood events in Somogy and Northern Borsod further highlighted the importance of volunteer involvement in disaster response. Volunteers often provided essential support during defence and recovery activities, particularly in situations where professional capacities were temporarily overwhelmed. Their effective engagement depends on prior training, integration into response structures, and mutual understanding between professional and volunteer actors. Strengthening these linkages is therefore a key component of resilient local preparedness.

Finally, the recovery phase following the 2020 summer flood events demonstrated that preparedness extends beyond immediate response. Damage assessment, restoration of infrastructure, and long-term resilience building require coordinated institutional action and sustained capacity development. The experiences from these local water damage events confirm that investments in training, practice-oriented preparedness, and community engagement are indispensable for managing increasingly frequent and intense hydrological hazards.

Keywords: disaster preparedness; flood risk management; training of trainers; capacity building; local flood events; volunteer engagement; practice-oriented learning; climate change adaptation; multi-hazard risk; civil protection

Synergies of Climate Adaptation Projects in Vas County – Integrating Risk Management, Water Governance and Community Resilience

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The Vas County Government Office participates in a significant number of interregional cooperation projects, three of which have close professional ties: the CLIMATE, Gov4Water, and LOCALIENCE projects all support adaptation to climate change in complementary dimensions.

The CLIMATE project is centred on the management of risk, the assessment of vulnerability, and the establishment of protocols for disaster management. The project promotes a proactive response to extreme weather events and the institutional and policy integration of considerations for climate adaptation.

The Gov4Water project has been developed to adapt water management systems to climate stress, with a particular focus on nature-based solutions and the strengthening of cooperation between sectors and administrative levels.

The LOCALIENCE project is a social initiative that aims to enhance community involvement, participatory methods, and social resilience. By doing so, it seeks to ensure the acceptance of climate adaptation measures within local communities, ensuring their sustainability and long-term relevance.

The common denominators of the three projects are the prevention-based climate adaptation, the knowledge-based and participatory decision-making, and the development of institutional capacities and governance mechanisms. The synergy between the projects enables the development of a complex, multidimensional climate adaptation model in Vas County, where technical, water management and social approaches converge.

The study visits, workshops and stakeholder meetings have resulted in significant knowledge transfer, which has contributed to the development of the county's climate strategy, the refinement of emergency protocols and the strengthening of water management decision-making. The results of the projects are being incorporated into the county's development strategy-making and decision-making processes, thereby increasing Vas County's preparedness and resilience to the effects of climate change.

References:

1. CLIMATE project official page - https://www.interregeurope.eu/projects/climate
2. Gov4Water project official page - https://www.interregeurope.eu/projects/gov4water
3. LOCALIENCE project official page - https://localience.eu/; https://www.interreg-central.eu/projects/localience/
4. European Commission – Consequences of climate change - https://climate.ec.europa.eu/climate-change/consequences-climate-change_en

Keywords: climate adaptation; risk management; water governance; social resilience; Interreg; Vas County

Using new technologies in disaster prevention

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Exploring new opportunities to support firefighting and disaster management activities (both prevention and intervention) is always relevant and timely. This is based on different national requirements and needs, depending on the social and development levels of each country. Changes caused by external factors such as global climate change, which means increasingly extreme and variable weather with more pronounced fluctuations, also place a significant burden on the populations of individual countries, and thus on disaster management and firefighting organizations.

New development and support opportunities for disaster management and prevention may include organizational and training aspects, as well as logistical improvements using already available tools. This topic primarily provides an opportunity for a brief overview of new technological possibilities and their background from the above perspectives.

When it comes to new technologies, the question arises: how new are they really? To illustrate this with a brief example, the use of drones can now be considered a novelty, as every disaster management agency in Hungary has drones at its disposal and is gaining more and more experience in their use. Here, technical and IT enhancements can bring about innovations that significantly and demonstrably increase existing disaster management capabilities.

Examples of this in the technical field include significantly increased flight distances, increased payload capacities, and the provision of multiple sensors or active intervention capabilities, while in the IT and software field, autonomous activities (programmed reconnaissance flights, autonomous sampling) and adaptive response to incoming data using artificial intelligence solutions could be another direction for development, which could result in the emergence of new capabilities.

When categorizing new technologies, it is worth analysing their usefulness as well as their individual advantages and disadvantages.

Examining three directions:

1. Prevention and Intervention remotely such as **drones, robots**
   Advantages: improved safety for interveners, more place to reach in different circumstances, can carry more sensors
   Disadvantages: purchase cost, Maintenance, Trainings for their users

2. Supporting the devices, equipment and the experts, responders, incident commanders by **databases, sensors** (i.e. handheld or positioned), more way to detect important elements of the environment
   Advantages: More and wide range of data for reconnaissance
   Disadvantages: purchase cost, maintenance, data abundance, needs skilled staff

3. Control equipment and Support devices, responders, decision-makers by filtered data using **Artificial Intelligence**
   Advantages: More capabilities in data-analysing (widely), auto-control possibilities in different ways
   Disadvantages: installing cost, needs skilled staff, security issues, responsibility of the decisions what made finally

Taking all these aspects into account, this paper presents a number of new specific technical solutions that can be used to expand and improve disaster management, firefighting prevention and response capabilities**.** More specifically, the automatic remote sensing systems, the wider use of sensors, certain remote-controlled and robotic solutions, as well as the already visible results and possibilities of applying artificial intelligence in this field.

Keywords: disaster management, prevention, new, technology, fire protection

Anticipating global catastrophic risks and their implications to the security and defence sector

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It is beyond any doubt that we live in an age of polycrisis. The emerging nature, as well as increasing frequency and diversity of shocks clearly require new approaches to understand our startegic and operating environment.

Starting from the early 70s, US startegic thinkers in the defence sector and a multinational team working for SHELL in the commercial arena have championed a new set of methods to anticpate the emerging startegic environment more efficiently, with a view to avoid shocks, adjust to changes and if possible shape conditions towards a more favourable environment.

This method, called startegic foresight is in use ever since, while it remained highly utilized in both vommercial intelligence and defence. That said, foresight is underemphasized in most other sectors, including the dusaster relief and management.

The presentation aims to highlight the utility of strategic foresight through showcasing major trends which may lead to a global catastrophic risk (ie. low-probability, high-impact events that could threaten the continuity of human civilization). These risks have been assessed as systemic, transboundary, and often lie beyond the horizon of conventional security frameworks, therefore a multidisciplinary effort is required to anticipate.

Amidst most consequential challenges, including climate breakdown and loss of biodiversity, resource scarcity driving instabilities, the age of AI and emerging disruptive technologies, geoeconomic competition and scramble for the commons, the international order is clearly in transititon.

In these circumstances, a movement from national to global perspectives is highly necessary, acknowledging that traditional security competition may intensify the very threats it seeks to contain, while leaving many of the Global Catastrophic Risks unattended and unsolved.

With the context of the LOCALIENCE conference, the presentation is addressing the importance of anticipating risks and acting together to create resilience against these challenges to come.

Keywords: strategic foresight, global catastrophic risks, disaster management, extreme weather, responses, resilience, project