

CI3R



UL

DCNA<sup>ustria</sup>  
Disaster Competence Network Austria



# BORIS2

Cross **B**Order **R**ISK assessment for increased prevention  
and preparedness in Europe: way forward

## D2.3

### **Synergies and Integration of existing initiatives within the Union Civil Protection Mechanism (UCPM)**

June 2024



Grant Agreement number: 101140181 — BORIS2 — UCPM-2023-KAPP-  
PV  
Project co-funded by the European Union Civil Protection

BORIS2

Contributions by the following National Experts:

### Austria

René Kastner [rene.kastner@dcna.at](mailto:rene.kastner@dcna.at)  
Susanna Wernhart [susanna.wernhart@dcna.at](mailto:susanna.wernhart@dcna.at)  
Christina Rechberger [christina.rechberger@dcna.at](mailto:christina.rechberger@dcna.at)  
Jasmina Schmidt [jasmina.schmidt@dcna.at](mailto:jasmina.schmidt@dcna.at)

### Italy

Valerio Poggi [vpoggi@ogs.it](mailto:vpoggi@ogs.it)  
Chiara Scaini [cscaini@ogs.it](mailto:cscaini@ogs.it)  
Elisa Zuccolo [ezuccolo@ogs.it](mailto:ezuccolo@ogs.it)  
Marta Faravelli [marta.faravelli@eucentre.it](mailto:marta.faravelli@eucentre.it)  
Maria Polese [maria.polese@unina.it](mailto:maria.polese@unina.it)  
Paolo Ricci [paolo.ricci@unina.it](mailto:paolo.ricci@unina.it)  
Marco Gaetani d' Aragona [marco.gaetanidaragona@unina.it](mailto:marco.gaetanidaragona@unina.it)  
Serena Cattari [serena.cattari@unige.it](mailto:serena.cattari@unige.it)  
Marco Lazzati [marco.lazzati@edu.unige.it](mailto:marco.lazzati@edu.unige.it)  
Stefano Parolai [stefano.parolai@units.it](mailto:stefano.parolai@units.it)

### Montenegro

Jelena Pejović [jelenapej@ucg.ac.me](mailto:jelenapej@ucg.ac.me)  
Nina Serdar [ninas@ucg.ac.me](mailto:ninas@ucg.ac.me)  
Ivana Cipranić [ivanac@ucg.ac.me](mailto:ivanac@ucg.ac.me)  
Milena Ostojić [milena@ucg.ac.me](mailto:milena@ucg.ac.me)

### Slovenia

Anže Babič [anze.babic@fgg.uni-lj.si](mailto:anze.babic@fgg.uni-lj.si)  
Katarina Zabret [katarina.zabret@fgg.uni-lj.si](mailto:katarina.zabret@fgg.uni-lj.si)

### Turkey

Mehmet Ali Kökpınar [mehmet.kokpinar@tedu.edu.tr](mailto:mehmet.kokpinar@tedu.edu.tr)  
Aslı Numanoğlu Genç [asli.genc@tedu.edu.tr](mailto:asli.genc@tedu.edu.tr)  
Neslihan Pınar Gödek Hayal [npinar.godek@tedu.edu.tr](mailto:npinar.godek@tedu.edu.tr)  
Rıza Secer Orkun Keskin [secer.keskin@tedu.edu.tr](mailto:secer.keskin@tedu.edu.tr)  
Mehmet Fırat Aydın [firat.aydin@tedu.edu.tr](mailto:firat.aydin@tedu.edu.tr)



## Table of Contents

<b>1. SUMMARY .....</b>	<b>5</b>
<b>2. INTRODUCTION .....</b>	<b>6</b>
<b>2.1. The relevance of existing DRM initiatives within UCPM .....</b>	<b>6</b>
<b>3. OVERVIEW ON EXISTING DRM INITIATIVE .....</b>	<b>8</b>
<b>3.1. Proposed review methodology.....</b>	<b>8</b>
<b>3.2. Criteria for identification of initiatives meaningful for the project .....</b>	<b>9</b>
<b>3.3. Preliminary review of the collected initiatives .....</b>	<b>21</b>
<b>3.4. Procedure for the selection of most relevant initiatives .....</b>	<b>24</b>
<b>4. INDIVIDUAL DESCRIPTION OF SELECTED PROJECTS .....</b>	<b>25</b>
<b>4.1. PARATUS.....</b>	<b>25</b>
<b>4.2. CRISIS.....</b>	<b>26</b>
<b>4.3. COVALEX.....</b>	<b>27</b>
<b>4.4. CRISAFE.....</b>	<b>29</b>
<b>4.5. oVERFLOW.....</b>	<b>30</b>
<b>4.6. CROSScade .....</b>	<b>32</b>
<b>4.7. MYRIAD-EU .....</b>	<b>34</b>
<b>4.8. DPPI SEE.....</b>	<b>36</b>
<b>4.9. EFDRR Roadmap 2021-2030.....</b>	<b>37</b>
<b>5. KEY AREAS FOR SYNERGIES AND INTEGRATION.....</b>	<b>40</b>
<b>5.1. Analysis of gaps and overlaps within existing and ongoing initiatives .....</b>	<b>40</b>
<b>5.2. Examination of potential synergies between different programs .....</b>	<b>41</b>



CI3R



UL

DCNAustria  
Disaster Competence Network Austria



5.3. *Identification of common challenges and new opportunities for integration* ..... 42

6. **CONCLUSIONS** ..... 44



Grant Agreement number: 101140181 — BORIS2 — UCPM-2023-KAPP-PV  
Project co-funded by the European Union Civil Protection

**BORIS2**

CI3R



UL

DCNA<sup>ustria</sup>  
Disaster Competence Network Austria



**Key words:**

Union Civil Protection Mechanism (UCPM)

Disaster Risk Management (DRM)

Disaster Preparedness

Disaster Response

Resilience

Cross-Border Cooperation

Multi-Risk Assessments

Emergency Planning

Best Practices

Capacity Building



Grant Agreement number: 101140181 — BORIS2 — UCPM-2023-KAPP-PV

**Project co-funded by the European Union Civil Protection**

**BORIS2**

## 1. SUMMARY

Considering the results and expertise of previous and ongoing initiatives is crucial to improve effective disaster risk management (DRM) within the framework of the Union Civil Protection Mechanism (UCPM) across Europe and in other countries.

This work aims to investigate, identify and utilise synergies between the BORIS2 project and existing UCPM initiatives. By considering the results of these initiatives, BORIS2 seeks to improve its methodologies, tools and frameworks for DRM, particularly for cross-border and multi-risk assessments. This report shows how existing projects and networks contribute to BORIS2 activities and promote a coherent approach to disaster resilience and emergency planning across Europe.

The report begins with a comprehensive review of past and current EU and UCPM-funded projects. This review includes a detailed examination of the objectives, outcomes and methodologies of these projects to identify overlapping objectives and complementary approaches. Understanding these initiatives allows us to identify approaches and outcomes that may be relevant to BORIS2. An important part of this process is the identification of common methods and tools used in these initiatives.



## 2. INTRODUCTION

### 2.1. *The relevance of existing DRM initiatives within UCPM*

Taking into account the results of recent disaster risk management (DRM) projects within new initiatives in the framework of Union Civil Protection Mechanism (UCPM) is crucial for several reasons. Firstly, it has the potential to increase the overall effectiveness and efficiency of disaster response and preparedness. By utilising the knowledge, experience and resources gained in the development of the various initiatives, more comprehensive and robust strategies for dealing with disasters can be developed within UCPM. This collaborative approach ensures that best practises are shared and implemented across different regions, resulting in more resilient communities..

Secondly, the knowledge of existing DRM initiatives helps to avoid duplication of effort and optimise the use of available resources for future projects and developments. The coordinated approach within UCPM enables better allocation of financial, technical and human resources and ensures that these are channelled into the most important areas. This not only improves the cost-effectiveness of disaster management, but also increases its impact by ensuring that all stakeholders are working towards common goals. The streamlined processes and unified objectives prevent wastage of resources and ensure that each effort contributes effectively to the overall goal of disaster risk reduction and management.

Thirdly, considering relevant projects and initiatives developed towards effective DRM promotes a more harmonised and coherent approach to disaster risk reduction and management across Europe and supports UCPM in ensuring more effective and coherent approaches. This is particularly important given the cross-border nature of many disasters, which can affect several countries simultaneously in a multi-risk perspective. In addition, the knowledge of the output of existing DRM initiatives supports the development of a comprehensive and inclusive framework for disaster risk management. This framework recognises the different needs and capacities of different regions and communities and ensures that disaster management strategies are tailored to local circumstances. By engaging a broad range of stakeholders, including local authorities, civil society organisations and the private sector, a holistic approach to disaster risk management that addresses underlying vulnerabilities and strengthens community resilience is promoted within UCPM. The inclusive nature of this approach ensures that all voices are heard, and all needs are met, creating a more robust and resilient disaster management system.

Finally, the knowledge and dissemination of DRM initiatives contributes to the continuous improvement of disaster management practises. By fostering a culture of learning and innovation, the adoption of new



CI3R



UL

DCNA<sup>ustria</sup>  
Disaster Competence Network Austria



technologies, data, methods and approaches that improve disaster preparedness and response is encouraged. This continuous improvement process ensures that the UCPM remains adaptable and responsive to new challenges, ultimately leading to more effective and sustainable disaster management outcomes. The dynamic nature of this integrated approach ensures that the UCPM evolves with the changing landscape of disaster risks and incorporates the latest advances and innovations to stay ahead of potential threats.

To summarise, considering existing DRM initiatives that can effectively support activities of the UCPM is crucial to improve the effectiveness, efficiency and coherence of disaster risk management efforts in Europe. However, such an improvement can only be achieved through a comprehensive review of relevant DRM initiatives (both past and present). This review should assess the key objectives, differences and common issues in order to gain a detailed understanding of the strengths and weaknesses of each initiative. Through a thorough assessment of these initiatives, it is possible to identify overlapping objectives, complementary strategies and potential areas for collaboration, thus enhancing the collective impact of DRM efforts.



Grant Agreement number: 101140181 — BORIS2 — UCPM-2023-KAPP-PV

**Project co-funded by the European Union Civil Protection**

**BORIS2**



### 3. OVERVIEW ON EXISTING DRM INITIATIVE

#### 3.1. *Proposed review methodology*

The review methodology we propose involves a systematic approach to identify and assess the valuable lessons and tools developed through past and ongoing projects within Union Civil Protection Mechanism (UCPM) and other EU funded ones. This process begins with a preliminary data collection phase aimed at gathering information on projects developed within UCPM or other financial instruments that could be of relevance for BORIS2. This includes accessing various online resources, databases and repositories that contain information on past and ongoing initiatives. Primary sources include European Commission databases, DG-ECHO project lists, academic publications and contributions from project partners and relevant stakeholders.

Following the data collection, a preliminary review of the individual projects is carried out. This review will analyse project documents, final reports, publications and other available resources to identify key information. For each project, the focus is on identifying key objectives, implementation strategies, end results, tools, products delivered, key findings, best practises and lessons learnt. This review helps to understand the scope and impact of each initiative and enables a detailed assessment of its relevance for BORIS2. An important aspect of this methodology is the creation of a detailed table (provided as an annex to this report) summarising the key points, common objectives, differences and products of each project reviewed. This table serves as a basic tool for comparing the different initiatives and highlights the areas of convergence and divergence. It provides an overview of how the different projects address specific phases of DRM, such as prevention, preparedness, response and recovery, and highlights the tools and methods that have proven effective in these areas.

Based on this collection, the next step is to summarise this information to identify synergies and potential areas for integration. By reviewing the summarised data, we can identify common themes and goals that are aligned with BORIS2 objectives. Moreover, this synthesis process also helps to identify innovative approaches and successful strategies that may be useful for BORIS2.

Building on this initial review, the top projects are then selected to describe their relevance to BORIS2 in more detail and comprehensively. This selection is based on specific criteria, including their relevance to cross-border and multi-risk scenarios, their applicability to urban challenges and their contributions to prevention and preparedness; other aspects considered are their effectiveness in emergency response and recovery, their efforts in capacity building, communication, critical infrastructure protection and exercises or scenario



development. Initially, all reviewed projects are screened to filter out those that do not fulfil the basic relevance criteria for BORIS2. This screening focuses on the scope, objectives and outcomes of the project and ensures that these are in line with the main topics of BORIS2. The projects that pass this screening are then shortlisted based on their effectiveness in meeting the identified criteria and only the 9 more relevant projects with respect to the BORIS2 goals are selected for further consideration.

Once the top projects are identified, a more detailed and comprehensive description of their relevance is prepared. This will analyse the specific contributions of each project with reference to the main objectives of BORIS2, that are to develop a shared methodology for single risk and multi-risk assessment of urban settlements as well as a tool to evaluate the emergency condition for urban settlements in a multi-risk framework as a support for DRM planning. The analysis looks at the methods, tools and results of each project and how these can be useful for BORIS2. Each selected project is analysed in terms of its implementation strategies, the technologies and tools developed, the training and capacity building activities carried out and the good practises identified. This detailed analysis will also examine the impact of the project on local and regional disaster management capacities, the scalability of the solutions and the potential for replication in other contexts within UCPM. By gaining a comprehensive understanding of these projects, we will ensure that knowledge can be utilised effectively and that innovations gained through these initiatives can potentially be used to improve the BORIS2 approach.

### *3.2. Criteria for identification of initiatives meaningful for the project*

To effectively review and integrate existing disaster risk management (DRM) initiatives, it is important to describe the process underlying the ranking and selection of the best projects discussed below. To achieve this ranking, we have carefully compiled a set of criteria tailored to recognise the most important and impactful disaster risk management (DRM) initiatives.

With the aim of ensuring a comprehensive and targeted approach to integrating existing knowledge and practises, these criteria have been selected to ensure a comprehensive assessment of each project's potential to improve DRM strategies. This covers a spectrum of key areas critical to effective risk management, from initial assessment and preparation through to response and recovery, with a particular focus on addressing the multi-layered challenges associated with the urban environment. By focusing on cross-border, multi-risk, urban-scale, prevention, preparedness, emergency response and recovery, capacity building, communication, critical



infrastructure and exercises/scenarios, a more effective and resilient disaster management framework can be developed and implemented.

We have applied these criteria to rank and prioritise DRM initiatives to identify the most relevant projects. Key factors such as project type, funding mechanisms, geographical focus and operational tools provided are also methodically assessed. In addition, we prioritise initiatives that highlight critical infrastructure, effective communication channels and robust capacity building efforts that are essential for successful DRM implementation. By adhering to this evaluation framework, we ensure a more objective selection of projects that fit seamlessly into the project objectives.

In the following sections, we will detail the key criteria that guide our evaluation process, namely:

- Cross-border
- Cascading and/or multi-risk
- Application to urban scale
- Prevention and preparedness tools
- Emergency response
- Critical and transportation infrastructures
- Exercise and scenario

Other aspects that are considered, even if not central towards BORIS2 objectives are:

- Recovery
- Capacity building / guidelines
- Communication

#### *a) Cross-border*

The "cross-border" criterion for categorising and classifying DRM projects involves analysing initiatives that tackle challenges affecting multiple countries. These projects play a crucial role in addressing risks that transcend national borders and provide valuable methods and insights for effective disaster response. An example is the Interreg projects funded by the European Union (<https://www.interregeurope.eu>) that focus on promoting cooperation and exchange between neighbouring regions. By developing joint strategies, sharing resources, and standardizing protocols, Interreg projects contribute significantly to the improvement of cross-border disaster management and resilience. In addition, cross-border projects promote the standardisation of



protocols and procedures for cross-border disaster management, thereby strengthening regional resilience and promoting harmonised approaches to risk management. Therefore, a comprehensive assessment of the transboundary aspect of a project provides crucial insight into its potential to address complex and interlinked disaster challenges at the regional level, making it a fundamental criterion for classification and ranking.

*b) Cascading and multi-risk*

The extension of the "cascading and multiple risks" criterion for the categorisation and classification of DRM projects involves evaluating initiatives that address both individual risks and the interactions of multiple hazards. Understanding and dealing effectively with these scenarios is critical to improving disaster resilience. These projects provide sophisticated methods for analysing the impact of multiple hazards, such as earthquakes, floods and landslides, within a single event, whether they occur independently or in a cascading sequence. By using advanced modelling techniques and risk assessment frameworks, these projects offer insights into the complex dynamics of independent and multi-risk scenarios and contribute to developing integrated decision support tools that enable stakeholders to prioritise risk mitigation actions and allocate resources effectively. A careful assessment of a project's focus on cascading or multi-risk scenarios as well as on independent risks therefore provides crucial indications of its ability to deal with the complexity of today's disaster landscapes making this an indispensable criterion for classification and categorisation.

*c) Application to urban scale*

The extension of the "application to urban conditions" criterion for project selection requires careful consideration of initiatives that are tailored to the complex challenges of urban environments. European urban areas are complex due to dense populations, intricate infrastructure, and diverse socio-economic dynamics. Projects focusing on the urban scale such as the European Urban Adaptation Initiative offer invaluable insights and tools for risk management in these environments by using spatial analysis, socio-economic modelling, and infrastructure vulnerability assessments to improve risk management in cities prone to hazards like floods, heatwaves, and industrial accidents. By exploring the unique vulnerabilities and resilience factors of European urban areas, these projects contribute to the refinement and adaptation of DRM methodologies to the specific needs of urban environments in the European context. They facilitate the development of targeted intervention plans and resource allocation strategies, ensuring a more robust and adaptive approach to disaster risk reduction in urban contexts. A thorough assessment of a project's applicability to the urban scale in Europe is an important guide for addressing the complex challenges of urban resilience.



#### *d) Prevention and preparedness*

The "prevention and preparedness" criterion for project selection includes a detailed review of initiatives that focus on proactive measures to build resilience and reduce the impact of disasters. This includes initiatives in focusing on several key areas, including comprehensive risk assessment, strategic planning, early warning systems and awareness-raising campaigns. Such initiatives help reduce risk and improve community and authority readiness to respond efficiently to disasters.

Key areas to improve prevention and preparedness include retrofitting buildings to meet higher safety standards, constructing flood defenses and ensuring essential services such as hospitals, schools and utilities effectively operate during and after disasters. Community involvement is crucial, including volunteer training, regular exercises, and emergency team organization. Engaged and informed communities are more resilient and can respond more effectively in the event of a disaster.

Developing and enforcing policies and regulations to reduce disaster risk is another important area for improvement. This includes land-use planning that avoids high-risk areas, building codes that require disaster-resistant construction, and environmental regulations that protect natural buffer zones such as wetlands and forests. It must also be ensured that sufficient resources are available for disaster preparedness. This includes funding for emergency supplies, training programmes and the maintenance and improvement of early warning systems. Adequate resources ensure that response measures are well supported and effective.

The integration of advanced risk assessment technologies, e.g. for early warning and response coordination, can significantly improve preparedness. Geographic information systems (GIS), remote sensing and data analysis can provide valuable insights into hazard patterns and help optimise response strategies.

Fostering collaboration between government agencies, private sector companies, NGOs, and academia can improve overall preparedness by sharing best practises, resources and innovative solutions. Robust monitoring and evaluation frameworks are needed to assess the effectiveness of these initiatives. Regular evaluations will help to identify gaps, make improvements and keep strategies effective. Addressing these areas can significantly reduce community and infrastructure vulnerability, ensuring a more resilient society.

Since the BORIS2 project aims to extend and enhance risk assessment methodologies to support emergency planning at urban scale, the methodologies and results that will be developed in the project can be intended as elements supporting the preparation of the civil protection plan at municipal level, that can be considered an "active" non-structural measure of a prevention phase. The following project selection is affected by this



perspective on prevention, focused on emergency planning. Hence, although several other aspects of prevention are relevant for effective DRM, such as methods to enhance land-use planning, or mitigation/adaptation strategies and actions like seismic retrofit of buildings or the construction of river levees to prevent flooding, projects dealing with those issues are not specifically selected as potentially relevant for BORIS2.

*e) Emergency response*

The "emergency response" criterion for project selection includes a detailed review of initiatives that provide frameworks, tools and best practises to minimise damage and loss in the event of disasters. Effective emergency response measures are crucial to minimising the immediate impact of disasters. Initiatives in this category are invaluable as they ensure that communities and authorities can take immediate and effective action. These initiatives focus on several key areas, including coordination, communication, resource mobilisation and logistics: Although not all these aspects are central for BORIS2, that is more devoted to the planning of the response, we find it useful to recall here basic issues for each one of them:

Coordination is a fundamental aspect of emergency response. It involves establishing clear roles and responsibilities between the various stakeholders, including government agencies, emergency services, non-governmental organisations and the private sector. By developing an integrated coordination framework, these initiatives ensure that all parties can work together seamlessly during a disaster. This is particularly important in complex scenarios where multiple agencies need to work together to ensure an efficient response.

Communication is another important element of emergency response. Effective communication systems are important for relaying information quickly and accurately to emergency responders and the public. Initiatives that focus on developing robust communication networks, including the use of modern technologies such as mobile communication platforms and social media, can significantly improve the speed and clarity of information flow during emergencies. This helps to make informed decisions and direct resources to where they are most needed.

Resource mobilisation is about the rapid deployment of necessary resources such as personnel, equipment and supplies. Initiatives in this area develop strategies and tools for the efficient allocation and distribution of resources. These include easily accessible stocks of essential goods, pre-arranged mutual aid and mechanisms for the rapid procurement and transport of goods and services.



Logistics ensures that resources are available in the right place at the right time. This includes managing transport networks, storage and distribution systems to ensure that aid reaches affected areas promptly. Initiatives that focus on improving logistics capacity can help minimise delays and bottlenecks and ensure a more effective response.

As in the prevention and preparedness phase, the integration of advanced technologies can improve emergency response. Tools such as geographic information systems (GIS), real-time data analytics and unmanned aerial vehicles (drones) can provide valuable situational awareness that helps responders assess the extent of damage and quickly identify critical needs. When these areas are considered, emergency response initiatives can significantly reduce the impact of disasters and ensure a more effective and immediate response.

#### *f) Recovery*

The "recovery" criterion for project selection includes a comprehensive review of initiatives that provide strategies and guidelines for post-disaster reconstruction and rehabilitation. The recovery phase is critical to restoring normalcy and rebuilding communities after a disaster. Effective recovery initiatives are important not only to meet the immediate needs of the affected population, but also to lay the foundation for long-term resilience and reduce future vulnerabilities. Recovery initiatives focus on several key areas, including damage assessment, infrastructure reconstruction, psychosocial support, economic revitalisation and environmental rehabilitation:

Damage assessment is the first important step in the recovery process. Accurate and timely assessments provide the necessary information to prioritise actions and allocate resources effectively. Initiatives that develop standardised methods and tools for damage assessment ensure a systematic approach to evaluating the extent of destruction and identifying the most urgent needs.

Infrastructure reconstruction includes rebuilding homes, schools, hospitals, transport networks and utilities to restore essential services and functions. Reconstruction initiatives emphasise the importance of incorporating disaster resilient features into reconstruction to increase the resilience of rebuilt structures, which includes using better building materials, adhering to updated building codes and installing flood or earthquake resistant retrofits.

Psychosocial support is crucial in helping affected people and communities cope with the trauma and stress caused by disasters. Initiatives in this area focus on the provision of psychosocial services, counselling services



and community support programmes to promote emotional recovery. By addressing the psychological impact of disasters, these initiatives contribute to the overall well-being and resilience of communities.

Economic revitalisation is also an important part of the recovery process. Disasters can severely impact local economies, leading to loss of livelihoods and financial instability. Recovery initiatives that support economic recovery focus on restoring businesses, creating jobs and providing financial support to affected individuals and businesses. This includes developing strategies to rebuild the local economy, offering microfinance programmes and facilitating access to insurance and other financial instruments.

Environmental rehabilitation is crucial for sustainable recovery. Disasters often cause significant environmental damage such as soil erosion, water pollution and loss of biodiversity. Initiatives in this area promote the restoration of natural ecosystems, reforestation and sustainable land management practises. By integrating environmental considerations into the restoration process, these initiatives help to rebuild ecosystems that can provide natural protection against future threats.

In addition, effective recovery initiatives emphasise the importance of community involvement and participation. Involving local communities in the planning and implementation of restoration ensures that restoration measures are tailored to their specific needs and preferences. This participatory approach fosters a sense of ownership and empowerment, contributing to the long-term sustainability of recovery efforts.

Sustainable recovery practises are a central theme in these initiatives. Emphasising sustainability ensures that recovery efforts not only meet immediate needs, but also strengthen resilience and reduce future vulnerabilities.

#### *g) Capacity building*

The "capacity building" criterion for project selection includes a review of initiatives that provide training, education and resources to improve the skills and knowledge of individuals and organisations involved in disaster risk management (DRM). Capacity building of stakeholders is essential for effective disaster management as it ensures that local authorities, emergency responders and communities are well prepared to deal with disasters. Initiatives that focus on capacity building cover several key areas, including professional training, public education, resource development and the creation of robust training frameworks:

Professional training is crucial to improving the skills of emergency responders, planners and local authorities. These initiatives offer specialised courses, workshops and certifications that cover a wide range of DRM topics, such as hazard assessment, emergency planning and crisis communication. By equipping professionals with





up-to-date knowledge and skills, these training programmes ensure a more effective and coordinated response to disasters.

Public education is another important aspect of capacity building. Initiatives in this area aim to educate the public about disaster risks and safety measures. These include school programmes that educate children about disaster preparedness and community campaigns that provide practical information on how to respond to various hazards. By promoting a culture of preparedness, public education initiatives empower people to take proactive steps to protect themselves and their communities.

Resource development is also a key component of capacity building. This includes the creation and dissemination of educational materials, guidelines and tools that support DRM activities. These resources may include emergency response manuals, online training modules and simulation software that allows users to practise emergency response scenarios. Accessible and high-quality resources ensure that stakeholders have the information and tools they need to effectively build their capacity.

The creation of robust training framework is crucial to ensure the sustainability and effectiveness of capacity building activities. This includes the development of standardised curricula, the establishment of training centres and the creation of certification programmes that recognise the competencies of DRM experts. These frameworks provide a structured approach to capacity building and ensure that training efforts are consistent, comprehensive and aligned with international best practises.

Continuous education and training are critical to maintaining and improving the skills of both the public and disaster management professionals. Regular training and simulation exercises are essential components of this continuous process. These activities prepare responders for real-life scenarios and test their ability to implement response plans and adapt to changing situations. Simulation exercises provide a safe environment to test and refine emergency response strategies, identify gaps and improve coordination between different agencies.

In addition to formal training programmes, peer-to-peer learning and knowledge sharing are valuable aspects of capacity building. Initiatives that facilitate networking and collaboration between DRM professionals, such as conferences, workshops and online forums, promote the exchange of best practises, experiences and innovative solutions.

#### *h) Communication*



The "communication" criterion for project selection includes those initiatives that emphasise communication strategies and tools to ensure timely and accurate information dissemination at all stages of disaster management. Effective communication is a cornerstone of successful disaster management as it improves the flow of information and stakeholder engagement, which is critical to coordinating response efforts and making informed decisions in emergencies. Initiatives that focus on communication cover several key areas, including public awareness campaigns, early warning systems and stakeholder coordination:

Public awareness campaigns aim to increase citizen preparedness and awareness. These initiatives often include community workshops, school programmes and multimedia campaigns to educate the public about disaster risks and safety measures.

Early warning systems are another important component of effective disaster management communication. These systems provide timely warnings and information about impending hazards so that communities and authorities can take precautionary measures. Initiatives in this area focus on the development and implementation of technologies and protocols to recognise and disseminate warnings. This includes the use of meteorological data, seismic monitoring and remote sensing technologies to predict and track hazards. The integration of mobile networks and other communication platforms ensures that warnings reach a wide audience quickly and efficiently.

Stakeholder coordination is essential for a harmonised and coherent response to disasters. Communication initiatives in this area aim to establish clear channels and protocols for the exchange of information between different actors, including government agencies, emergency services, non-governmental organisations and the private sector. Effective coordination of stakeholders facilitates the efficient allocation of resources, minimises duplication of effort and increases the overall effectiveness of disaster response.

In addition, these initiatives often include the development of central communication centres or platforms that serve as information and coordination points in emergencies. These platforms enable real-time data sharing, situational awareness and support decision-making.

Training and communication capacity building are also important. This involves equipping stakeholders with the skills and knowledge they need to use communication tools effectively and convey information accurately and clearly. Training programmes can include workshops on crisis communication, the use of social media for disaster response and the operation of early warning systems.



Another aspect of communication initiatives is the development of multilingual communication strategies to ensure that non-native speakers receive important information. This is particularly important in diverse communities where language barriers can hinder effective communication in emergencies.

Finally, feedback mechanisms are an essential part of communication initiatives. These mechanisms allow information to be gathered from the affected population and responders, providing insight into the effectiveness of communication strategies and highlighting areas for improvement. Regularly reviewing and updating communication plans based on feedback ensures that they remain relevant and effective.

#### *i) Critical/special infrastructures*

The "critical/special infrastructure" criterion for project selection includes a comprehensive review of initiatives that focus on the resilience and security of essential services and infrastructure during and after disasters. Protecting critical and special infrastructure such as hospitals, transport networks and utilities is crucial to maintaining vital services and minimising the impact of disasters on society. Initiatives in this area provide methods for assessing vulnerabilities and implementing protective measures to ensure the continuity of vital services and improve overall resilience in the event of a disaster. Initiatives focused on critical and specialised infrastructure cover several key areas, including vulnerability assessment, protective measures, strategic planning and technology integration:

Vulnerability assessment is an important first step in protecting critical infrastructure. Initiatives in this area are developing standardised tools and methods to identify and assess potential vulnerabilities in infrastructure systems. These assessments take into account various factors including structural integrity, redundancy, interdependencies and susceptibility to different types of hazards such as earthquakes, floods and cyber-attacks. Accurate vulnerability assessments allow stakeholders to prioritise actions and allocate resources effectively to strengthen the resilience of critical infrastructure.

Protective measures implementation is another fundamental aspect of these initiatives. Protective measures include both physical and operational strategies to improve the resilience and reliability of critical infrastructure. Physical measures include retrofitting buildings and structures to withstand extreme events, constructing barriers or dams to protect against flooding and modernising utilities to ensure they can continue to function under adverse conditions. Operational measures include developing and implementing contingency plans, setting up backup systems and redundancies, and implementing cybersecurity protocols to protect against digital threats.



Strategic planning is important to ensure a coordinated and effective response to critical infrastructure disruptions. Strategic planning initiatives include the development of detailed disaster response and recovery plans. These plans are developed in co-operation with local authorities, emergency services, infrastructure operators and community stakeholders to ensure a comprehensive and integrated approach. The EU-funded project "IN-PREP" (Improving Preparedness and Response of Critical Infrastructure) exemplifies this approach by developing a platform that integrates planning and scenario-based training for crisis management experts. Initiatives such as IN-PREP improve the preparedness and resilience of critical infrastructure by providing a collaborative environment for stakeholders to develop and test response strategies.

Technological integration plays an important role in critical infrastructure protection. Modern technologies such as remote sensing and real-time monitoring systems provide valuable insights into the health and vulnerabilities of infrastructure systems. These technologies enable continuous monitoring and early warning, allowing timely intervention and reducing the impact of potential disruptions. In addition, the integration of smart technologies and the Internet of Things (IoT) can improve the efficiency and resilience of infrastructure operations and enable adaptive responses to changing conditions.

*j) Exercises and scenarios*

The "Exercises and scenario-based initiatives" criterion for project selection includes a detailed assessment of initiatives that provide practical and experiential learning opportunities for disaster management. These initiatives are critical to improving the preparedness and response capabilities of all stakeholders involved in disaster risk management (DRM) by simulating disaster scenarios to test plans, procedures and capabilities in a controlled environment.

Exercises and scenario-based initiatives offer several important benefits, including evaluating existing methods, identifying gaps, and improving preparedness and response strategies through realistic simulations. These initiatives typically involve the planning and execution of different types of exercises, such as tabletop exercises, functional exercises, and full-scale exercises, each serving different purposes and levels of complexity:

Tabletop exercises are discussion-based sessions in which participants act out a hypothetical disaster scenario to discuss and review their roles, responsibilities and actions. These exercises help identify potential problems in plans and procedures without requiring a physical commitment of resources.



Functional exercises are more hands-on and focus on testing specific functions or skills, such as communication, coordination and mobilisation of resources. These exercises often involve simulated operations centres and the partial deployment of resources.

Full-scale exercises are the most comprehensive and involve the actual deployment of personnel and resources in a simulated disaster environment. These exercises provide the most realistic test of preparedness and response capabilities and allow for a thorough evaluation of operational effectiveness.

One of the key benefits of exercises and scenario-based initiatives is the ability to evaluate the effectiveness of existing DRM plans and procedures. By simulating various disaster scenarios, stakeholders can assess whether their plans are comprehensive, workable and meet real-world challenges. These exercises also provide an opportunity to test interoperability and coordination between different agencies, organisations and sectors involved in disaster response. This is particularly important in large-scale or cross-border incidents where multiple agencies need to work together seamlessly.

Another important benefit is the identification of gaps and weaknesses in current preparedness and response strategies. During exercises, participants can identify areas where plans and procedures are lacking, where communication and coordination is failing or where resources are inadequate. This feedback is invaluable for improving DRM strategies as it highlights specific areas that need attention and improvement.

Exercises and scenario-based initiatives also contribute to continuous improvement and learning. They provide a safe environment to test new methods, technologies and innovations in disaster management. By experimenting with different approaches and solutions, stakeholders can identify the most effective strategies for different types of disasters. In addition, these exercises help to create a culture of preparedness and resilience among participants that emphasises the importance of emergency preparedness.

Realistic simulations are a key component of these initiatives as they provide participants with a hands-on and immersive experience. This hands-on approach helps build the muscle memory and confidence of responders so that they are better prepared to act quickly and effectively in actual disasters. Simulations also help to familiarise participants with the specific challenges and dynamics of different disaster scenarios, such as the demands of urban environments or the complexity of cross-border incidents.

In addition, exercises and scenario-based initiatives facilitate knowledge sharing and collaboration between stakeholders. By bringing together different groups, including government agencies, emergency services, non-governmental organisations and the private sector, these initiatives promote the exchange of best practises,



experiences and innovative solutions. This collaborative approach helps to build stronger networks and partnerships that increase overall resilience to disasters. The results of exercises and scenario-based initiatives should be systematically documented and analysed to ensure continuous improvement.

### 3.3. Preliminary review of the collected initiatives

A total of 165 projects and existing UCPM initiatives has been analysed to identify possible synergies and gaps with respect to the BORIS2 goals. The complete list of these projects has been reported in table format in Annex A. The table indicates the Name, a brief description of the project, the type of project, the possible product, the funding mechanism, the single or multiple peril addressed, the scale at which the project is applied, the geographic area, and the key criteria that guide the evaluation process as described in §3.2. Finally, additional information regarding whether the project is still ongoing or completed, along with the references to the project are indicated.

The distribution of the 165 projects analysed provides several important insights into the landscape of disaster risk management (DRM) initiatives in Europe. Almost half of these projects, around 50%, address multiple risks or cascading effects. This emphasis on understanding and mitigating complex disaster dynamics emphasises the recognition that risks are interconnected and require coordinated responses that span multiple sectors and jurisdictions. By addressing multi-risk scenarios, these projects aim to strengthen resilience and reduce vulnerability - critical steps in preparing communities for the unpredictability of disasters.

A significant proportion of projects, around 33%, involve cross-border co-operation. This statistic reflects a strong commitment to international and interregional co-operation in addressing risks that transcend national borders. Such co-operation is crucial for pooling resources, expertise and relief efforts and improves preparedness and response capabilities on a broader scale.

It is interesting to note that only a quarter of the projects are specifically targeted at urban areas. This observation points to a potential gap in disaster risk management in densely populated areas, where vulnerability may be increased due to concentrated infrastructure and population. Urban environments present unique challenges that require customised strategies to effectively mitigate risks and ensure a robust post-disaster recovery.

The overwhelming 86% of projects that focus on prevention and preparedness measures emphasises a proactive approach to disaster risk management. These efforts include a range of activities from risk assessment and early warning systems to training the population and strengthening infrastructure. By



prioritising prevention and preparedness, these projects aim to minimise the impact of disasters and improve adaptive capacity to respond quickly and effectively.

In contrast, around half of the projects prioritise emergency aid, which shows that the focus is on immediate measures during and after a disaster. While this distribution is important, it emphasises the general trend towards proactive measures over reactive responses in DRM strategies.

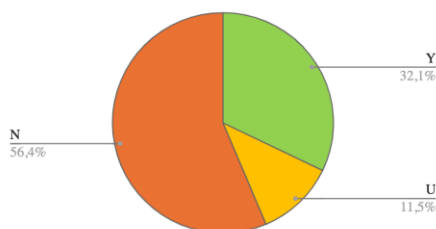
Reconstruction, i.e. rebuilding and restoring communities after disasters, is the focus of only 2% of projects. This statistic highlights the potential for growth and improvement in DRM initiatives, as effective recovery is crucial for long-term resilience and sustainable development in disaster-prone regions.

Capacity building is a central theme in around 68% of projects. This is primarily about equipping communities and institutions with the knowledge and skills they need to reduce risks and respond effectively to disasters. Communication is also emphasised in 38% of projects, reflecting the critical role of information flow in coordinating action and engaging communities in DRM efforts.

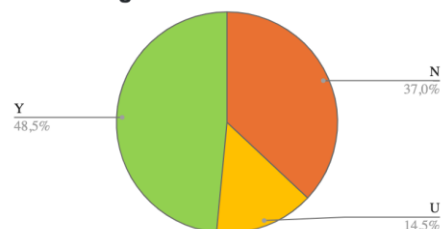
A smaller proportion of projects, around 18%, focus on critical or specialised infrastructure. While this area is critical to maintaining essential services during disasters, it could benefit from more attention and investment to improve overall resilience.

Around 38% of projects include exercises or scenario demonstrations, emphasising the importance of practical training and continuous improvement in disaster preparedness. These activities allow communities and organisations to test their response capabilities, identify gaps and refine strategies in a controlled environment, ultimately improving preparedness for real-life disaster events.

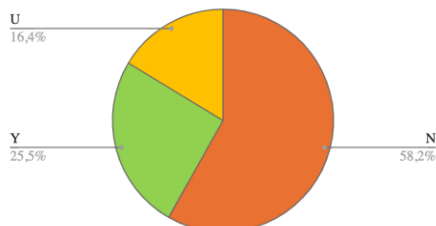
**Cross-border**



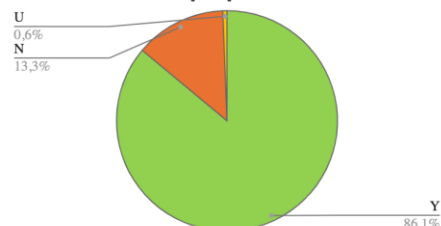
**Cascading or multi-risk**



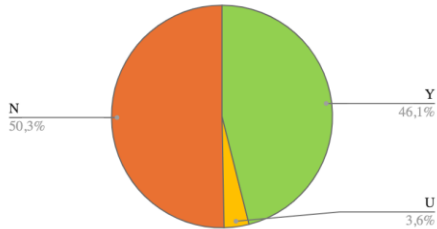
**Application to urban scale**



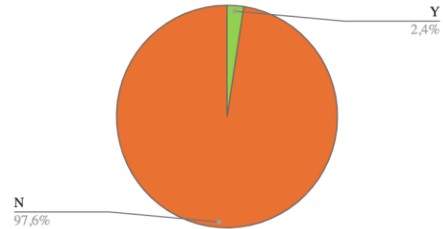
**Prevention and preparedness**



**Emergency response**

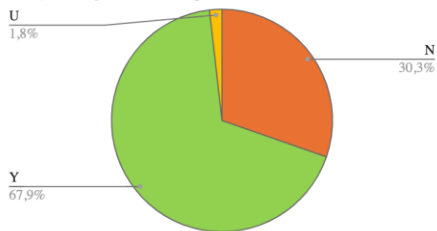


**Recovery**

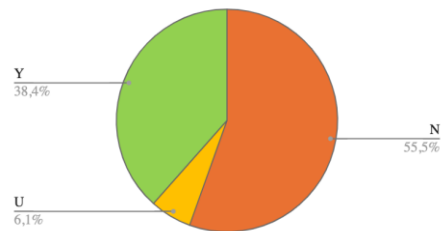


**Figure 1.** Charts displaying the distribution of the analysed initiatives evaluated based on the criteria considered in this study: Y = yes (green shaded area), N = no (orange shaded area), U = unknown or not clearly interpretable (yellow shaded area).

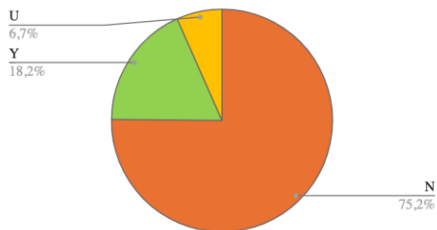
**Capacity building**



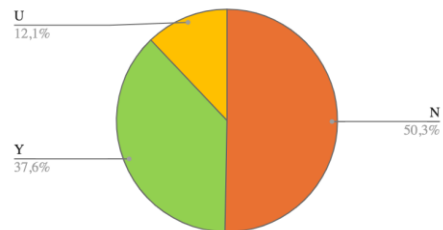
**Communication**



**Critical/Special infrastructures**



**Exercise/Scenario**



**Figure 1.** (continued)

The distribution of these projects emphasises a comprehensive approach to disaster risk reduction, encompassing prevention, preparedness, response and capacity building. While significant progress has been made, areas such as urban resilience, recovery and critical infrastructure require further attention in order to strengthen Europe's resilience to evolving disaster risks.



### 3.4. Procedure for the selection of most relevant initiatives

In selecting the most representative initiatives from the 165 projects analysed, a two-step approach was followed to ensure that the most impactful and relevant projects were selected in line with the focus of the BORIS2 initiative. In the first step, an objective analysis of the distribution of the analysed criteria was conducted. In this phase, all analysed projects were systematically reviewed to filter out those that did not meet the basic relevance criteria for the present framework. This was done primarily to ensure that only projects that make a significant contribution to disaster risk management (DRM) are considered for further evaluation. In this initial screening, each project was assessed against the key criteria discussed previously, such as relevance to cross-border and multi-risk scenarios, applicability to urban challenges, contributions to prevention and preparedness, effectiveness in emergency response and recovery, and efforts in capacity building, communication, critical infrastructure protection and exercises or scenario development.

The projects that passed this preliminary assessment were then subjected to an evaluation process by the partners of the BORIS2 initiative. Each project was assessed based on its effectiveness in meeting the identified criteria, with a focus on its overall impact on disaster risk reduction. The evaluation process included a detailed review of project documents, final reports, publications and other available resources to obtain key information on project objectives, implementation strategies, outcomes, tools and products provided, key lessons learnt and best practises. This evaluation ensured that each project was assessed against a comprehensive set of parameters, allowing for a fair comparison and selection of the most relevant initiatives.

Following this evaluation process, 9 projects were selected for further consideration (see Table in Annex B). This selection represents the most impactful and relevant initiatives in terms of their contribution to the objectives of the present project.. Each selected project was analysed in terms of its implementation strategies, the technologies and tools developed, the training and capacity building activities and the best practises identified. In addition, the impact of each project on local and regional disaster management capacities, the scalability of the solutions and the potential for replication in other contexts of the UCPM framework were assessed.



## 4. INDIVIDUAL DESCRIPTION OF SELECTED PROJECTS

### 4.1. PARATUS

PARATUS (Promoting Disaster Preparedness and Resilience by Co-Developing Stakeholder Support Tools for Managing the Systemic Risk of Compounding Disasters) is an ongoing project that started in September 2022 and is funded by the European Union's Horizon 2021 Research and Innovation Programme. Participants include EURAC, UPC, the Red Cross Red Crescent Climate Centre, the University of Twente and the Resilience Advisors Network. The project focuses on improving the preparedness of first and second responders to multi-hazard events from a cross-sectoral perspective. It will consider complex interactions between hazards leading to cascading effects and impact chains, transboundary impacts and future changes, including the impact of climate change, with intensive stakeholder involvement and application to different case studies.

Building on existing case studies and the history of disasters, the project will provide a methodological basis for the characterisation of impact chains and systemic risks. A methodology for systemic, cross-sectoral and multi-hazard risk assessment will then be developed and applied to four case studies, taking into account future changes, including the impact of climate change, and characterising the uncertainties affecting the components of the risk assessment. The four case study locations are the Caribbean islands (tropical storms, earthquakes, tsunamis and volcanic activity), the Alps (extreme winds, floods, rockfall, heat, drought, mudslides, landslides and snow avalanches), Bucharest metropolitan city (earthquakes and their cascading effects such as floods and fire outbreaks) and the megacity of Istanbul (earthquakes, tsunamis, landslides, liquefaction and hydrometeorological hazards). Stakeholders will be involved through workshops at the case study sites. Adaptation and mitigation strategies will be developed in collaboration with stakeholders, including serious games to support the learning process. An online tool will be developed to support first and second responders and other stakeholders in assessing the impact chains of multi-hazard events, with a particular focus on transboundary and cascading impacts.

The main output of the project is a web-based tool to support first responders and other stakeholders in managing risk in multi-hazard scenarios. Additional tools and guidance will be provided, including historical disaster data, uncertainty analyses in risk assessment, co-development of scenarios for different sectors (social sciences, human health, cultural heritage, environment and biodiversity, public financial management and key economic sectors) and application examples of the proposed methodology.

Three deliverables have been published by 10 June 2024:



- Deliverable 1.1, a report on participatory workshops at the four use case study sites, including impact chain diagrams for each event analysed;
- Deliverable 4.1, a draft document for the web-based multi-hazard impact chain simulation and information service;
- Deliverable 6.2, the first report on workshops in the use case studies.

The PARATUS project addresses all the criteria listed in the table, except for recovery and critical/specialised infrastructures. Its focus is on the assessment of multi-hazard risks, cascading effects and impact chains, explicitly considering transboundary impacts as part of the analysed multi-hazard events. The project addresses applications at city level with specific case studies in Bucharest and Istanbul. A key objective is to increase preparedness, with a focus on the learning process. The project aims to provide a web-based tool to support emergency responders and thus promote capacity building. In addition, the project will communicate risks through serious games to support the learning process. Scenarios will be developed to assess the potential impact of future changes, including climate change, on risk assessment for different hazards.

#### 4.2. *CRISIS*

Comprehensive RISK Assessment of Basic Services and Transport Infrastructure (CRISIS) is a project funded by the European Civil Protection Mechanism under the grant agreement 101004830 — CRISIS — UCPM-2020-PP-AG. The project, coordinated by the Institute of Earthquake Engineering and Engineering Seismology in Skopje, started in November 2020 and lasted two years. The consortium included the Crisis Management Centre of the Republic of North Macedonia, the Department of Civil Engineering of the Polytechnic University of Tirana, the Department of Civil Engineering of the Aristotle University of Thessaloniki and the Eucentre Foundation. CRISIS aimed to improve the current disaster and emergency management in the cross-border area that includes North Macedonia (18 municipalities), Albania (11 districts) and Greece (12 municipalities). This focus area was selected because it is exposed to a variety of natural hazards, in particular earthquakes and landslides.

The project methodology consisted of four main interlinked steps: (i) multi-hazard assessment, (ii) needs assessment, (iii) multi-risk assessment and (iv) development of a geo-referenced web-based platform (WBP). The core of the methodology was the multi-risk assessment of basic services (i.e., reinforced concrete and masonry schools and hospitals) and transport infrastructure (i.e., bridges and viaducts). The multi-risk assessment included the creation of a comprehensive exposure model for these services and infrastructure, the assessment of the vulnerability of different groups of assets and the definition of the most likely and worst-



case risk scenarios using regionally harmonised seismic and seismically induced landslide hazard models. The European Seismic Hazard Model (ESHM13; Giardini et al., 2014) and the Pan-European Landslide Susceptibility Map Version 2 (ELSUS v2; Wilde et al., 2018) were used for this purpose as they are suitable to provide a harmonised approach at national and regional level for the project area.

The risk outputs, including exposure, vulnerability and hazard assessments, were implemented within a WebGIS platform, which was the main product of the CRISIS project. The CRISIS WebGIS was developed for disaster and emergency management authorities in the cross-border region of Albania, North Macedonia and Greece. It integrates several regional exposure databases on schools, hospitals and transport infrastructures into a single tool that provides information on the extent of damage and risks from earthquakes or seismic landslides. The platform also includes a routing function that identifies the safest routes for rescue teams to avoid bridges that could be damaged by simulated seismic events. The modular design of CRISIS WebGIS allows for future updates and the inclusion of additional functionalities. The most important functions of the platform are:

- Cross-border consideration of the areas
- Multi-risk assessment of earthquakes and landslides, but without cascading effects
- Scenarios that apply to the prevention and preparation phase as well as the emergency phase
- Inclusion of critical infrastructure such as hospitals and schools
- Generation of scenarios in real time

The CRISIS project thus makes an important contribution to improving disaster and emergency management in a region prone to natural disasters.

#### 4.3. COVALEX

The COVALEX (Community of Valued Experts in Hydrometeorological and Technological Multi-Hazards) project, funded by the European Union, which started on 1 January 2023 and is expected to end in December 2024, aims to create a community of experts specialising in hydrometeorological and technological hazards. The project is funded by the European Directorate-General for Civil Protection and Humanitarian Aid (DG ECHO) and brings together six partners from Italy, Austria, Greece, France and Spain.

COVALEX focuses on building a network of academics, practitioners and policy makers involved in risk governance to promote multidisciplinary and cross-sectoral co-operation. The project targets hydrometeorological hazards such as thunderstorms, heavy snowfalls, droughts, hot and cold spells and their





secondary impacts such as landslides and forest fires. These hazards can also lead to technological risks, such as heavy snowfall causing prolonged power outages. By creating this community of experts, COVALEX aims to benefit from their experience and expand its geographical coverage and various sectoral networks.

The main objective of COVALEX is to strengthen European cooperation in the field of civil protection and disaster prevention by promoting evidence-based governance and improving prevention, preparedness and testing procedures. The project focuses on building a comprehensive network of experts who can participate in international and local case studies and events. It aims to create interoperable communication frameworks and provide general guidelines for scenario-based exercises.

COVALEX plans to expand the existing knowledge network and form a thematic community to pool, share and disseminate knowledge, skills and applicable solutions. The project will develop a series of scenario-based capacity building and applied science activities addressing specific hydrometeorological and technological multi-hazard disaster risks. It will provide guidelines, planning tools, action plans, evaluation reports and other analytical products to support local communities and provide a framework for these exercises. An important aspect of COVALEX is the use of IT tools via the Knowledge Network online platform to collect, process, create and disseminate information and knowledge. As part of the project, training events will be organised for practical applications in the areas of decision-making, situational awareness, IRC communication and leadership in defined scenarios.

The expected outputs of COVALEX include a series of scenario-based exercises, live learning content combined with open-source tools to support decision-makers, and scientific community events such as hackathons and thematic discussions. The project aims to activate over 200 experts in the COVALEX database, train more than 200 people through scenario-based experiences and create a common framework for the involvement of all stakeholders, scientists and IT developers to promote a human-centred scientific approach to resilience and disaster preparedness.

Geographically, COVALEX focuses on Europe/EU and is relevant to the BORIS2 project. The focus is on capacity building, prevention and preparedness through the formation of a community of experts in hydrometeorological and technological disasters to leverage their expertise and expand geographical and sectoral networks. The project will also develop a series of scenario-based capacity building and applied science activities that address specific risks associated with multi-hazard hydrometeorological and technological disasters. COVALEX will provide general guidance, planning tools, action plans, assessment reports and other analytical products to support local communities and provide a framework for these exercises.



Grant Agreement number: 101140181 — BORIS2 — UCPM-2023-KAPP-PV

**Project co-funded by the European Union Civil Protection**



The exercises within the project aim to improve preparedness and response to hydrometeorological hazards and to demonstrate the effective use of disaster preparedness tools at the local level. For example, one of the first face-to-face events of the COVALEX project took place on 9 and 10 April in Ferrol, Spain. The activities included a simulation exercise for a real emergency. In addition, the project collects, processes, creates and disseminates information and knowledge using IT tools via the Knowledge Network online platform. As part of the project, training events are organised for the practical application of decision-making, situational awareness, IRC communication and leadership in defined, topic-centred scenarios.

#### 4.4. CRISAFE

The CRISAFE (Critical Infrastructure Early Warning System and Population Awareness for Multi-Hazard Cascading Events) project, supported by the European Union Civil Protection Mechanism, aims to improve the resilience of urban areas to cascading multi-hazard scenarios, such as those frequently occurring in Croatia, the Netherlands and Italy. This initiative aims to develop a harmonised and quantified risk assessment methodology to assess the vulnerability of urban infrastructures and populations to cumulative hazards.

The project, which was launched on 1 March 2024 and is expected to be completed on 28 February 2026, involves a consortium of eight partners, including small and medium-sized enterprises, research institutions, infrastructure owners and first responders. These partners have already worked together on the Horizon and UCPM projects. Although the project is still in its early stages, the expected results can be briefly outlined in this project description.

The strategic approach of CRISAFE is to refine and apply risk assessment methods derived from the findings of two major previous projects: oVERFLOW and CROSScade. A key outcome of these projects is the development of fragility curves for two types of critical structures: Dams and bridges. These curves provide a framework for predicting risks associated with climate change and flooding scenarios. These previously developed methods are integrated into risk assessments to enable advanced visualisation of scenarios and their implementation in IT platforms used by critical infrastructure managers and first responders. Using refined vulnerability assessments and a sensor network that provides near real-time information on detected alerts, the CRISAFE project will develop a cascading multi-hazard early warning system (CHEWS).

Two key urban locations have been selected for the demonstration and implementation of the project: Zagreb and Rotterdam. In Zagreb, the project will assess the vulnerability of 19 retention systems that protect the city from flash floods. In Rotterdam, it will assess a 1-kilometre-long dyke to protect against flooding. In terms of



public engagement and risk communication, CRISAFE is committed to raising public awareness by developing effective strategies to improve public access to information on cascading risks.

#### 4.5. *oVERFLOW*

The *oVERFLOW* (Vulnerability Assessment of Embankments and Bridges Exposed to Flooding Hazards) project began in December 2019 and concluded in December 2021. It was funded by the European Union's Horizon 2020 Framework Programme and the EU Civil Protection Mechanism. The project involved seven partners from Croatia, the Netherlands, and Slovenia, and was coordinated by the Faculty of Civil Engineering, University of Zagreb. The National Protection and Rescue Directorate (DUZS) MHUP, Croatia, provided a letter of support for the project.

The primary aim of *oVERFLOW* was to enhance the methodology for assessing the vulnerability of embankments and bridges to floods. In the Netherlands, the VNK2 method had been developed but was burdened by several uncertainties, mainly due to the lack of adequate methodology to assess the condition of existing flood protection embankments and associated failure mechanisms. Within the scope of the project, partners worked on reducing these uncertainties in the VNK2 approach and tested the upgraded methodology on two pilot sites in Croatia (City of Karlovac) and the Netherlands (Rhine-Maas delta region).

The project had several key objectives:

- Developing and applying advanced vulnerability assessment methodologies to existing flood protection systems and critically assessing potential evacuation/emergency routes (bridges).
- Developing a risk forecasting tool using downscaled climate change and flooding scenarios to estimate direct and indirect impacts, followed by strategies for adaptation measures.

The project's work was divided into six work packages (WPs), including project management and dissemination (WP1 and WP6). Within the technical WPs, a GIS web-based platform was established, incorporating historical data and climate change and flooding scenarios for selected areas (WP2). In WP3, advanced in-situ condition assessment methods for embankments and bridges were prepared, combining several rapid and reliable non-destructive methods, such as ground-penetrating radar, multichannel analysis of surface waves, and seismic refraction for assessing the condition of levees. For bridges, the focus was on the potential for foundation scouring due to flood events, with vulnerability assessed through vibration-based methods and drones. WP4 involved developing a vulnerability assessment methodology using numerical models to determine failure triggering values for levees and bridges based on their condition and



loading/hazard scenarios. WP5 was dedicated to developing and implementing a framework based on the VNK2 model approach to quantify the direct and indirect impacts of hazards on the wider case study areas, considering impacts on natural and cultural heritage assets.

The main expected impacts of the project were:

- The developed vulnerability assessment methodologies and risk forecasting tool outputs will support various actors (Civil Protection, municipalities, administrations, professionals, etc.) in decision-making processes related to planning and designing measures to improve the safety and resilience of flood protection systems and bridges, the most critical assets in public infrastructure, during extreme weather and flooding events.
- The models developed in the project allow asset owners to understand the risk and performance of their infrastructure. This enables financial resources to be focused on critical objects, allowing significant cost savings and avoiding the waste of non-renewable resources on strengthening resilient sections.
- In the event of a flood before the resilience of known weak spots (e.g., vulnerable infrastructure or buildings) is increased, temporary reinforcement measures can be deployed by the asset owner, or other mitigation strategies can be considered by the Civil Protection Authority (CPA).
- By increasing the resilience of the infrastructure, the most vulnerable citizens can be protected from the impacts of climate change.
- A range of innovative technologies and management tools were demonstrated (drone data application, advanced decision-making, etc.), improving their technology readiness levels and increasing their marketability and potential for inclusion in standards.

Cross-border cooperation was also a major focus of the oVERFLOW project. Slovenia and Croatia, neighbouring countries whose Civil Protection teams often work closely together, were key partners. The project aimed to further strengthen cross-sectoral and cross-border cooperation through innovative protocols and communication between the countries, extending cooperation to one of the world's leaders in flood-related crisis management, the Netherlands.

The relevance of the oVERFLOW project for the BORIS2 project lies mainly in the assessment of critical infrastructure, which is crucial for evacuation and cross-border cooperation. Although oVERFLOW focused solely on flood safety, the developed methodologies for investigating and monitoring embankments and bridges provide a useful tool for detecting weak spots in any system or case study. Additionally, the inventory of critical infrastructure assets, which followed the monitoring, may provide valuable information on defining





"hot spots" in the system. These spots are important for evacuation from the area but may be damaged to the point where they no longer allow safe crossing.

#### 4.6. CROSScade

The CROSScade (Cross-Border Cascading Risk Management for Critical Infrastructure in the Sava River Basin) project was funded by the EU Civil Protection Mechanism. It started in March 2022 and lasted for two years, involving five partners from Slovenia and Croatia. The project received letters of support from civil protection agencies and critical infrastructure managers from both countries.

The project focused on analyzing cross-border risks between Slovenia and Croatia caused by earthquakes and floods, and their potential cascading sequences of events along the Sava River. These countries are particularly vulnerable to these hazards due to their position in a seismically active area near the end of major European river systems.

The specific objectives of the project were associated with five main topics:

- **Flood Risk:** Development of cross-border flood hazard assessments and scenarios for the Sava River basin; creation of a risk assessment methodology for cross-border flood impacts; formulation of action plans related to flood cross-border impacts; development of specific cross-border action plans in cooperation with Slovenian and Croatian civil protection agencies and critical infrastructure managers, supported by experts.
- **Seismic Risk:** Vulnerability assessment of critical infrastructures at the level of individual assets (e.g., bridges over the Sava River in Slovenia, embankments along the Sava River at selected locations); detailed data collection and probabilistic modeling for different return periods.
- **Cascading Hazards:** Development of cross-border cascading hazard scenario analysis, focusing on earthquakes in Slovenia that could disrupt the operation of gates on dams in the lower parts of the Sava River or cause failures in other critical infrastructure, such as flood protection systems. Such failures could result in flooding in Croatia, significantly impacting Zagreb and surrounding areas.
- **Critical Infrastructures:** Creation of a cross-border cascading event tree focused on identified triggering hazards that may cause cascading risks due to the high vulnerability of selected critical infrastructures.
- **Cross-Border Collaboration:** Development of specific cross-border action plans for managing risks identified in joint risk assessments, including risks to critical infrastructure.

The project work was divided into six work packages (WPs), including project management and dissemination (WP1 and WP6). Within the technical WPs, the project first identified cross-border risk management gaps and



needs (WP2). Then, cross-border hazard scenarios were defined (WP3), and a risk assessment methodology considering cascading effects was developed and applied (WP4). Based on these scenarios and the results of the risk assessment, cross-border action plans were formulated (WP5).

The main outcomes of the project were (i) a risk assessment methodology for cross-border cascading hazard scenarios and (ii) cross-border action plans for risks identified in the risk assessment.

The developed risk assessment methodology is based on event trees with an initial event (e.g., earthquake or extreme rainfall) that causes a chain of subsequent events. The outcomes and associated probabilities were analyzed using Bayesian belief networks. For event trees triggered by earthquakes, two historical earthquake scenarios were selected. For those triggered by extreme rainfall, three distinct branches of rainfall flooding were identified.

The action plans were divided into two categories: those addressing the increase of critical infrastructure resilience through risk mitigation, and those addressing the response after an adverse event. Mitigation phase plans define targets for increasing the structural resilience of critical infrastructure, measures to achieve these targets, and the costs and timeframes for implementing the measures. Response phase plans include protocols for civil protection agencies during cross-border cascading events, including communication with critical infrastructure managers.

Other project outcomes included:

- A report on current cross-border physical hazard risk management.
- A cross-border communication compatibility matrix for civil protection agencies and critical infrastructure managers.
- An inventory of critical infrastructure in the cross-border area of the Sava River basin.
- A set of cross-border cascading hazard events and scenarios.
- Guidelines for integrating cross-border hazard risk assessment methodology into the critical infrastructure asset management system.
- A report on the implementation of risk methodology in case study areas.

The relevance of the CROSScade project to the BORIS2 project is multifaceted. It focused on the risk to critical infrastructures, such as flood protection systems, hydropower plant dams, and transport infrastructure, and considered the cross-border dimension of risk in the Sava River basin near the Slovenia-Croatia border. The project addressed both risk assessment and the definition of action plans, incorporating cascading hazard effects through event trees using earthquakes and extreme rainfall as possible triggering events. This approach considered scenarios where an earthquake and heavy rainfall co-occur, as well as scenarios where they do not.



In both cases, the potential for damage to one unit of critical infrastructure causing increased loads on other units was considered.

The CROSScade project aimed to enhance the prevention and preparedness phases of risk management by developing action plans at two levels: improving critical infrastructure resilience prior to an adverse event (e.g., inspecting bridges, conducting detailed assessments of critical infrastructure) and improving communication between civil protection agencies and critical infrastructure managers during adverse events. These action plans were presented in three training workshops with civil protection agencies and critical infrastructure managers, reinforcing the capacity-building aspect of disaster risk management. Although the project did not focus on strengthening the recovery phase of disaster risk management, simulating disaster scenarios for stakeholders, or analyzing risk and emergency response at an urban level, its contributions to cross-border collaboration and cascading hazard risk management remain significant.

#### 4.7. MYRIAD-EU

MYRIAD-EU's mission is to catalyse a paradigm shift in the way risks are currently assessed and managed. The ongoing MYRIAD-EU project, funded by Horizon 2020, will run for four years from September 2021 to August 2025, bringing together an interdisciplinary, intersectoral consortium from Belgium, the Netherlands, Romania, Spain, Norway, Italy, Austria, Germany and the United Kingdom. This consortium includes research institutions (CMCC, UKRI BGS, Deltares, IIASA, CICERO, MPI, TNO), universities (VUA, ULL, ASE, UHAM), SMEs (Risklayer, Arctik), large companies (Aon), government agencies (CICYTEX), non-governmental organisations (WIEA) and umbrella organisations (FEHRL, HOTREC).

The main objective of the project is to support the shift from a single hazard, single sector risk perspective to a multi-hazard, multi-sector approach. This shift is crucial as there is still a lack of common frameworks for the assessment and management of multi-risks. MYRIAD-EU addresses this issue through five multi-scale pilots in the North Sea, Canary Islands, Scandinavia, Danube and Veneto regions. Each pilot focuses on forward-looking disaster risk management (DRM) solutions to real-world sustainability challenges in six key sectors: Infrastructure and Transport, Food and Agriculture, Ecosystems and Forestry, Energy, Finance and Tourism.

The specific objectives of the project are to develop advanced DRM products and services for policy makers, decision makers and practitioners. This includes the development of a wide range of solutions and tools that enable stakeholders to adopt a new DRM approach, such as open-source software for the creation of multi-hazard/risk scenarios and policy recommendations. The project work is divided into seven work packages



(WPs). The first step involved a diagnosis within the project team (WP1) to understand perspectives, challenges and ways of working, complemented by a review of existing methods, models, tools, policies and governance for multi-hazard and multi-risk management. Following this, an initial framework for multi-hazard, multi-sector and systemic risk management (WP2) was designed. This framework is an iterative process consisting of six steps: system definition, characterisation of direct risk, characterisation of indirect risk, assessment of direct and indirect risk, definition of risk management options and consideration of future system states. It includes single, multiple and systemic risk assessments, depending on the context of the analysis and the needs of the stakeholders. The framework and associated guidance protocols will be further improved through work in the five pilot regions (WP3).

Key products developed to date include a 'wiki-like online crowdsourcing platform for multi-risk methods, models and tools' associated with the task of reviewing methods, models and tools for the management of multi-hazards and multi-risks (accessible at [disasterriskgateway.net](http://disasterriskgateway.net)), the publication "Invited perspectives: A research agenda towards disaster risk management pathways in multi-(hazard-)risk assessment" by Ward, P.J. (2022), which identifies five key themes for challenges in the assessment and management of multi-risks: Governance, knowledge, existing approaches, translating science into policy and data gaps. Other outputs include the "Handbook of Multi-Hazard, Multi-Risk Definitions and Concepts", a report on policies, policy-making processes and governance for multi-risk management, a compilation of resources in the VulneraCity database with unique urban vulnerability factors for six different hazards, proceedings of the 3rd International Conference on Natural Hazards and Risks in a Changing World (June 2024) and more than ten peer-reviewed scientific papers published on the MYRIAD-EU Zenodo community page ([zenodo.org/communities/myriad-eu](https://zenodo.org/communities/myriad-eu)).

Ongoing and upcoming activities include the provision of a database of dynamic feedback between risk drivers (WP4), the development of open-source software for multi-hazard/risk scenario building (WP5), collaborative systems analysis approaches for DRM pathways linked to an online repository of lessons learnt (WP6), and policy recommendations and training products for online and in-person use (WP7).

MYRIAD-EU works on a different scale than BORIS2, focussing on systemic risk interdependencies across Europe. The project's approach to multi-risk and multi-hazard assessments as well as cascading and compounding events and dynamic vulnerability can provide valuable insights for BORIS2. Although MYRIAD-EU primarily addresses different pilot regions and does not focus on transboundary aspects, its work in the Danube pilot area, which spans several countries, can contribute relevant data and methodologies. MYRIAD-EU's policy recommendations and training products can also improve the capacity building of stakeholders in BORIS2. The project's innovative approach to multi-hazard and systemic risk management,



comprehensive collaborative framework and diverse outcomes are instrumental in advancing DRM practises and improving resilience across sectors and regions.

#### 4.8. DPPI SEE

The Disaster Preparedness and Prevention Initiative for Southeastern Europe (DPPI SEE) focuses on improving regional cooperation and coordination in disaster management in Southeastern Europe, which is prone to cross-border disasters that often exceed the capacities of individual countries. DPPI SEE was established in November 2000 as part of the Stability Pact for Southeastern Europe and aims to develop a coherent regional strategy for disaster prevention and preparedness in the 10 member states: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, North Macedonia, Montenegro, Romania, Serbia, Slovenia and Turkey. The initiative aims to improve national disaster management systems by facilitating coordination between donor countries and international organisations without creating new bureaucratic structures.

The main objectives of DPPI SEE include strengthening disaster management organisations to improve prevention and preparedness, acting as a regional disaster management support network for natural and man-made disasters, and promoting cooperation between member countries in the context of EU enlargement and the Euro-Atlantic integration process. The initiative also aims to promote stability through the exchange of information, experience and best practise in disaster management. In addition, it supports the development of disaster preparedness and prevention capabilities through coordinated approaches with international organisations, in particular the EU Civil Protection Mechanism, and facilitates bilateral and multilateral cooperation at all levels between national civil protection authorities and relevant institutions.

In 2021, the DPPI SEE Strategic Development Plan (SDP) 2021-2025 was implemented following extensive consultations with Member States in 2019-2020. This plan outlines the future direction of DPPI SEE and builds on existing activities such as the continuation of the training programme and introduces new priorities: project management and analytics & research. Each priority area includes specific targets and indicators to monitor progress, with the SDP being regularly reviewed at regional meetings and forming the basis for the annual work plans.

Expected outcomes of the project include improved regional cooperation and coordination through regular meetings, workshops and joint exercises; capacity building through training programmes for emergency responders and the development of specific training modules and curricula; policy development and harmonisation through the creation of standardised policies and procedures for disaster management and the alignment of national policies with international standards; strengthening public awareness and education



through teaching materials for schools, public awareness campaigns and media work; improving risk assessment and early warning systems through the development and implementation of regional methodologies and improved systems; and strengthening the institutional framework by strengthening national and regional disaster management institutions and developing new frameworks as needed.

Key tools to be used in the project include risk assessment tools, training and simulation tools, early warning systems, information sharing platforms and disaster management equipment. Deliverables include comprehensive reports and publications, research papers, policy briefs, annual disaster preparedness status reports, training materials such as manuals and guidelines for disaster response and preparedness, e-learning courses, video tutorials and public awareness campaigns. In addition, technical assistance grants and disaster management initiatives provide technical and financial support. The initiative has also created comprehensive databases on local disaster risks and events, GIS maps for planning and response, standardised procedures and protocols for various disaster scenarios, and protocols for international cooperation and assistance.

The DPPI SEE project addresses cross-border, risk-related applications at the urban level and focuses on prevention and preparedness, emergency response, capacity building and communication. However, it lacks a specific recovery plan, critical infrastructure assessment and scenario studies.

#### 4.9. EFDRR Roadmap 2021-2030

The European Forum for Disaster Risk Reduction (EFDRR) serves as a regional platform for 55 countries across Europe and Central Asia, each with different risk profiles and different methods for managing disasters and climate-related risks. These methods include different policies, strategies, laws, investments, preparedness levels, cooperation frameworks and partnership models. The EFDRR Roadmap 2021-2030 outlines four key priority areas aimed at realising the objectives of the Sendai Framework for Disaster Risk Reduction 2015-2030. These priorities include 16 joint action areas to promote development and investment, complemented by five approaches. The 2021-2030 Roadmap is based on input from European and Central Asian countries, an assessment of the implementation of the 2015-2020 Roadmap, and lessons learnt from the response to the Covid-19 pandemic and recovery. It also builds on the outcomes of the Global Platform 2019 and the Guiding Principles for the Global Platform 2022.

The implementation strategy includes understanding and communicating existing, emerging and future systemic risks. This includes investing in and using comprehensive and accessible methods and tools as well as disaggregated data to identify and understand current, evolving and future disaster risks, particularly those arising from future climate-related scenarios. There is also a focus on improving disaster risk monitoring and



lessons learned, with an emphasis on recognising and addressing the disproportionate impact on vulnerable groups such as people with disabilities, different genders, different age groups and marginalised populations. There are also efforts to improve coherence with global agendas and utilise these to address future challenges from climate change, disaster risks and socio-economic issues at all levels of government. Finally, the establishment of new comprehensive systems capable of effectively addressing systemic risks is proposed.

Inclusive and collaborative systems for governance and decision-making are also a priority. This includes introducing a multi-stakeholder governance approach at all levels, systematising decision-making processes based on scientific evidence at all levels and promoting the implementation of robust and comprehensive safeguards and safety nets to ensure inclusiveness and effectiveness. It also emphasises capacity building and multi-stakeholder activities at all levels by strengthening cooperation and cross-border systems.

Supporting investment in resilience is another important focus. Strategic areas to promote resilient investments at societal and regional levels include investing in the protection of critical infrastructure and systems from the negative impacts of climate change and potential cumulative and cascading disasters, the use of sustainable and transparent investments that take into account gender, age and inclusivity in the reduction of climate change impacts, and the use of sustainable and transparent investments, Age and inclusivity in disaster risk reduction, the strengthening of national and local financial resources and regulatory capacity to enable inclusive disaster risk reduction initiatives, and the development and implementation of comprehensive frameworks and methodologies to facilitate sustainable financial practises and investments at all levels.

Another key component is preparedness for response and resilience recovery. This includes investing in the establishment of early warning systems that are accessible to all, improving inclusive, age- and gender-sensitive preparedness for complex emergencies at all levels, utilising lessons learnt from the Covid-19 response for future preparedness and recovery strategies, and creating new accessible and inclusive disaster resilience tools aimed at rebuilding communities to effectively withstand existing, emerging and future risks.

The main expected outcome of the EFDRR Roadmap 2021-2030 is the translation of the Sendai Framework into practise through the following outputs. Identifying common gaps and challenges that hinder the region's efforts to build disaster resilience will support regional, national and local disaster risk reduction strategies and actions. The emphasis on effective collaboration between national and local levels will help share successful practises and opportunities for developing more inclusive policies, strategies, programmes and approaches, considering factors such as risk, gender and age-sensitivity. The roadmap also encourages and supports frameworks for cooperation and knowledge sharing between regions.



CI3R



UL

DCNAustria  
Disaster Competence Network Austria



The European Forum for Disaster Risk Reduction Roadmap 2021-2030 addresses cross-border, cross-risk applications at the urban level. It covers prevention and preparedness, capacity building, critical infrastructure, emergency response, recovery and communication criteria, as outlined in this study.



Grant Agreement number: 101140181 — BORIS2 — UCPM-2023-KAPP-PV

**Project co-funded by the European Union Civil Protection**

**BORIS2**



## 5. KEY AREAS FOR SYNERGIES AND INTEGRATION

### 5.1. *Analysis of gaps and overlaps within existing and ongoing initiatives*

The evaluation of nine projects analysed shows remarkable overlaps and gaps that highlight both successes and limitations of current disaster risk management (DRM) practises in Europe. Projects such as PARATUS and CRISIS have made significant progress in developing tools and methods to improve the skills of emergency responders, often summarised in web-based platforms and simulations. However, there are redundancies in the development of risk assessment methods. For example, PARATUS and CROSScade are independently developing similar tools for cross-sector and cross-border cascading effects without a standardised approach. This points to the need for a more integrated methodology that can be adapted to different scenarios and improve interoperability and resource efficiency. Geographical redundancy is another missed synergy opportunity. Both CRISIS and CRISAFE address earthquake and flood risks in neighbouring regions without any apparent coordination. Pooling resources and knowledge could increase their impact and enable more comprehensive risk management strategies across regional boundaries. Technological tools developed by projects such as the CRISIS webGIS platform and the MYRIAD-EU crowd-sourcing platform underline the need for standardisation. A standardised approach to the development and use of these digital tools could facilitate wider use and integration across different DRM initiatives and make technological resources more accessible and effective.

A key observation is the lack of focus on the recovery phase in most projects. While CROSScade and the European Forum's Roadmap for Disaster Risk Reduction include recovery strategies, other projects are predominantly focused on immediate response and preparedness. Integrating recovery planning into all projects could utilise the tools developed for emergency response to support long-term recovery actions, ensuring continuity and resilience after a disaster. Stakeholder involvement varies widely across projects. While MYRIAD-EU and PARATUS involve a wide range of stakeholders, including policy makers, local communities and cross-sectoral organisations, other projects are limited to emergency services personnel. Extending engagement to a broader range of societal sectors could significantly improve the relevance, acceptability and effectiveness of DRM strategies, especially in diverse and complex risk landscapes. In addition, economic impacts and cultural aspects are often overlooked in the planning and reconstruction phase. Incorporating these dimensions into the broader DRM framework could ensure a more holistic approach that addresses the immediate impact of the disaster and supports sustainable economic recovery as well as the preservation of cultural heritage.



This review shows that while Europe has made significant progress in improving its DRM capacity through these projects, there is still room for improvement. Promoting a more coherent approach that includes interoperable methodologies, comprehensive recovery planning, standardised technological developments and wider stakeholder involvement could significantly improve the effectiveness and sustainability of disaster management under the Union Civil Protection Mechanism (UCPM).

BORIS2 can offer a significant contribution in filling these gaps, specifically providing local stakeholders with tools and procedures to improve their activities related to the “emergency planning” addressing in a consistent manner transboundary and multi-risk issues.

## 5.2. Examination of potential synergies between different programs

The analysis of ongoing initiatives under the UCPM reveals a rich landscape of knowledge, tools and processes that have been developed to improve disaster risk management. These initiatives address critical DRM issues at national, transboundary and European levels and harbour significant potential for the further development of UCPM activities. Identifying and exploiting synergies between these projects is crucial for maximising the use of resources, increasing efficiency and promoting a more coherent approach to disaster management.

A promising area for synergies lies in the use of scenarios, a common element of most projects. These scenarios are used not only to prepare for and respond to emergencies, but also to simulate recovery processes, as can be seen in the CROSScade project. The establishment of a multi-purpose repository for these scenarios could provide a valuable resource for wider application within UCPM activities. This repository could contain comprehensive documentation to support their adaptation and use in different phases of disaster management, thus enhancing collective scenario-based planning and response capabilities. Case studies, another common feature of the analysed projects, provide detailed insights into specific DRM aspects that may be overlooked in general methodologies. The comparative analysis of these case studies can reveal synergies and trade-offs between different approaches, leading to general lessons that are applicable to multiple projects and improve the overall effectiveness of disaster management strategies.

The widespread development of web-based GIS tools and platforms offers another significant opportunity for synergies. Integrating these tools with other European data platforms could create a single resource for accessing and analysing disaster-related data, as is currently done in other scientific communities, e.g. EPOS. This integration would rationalise data use across projects and improve decision-making processes at different levels of government.



Stakeholder involvement is a key element in many projects, with various capacity building activities such as workshops and risk communication tools being developed. Projects such as MYRIAD-EU propose comprehensive cooperation frameworks that could be integrated into other initiatives to enrich the stakeholder engagement process. Broader engagement would ensure that different stakeholders are more involved in DRM activities, leading to more resilient communities. Furthermore, the development of stakeholder networks for knowledge sharing and transfer, as seen in projects such as COVALEX, emphasises the importance of collaborative knowledge ecosystems. These networks facilitate the exchange of information and best practise, which is particularly valuable in the assessment of multiple risk. The integration of experience from cross-border projects such as CRISIS and cross-sectoral perspectives from initiatives such as PARATUS could significantly improve dialogue and collaboration between different DRM stakeholders. Projects such as EFDRR, which collect DRM strategies across Europe and Central Asia, show the potential for broad application of local and regional knowledge. The findings from such wide-ranging projects could assess the applicability and scalability of approaches developed at national and cross-border levels.

The methodological results provided by BORIS2 could complement very usefully with the results of other projects, for instance, taking advantage of tools and procedures developed by other projects for transboundary and multi-risk assessment, that could be integrated in the procedural framework defined by BORIS2. On the other side, other projects could benefit from the results of BORIS2 in different issues, such as the understanding of how the proposed developments could be usefully applied for the aim of emergency planning.

### 5.3. *Identification of common challenges and new opportunities for integration*

The comprehensive analysis of various projects highlights both the challenges and opportunities associated with the implementation of different DRM approaches at local, national and European level. These projects address different aspects of disaster management, such as cross-sectoral and cross-border issues and the complex dynamics of multi-hazard and multi-risk environments, including their mutual interactions and possible cascading effects.

A fundamental challenge is the integration of efforts, often developed for specific local or urban contexts, into broader national or regional frameworks. Many local-level projects generate valuable insights and methodologies that could be useful for broader assessments, but often remain isolated due to the specificity of their design and implementation context. For example, city-level initiatives are characterised by detailed risk



mapping and community engagement strategies, but may struggle to adapt to broader national strategies that require a more generalised approach.

As emphasised above, a major opportunity for UCPM lies in the potential interoperability of the tools developed in these different initiatives. Many projects have developed sophisticated tools and platforms that, if integrated, could form a robust, interconnected framework for improving DRM at multiple levels. The key to this integration is the realisation of interoperable systems that can communicate across different technological platforms and administrative boundaries. The use of scenarios, which is a common thread running through most initiatives, represents a particularly valuable opportunity. These scenarios are not just theoretical constructs, but are based on rigorous data collection, evidence-based methods and practical implementations that have been tested in various local and cross-border environments. By expanding the use of these scenarios to actively promote preparedness and train response capabilities, the UCPM can more effectively engage all levels of society. This approach not only improves preparedness, but also ensures that different stakeholders, with their unique perspectives and experiences, are integrated into the disaster management process.

The next step is to use these scenarios to conduct cross-initiative exercises that test the interoperability and effectiveness of the various tools and approaches developed under the umbrella of the UCPM. Such exercises would validate the practical utility of different methodologies and foster a collaborative environment where stakeholders from different sectors and areas can share knowledge and refine strategies. This collaborative testing and refinement process could pave the way for a more unified and comprehensive European civil protection strategy, transforming the diversity of existing initiatives into a coherent, integrated force capable of tackling the complex landscape of disaster risks across the continent.

From this point of view, the integration between the tools and procedure proposed by BORIS2 and the ones proposed by other projects is certainly possible and desirable. As an example, the flexibility and interoperability of the platform developed within the project activities could promote the integration with the procedures and the methodologies developed within other projects, as well as with the resulting scenarios.



## 6. CONCLUSIONS

The work for this report emphasises the importance of comparing the results of existing disaster risk management (DRM) initiatives under the Union Civil Protection Mechanism (UCPM). Our comprehensive review of nine key projects has used practical examples to highlight the strengths and limitations of current practises and identified opportunities to improve and integrate these initiatives. These efforts aim to strengthen the coherence and effectiveness of disaster preparedness, response and recovery across Europe by capitalising on the collective knowledge and innovative solutions developed through various initiatives.

Through this analysis, it became clear that while significant progress has been made in improving DRM capabilities, there are areas where further integration and standardisation could bring significant benefits. Many projects have developed valuable tools and methodologies independently, but the lack of a unified approach often leads to redundancy and missed opportunities for resource optimisation. For example, several projects have developed sophisticated tools for risk assessment and emergency response, but these efforts often operate in isolation from one another. Promoting the interoperability and standardisation of these tools can improve their utility and accessibility and make them more effective in different scenarios and regions. Our results show the importance of promoting synergies between different DRM initiatives. By identifying commonalities and opportunities for collaboration, projects can avoid duplication and capitalise on each other's strengths. This cooperative approach can lead to more efficient use of resources and better disaster management outcomes.

An important observation is the need for a balanced focus in all phases of disaster management, especially in the recovery phase, which is almost completely absent in the projects analysed. While preparedness and response are well covered in the existing projects, the integration of comprehensive recovery planning can ensure long-term resilience and stability after disasters. Such an integrated DRM approach is critical to building robust systems that can not only withstand disasters, but also recover quickly and effectively.

Stakeholder involvement has proven to be a key element of successful DRM initiatives. Projects that involve a broad range of stakeholders, including policy makers, local communities and cross-sectoral organisations, tend to have more relevant and sustainable outcomes. Extending this inclusive approach to more projects can increase the relevance and impact of DRM strategies and ensure that different perspectives and needs are taken into account in planning and implementation. The economic and cultural dimensions of disaster management also need to be given greater consideration. Understanding and considering the economic impact of disasters and the preservation of cultural heritage can support comprehensive and sustainable recovery efforts.



CI3R



UL

DCNA<sup>ustria</sup>  
Disaster Competence Network Austria



Incorporating these considerations into DRM frameworks can help build more resilient communities that are better prepared for future challenges.

BORIS2, with its focus on transboundary and multi-risk assessments, is well positioned to address the gaps identified in our review. By promoting standardised methods and tools that can be adapted to different scenarios, BORIS2 can improve the coherence and efficiency of disaster response. Emphasising recovery planning and integrating economic and cultural dimensions into DRM strategies will support a more holistic approach. In addition, fostering broad stakeholder engagement and promoting interoperability between technological tools will improve the overall effectiveness of disaster management initiatives within UCPM.

The potential benefit of our findings lies in their application to current and future DRM projects. By addressing the gaps identified and promoting a more integrated approach, we can help to create more resilient and better prepared communities across Europe. The lessons learnt from this analysis can inform policy decisions, guide the development of new tools and methods and promote better collaboration between stakeholders. While the work done in this report is not groundbreaking, it could provide valuable guidance for improving disaster risk management. By integrating and standardising efforts across different projects, emphasising holistic DRM strategies and engaging a broad range of stakeholders, we can build a more robust and effective disaster management system. This collaborative and inclusive approach will help European communities to be better prepared for future disasters and recover faster and more sustainably.



Grant Agreement number: 101140181 — BORIS2 — UCPM-2023-KAPP-PV

**Project co-funded by the European Union Civil Protection**

**BORIS2**

# ANNEX A

Name	Description	Type	Product	Funding	Peril	Scale	Geographic focus	Cross-border	Cascading or multi-risk	Application to urban scale	Prevention and preparedness	Emergency response	Recovery	Capacity building	Communication	Critical/Special infrastructures	Exercise / Scenario	Closed/Ongoing	References
AMWHER	Enhancing emergency management and response to extreme weather and climate events		Pre-EU project on extreme climate risks	Horizon2020	climate, weather	Regional	EU	N	N	N	Y	Y	N	Y	N	N	N	Closed	<a href="https://www.ams2020.eu/">https://www.ams2020.eu/</a>
PROFOUND	Procedure of Rescue Organizations in Flood Operations (Prevention) Danube Region	Fish-scale exercises	Updated procedures, e-learning, Web app	EU	Flood	Europe-wide	Europe-wide	U	Y	U	Y	Y	N	Y	Y	N	Y	Closed	<a href="https://profound.eu.com/">https://profound.eu.com/</a>
EDRA	Empowering Demonstration of Resilient and Sustainable Impact forecasts.	Cross-border prevention and preparedness and marine pollution (Track 2)	Tools for forecasting	ICPM	Flood	Continental (EU)	Two states (Spain, Portugal and Finland)	Y	N	N	Y	N	N	N	N	N	N	Ongoing	<a href="https://www.edra-project.eu/">https://www.edra-project.eu/</a>
RESILANCE	Regional development and impact of Urban Civil Protection Exercise project to improve the response to an earthquake in South East Europe.	Fish-scale exercises	Advancement of non-scale disaster response capabilities	ICPM	Disaster preparedness	outside EU	Albania, Bosnia and Herzegovina, Montenegro	Y	N	Y	Y	N	N	Y	N	N	Y	Closed	<a href="https://www.resilience-project.eu/">https://www.resilience-project.eu/</a>
ARMA	Assessment and Simulations of Present and Future Multi-hazard Risk in the Marikonas-Saïr Region	Cross-border prevention and preparedness and marine pollution (Track 2)	Special multi-hazard risk information platform (MHP)	ICPM	Flood, drought, erosion	Regional	Marikonas-Saïr Region	N	Y	N	Y	N	N	Y	N	N	Y	Closed	<a href="https://www.armaproject.eu/">https://www.armaproject.eu/</a>
BALANCE	Large Scale Earthquake Management at Western Balkans through Joint Cross Border Cooperation Activities.	Fish-scale exercises	Exercise for response capabilities	ICPM	Earthquake	National / Local	Montenegro	Y	N	Y	Y	N	N	U	N	N	Y	Closed	<a href="https://balance-project.eu/">https://balance-project.eu/</a>
Marine Pollution EU MODES	The main focus of the contract is to design, plan, conduct and evaluate a discussion based EU MPD Dr Exercise.	Modelling and risk tools overview (Track 2)	Exercise for response capabilities	EU	Marine pollution	European		N	N	N	Y	Y	N	Y	Y	N	Y	Closed	<a href="https://www.marinepollution.eu.com/">https://www.marinepollution.eu.com/</a>
POEX-2JP	Professional Dialogue Exercises - Jordan River Palestine	Fish-scale exercises	Definition of exercises with procedures, guidelines, etc.	EU (DGECHO)	multi-hazard	outside EU	Jordan, Israel, Palestine	U	N	N	Y	Y	N	Y	N	N	Y	Closed	<a href="https://www.poex2jp.eu.com/">https://www.poex2jp.eu.com/</a>
Coastal	Coastal protection and disaster risk management, handling of planning and night decision using extensive scale and complex data			EU	Weather and flash floods, tsunamis and marine	EU	EU	N	Y	N	Y	N	N	N	N	N	N	Ongoing	<a href="https://coastal.eu/">https://coastal.eu/</a>
Development of a long term Wildfire Prevention Framework for the Danube Region - Track 1	Development of a long-term Wildfire Prevention Framework for the Danube Region - Track 1	Single country grants by disaster risk management (Track 2)		EU	Wildfire	Local	Beroul Point Region	N	N	U	Y	N	N	Y	N	N	N	Closed	<a href="https://www.wildfire.eu.com/">https://www.wildfire.eu.com/</a>
CROSS-SCALE	Cross-border emergency management for critical infrastructure in Save river Basin.	Cross-border prevention and preparedness and marine pollution (Track 2)		ICPM	Earthquake, flood	National / Regional	Save River Basin (Slovenia, Croatia)	Y	Y	N	Y	N	N	N	N	N	N	Closed	<a href="https://www.cross-scale.eu.com/">https://www.cross-scale.eu.com/</a>
DIMAND	Disaster Management Network in the Danube Region	Knowledge Network Partnership	Interactive platform	ICPM	Flood	National / Regional	Danube Region	Y	Y	N	Y	Y	N	N	N	N	N	Closed	<a href="https://www.dimand.eu.com/">https://www.dimand.eu.com/</a>





<b>UNIS Strengthening links to society</b>	The UNIS project is a comprehensive study of the state of Social Media and Conveyance in disaster risk management.	Smart CDRM-related research projects	UNIS Framework which consists of EU and guidelines addressing researchers' practices, and policy recommendations for the use of SMCs for disaster risk reduction. Use cases	EU (DG-EC/DI)	multi-hazard	European	Multi-practitioner	U	Y	U	Y	N	N	Y	Y	N	Y	Closed	<a href="https://www.unis-project.eu/">https://www.unis-project.eu/</a>
<b>MANHRS</b>	Managing risks and impacts from Expanding and dense urbanisation to population Shrink	Cross-border prevention and mitigation and marine pollution (Track 2)	Modelling software and tools, databases, open-source web platforms, operational guidance	EU (DG-EC/DI)	Water pollution	European	France, Belgium, United Kingdom, Norway, Spain, and Portugal	N	N	N	Y	Y	N	Y	N	N	Y	Closed	<a href="https://www.manhrs-project.eu/">https://www.manhrs-project.eu/</a>
<b>MANHRS Genus</b>	MANHRS Genus: from Genus and Ecosystems risk assessment towards an integrated management of sea and land pollution incidents	Knowledge for Action in Prevention & Response (KaPA)	Emergency plans, operational guidelines, emergency plans, intervention protocols, training material and exercises	EU (DG-EC/DI)	Multi-hazard	European	France, Belgium, Spain, UK and Portugal	U	U	N	Y	Y	N	Y	Y	Y	Y	Ongoing	<a href="https://www.manhrs-genus.com/">https://www.manhrs-genus.com/</a>
<b>NR-AMK</b>	The NR-AMK project will develop a methodology for national risk assessment for natural disasters in North Macedonia.	Single countries for disaster risk management (Track 1)	risk-related database for north Macedonia	EU	multi-hazard	national	North Macedonia	N	N	Y	Y	N	N	Y	Y	N	U	Ongoing	<a href="https://www.nramk.com/">https://www.nramk.com/</a>
<b>OVERWATCH</b>	OVERWATCH project is perfectly aligned with the Union Civil Protection Knowledge Network motto - applied knowledge for action.	Smart CDRM-related Horizon projects	crisis management platform to collect flood data and manage, manage operations and emergency actions, and convey responses	EU (HORIZON)	Floods and wildfires	European	European	N	Y	N	Y	Y	N	Y	Y	N	U	Ongoing	<a href="https://www.overwatch-project.eu/">https://www.overwatch-project.eu/</a>
<b>THANS-AP</b>	Goal of this project is to develop an integrated methodology for cross-border prevention and preparedness in coastal and mountainous regions at cross-border scale.	Cross-border prevention and preparedness		EU	Extreme weather events	Local / National	Austria, Italy	Y	N	N	Y	N	N	N	N	N	N	Closed	<a href="https://project-thansap.eu/">https://project-thansap.eu/</a>
<b>THANS-AP</b>	Transboundary Storm Risk and Impact Assessment in Alpine regions	Cross-border prevention and preparedness and marine pollution (Track 2)	conceptual methodology for the disaster management	UCPM	Multi-Hazard	regional	Italy, Austria	Y	Y	Y	Y	N	N	N	N	N	N	Closed	<a href="https://www.thansap-project.eu/">https://www.thansap-project.eu/</a>
<b>UGBR</b>	Learn to be Resilient	Knowledge Network Partnership	notebook, case studies, assembly studies, guidebooks	EU	Earthquake, multi-hazard, pandemic	European	Western Balkans & TL	N	Y	U	Y	Y	N	Y	Y	Y	Y	Closed	<a href="https://www.ugbr-project.eu/">https://www.ugbr-project.eu/</a>
<b>Prometheus</b>	Data Management System for USAR Operations	Cross-border prevention and preparedness and marine pollution (Track 2)	ICT data management system tool procedures developed within the project	EU	multi-hazard	European		N	Y	Y	Y	Y	N	Y	Y	N	U	Closed	<a href="https://www.prometheus-project.eu/">https://www.prometheus-project.eu/</a>
<b>MASTOOL</b>	EGMS MASTOOL: European ground motion risk assessment tool	Cross-border prevention and preparedness and marine pollution (Track 2)	tools for simplifying EGMS data	EU	probahazard (?)	National	EU	N	U	N	Y	N	N	N	N	N	N	Closed	<a href="https://www.mastool-project.eu/">https://www.mastool-project.eu/</a>
<b>RECIPE</b>	Refining our risk reduction capabilities and multi-hazard risk assessment under climate change	Cross-border prevention and preparedness and marine pollution (Track 2)		UCPM	Flood	European	Spain, Germany, Italy, Austria, Portugal	Y	Y	U	Y	N	N	Y	Y	N	N	Closed	<a href="https://www.recipe-project.eu/">https://www.recipe-project.eu/</a>
<b>ROADMAP</b>	European observatory on disaster risk and crisis management best practice	Knowledge Network Partnership	establishment of a European "disaster risk management" funded on the mutual cooperation between scientific communities and disaster risk management authorities.	UCPM	Multi-Hazard	European	Italy, Norway, Portugal	N	Y	N	Y	N	N	Y	N	N	N	Closed	<a href="https://www.roadmap-project.eu/">https://www.roadmap-project.eu/</a>
<b>ROADMAP</b>	European Observatory on Disaster Risk and Crisis Management Best Practices: way ahead.	Knowledge Network Partnership	Build an understanding of disaster management between decision-makers and scientific communities	UCPM	Multi-Hazard	European	France, Italy, Norway, Portugal	N	Y	Y	Y	N	N	Y	N	N	Y	Ongoing	<a href="https://www.roadmap-project.eu/">https://www.roadmap-project.eu/</a>

<b>HOME</b>	Complex Emergency Management in South Caucasus Operations Strengthening OMI Protection Systems through Volunteer Capabilities	Full scale exercises	Collaboration between Red Cross preparatdness and national Civil Protection	UCPM	Earthquake	Local / National	South Caucasus (Armenia, Georgia, Ukraine)	Y	U	N	Y	N	N	Y	N	N	N	N	N	N	Y	Closed	<a href="https://www.unicef.org/emergency/operations">https://www.unicef.org/emergency/operations</a>
<b>STRATEGY</b>	Training Centre Network on 3D and VR	Knowledge Network Partnership	Preparedness, Virtual Reality (VR) solutions and online collaborations in 3D environments to allow simulation scenarios	UCPM	Multi-hazard	EU	EU	N	N	N	Y	N	N	Y	N	N	N	N	N	N	Y	Closed	<a href="https://www.unicef.org/emergency/operations">https://www.unicef.org/emergency/operations</a>
<b>TRAINING</b>	Increasing Knowledge and Preparedness on Mental Health and Psychological Support for Helpers in Pandemics and Conflicts	Knowledge Network Partnership	Training courses	UCPM	Pandemic	National	EU	N	N	N	Y	N	N	Y	N	N	N	N	N	N	N	Ongoing	<a href="https://www.unicef.org/emergency/operations">https://www.unicef.org/emergency/operations</a>
<b>WMO CARES</b>	Virtual Urban Inuitudes Virtual Essays Workshop	Cross-border prevention and preparedness and marine pollution (Track 2)	Platform	EU	Wildfires	European	Europe (demonstration in Spain and Sweden)	N	N	N	Y	N	N	Y	N	N	N	N	N	N	Y	Closed	<a href="https://www.unicef.org/emergency/operations">https://www.unicef.org/emergency/operations</a>
<b>DELCE</b>	Building Experience to Lead in Risk Assessment in Challenging Emergency	Cross-border prevention and preparedness and marine pollution (Track 2)	Manual and handbook	UCPM	N/D	Local	Regenerant (Spain)	N	U	Y	N	N	N	Y	N	N	N	N	N	N	Y	Closed	<a href="https://www.unicef.org/emergency/operations">https://www.unicef.org/emergency/operations</a>
<b>BORIS</b>	The Cross border risk assessment for increased prevention and preparedness in Europe	Cross-border prevention and preparedness and marine pollution (Track 2)	Platform for single and multi-risk assessment	EU	Earthquake, Hydro-meteorological	Regional	Eastern Alps	Y	Y	N	Y	N	N	Y	N	N	N	N	N	N	N	Closed	<a href="https://www.unicef.org/emergency/operations">https://www.unicef.org/emergency/operations</a>
<b>CASCADE</b>	Community Safety Action for Supporting Climate Adaptation and Development	Cross-border prevention and preparedness and marine pollution (Track 2)	Manual and handbook	UCPM	Climate	Local / Regional	Baltic Sea Region	Y	N	Y	N	N	N	Y	N	N	N	N	N	N	N	Closed	<a href="https://www.unicef.org/emergency/operations">https://www.unicef.org/emergency/operations</a>
<b>NAVIS</b>	North Atlantic Maritime Incident Response System	Cross-border prevention and preparedness and marine pollution (Track 2)	Guidance for contingency plan in preparedness and response procedures for emergency responders, training programs	EU	Marine pollution	European	North Atlantic sea	Y	U	N	Y	N	N	Y	N	N	N	N	N	Y	Y	Closed	<a href="https://www.unicef.org/emergency/operations">https://www.unicef.org/emergency/operations</a>
<b>NEPTUNE</b>	Novelcasting and impact based predictors of inundations in Mediterranean coasts	Cross-border prevention and preparedness and marine pollution (Track 2)	Methods and tool for near-real time prediction of floods and their impacts	EU (DG ECHO)	Fish floods	Mediterranean region	Trans-border (Iberia catchment (FR))	Y	N	U	Y	Y	N	Y	Y	N	Y	N	N	U	U	Closed	<a href="https://www.unicef.org/emergency/operations">https://www.unicef.org/emergency/operations</a>
<b>CLIMATE CLIMATE risk and vulnerability assessment framework (and toolbox)</b>	Supporting regions in climate risk assessment	Select CPMs related Horizon projects		HOPECON	Environmental and Hydrological	N/D	EU	U	Y	N	Y	N	N	Y	N	N	N	N	N	N	N	Ongoing	<a href="https://www.unicef.org/emergency/operations">https://www.unicef.org/emergency/operations</a>
<b>MEDEVIS</b>	MEDEVIS is relevant to the UCPM since it is focused on the development of early warning systems (EWS) across the European-Asian region.	Select CPMs related Horizon projects	EU-registered impact-based multi-hazard early warning systems that deliver alerts in voice and text	EU	extreme weather, floods, storms, wildfires, landslides, tsunamis	European-Mediterranean region	Four Pilot cases	U	Y	Y	Y	N	N	Y	Y	N	U	U	U	U	U	Ongoing	<a href="https://www.unicef.org/emergency/operations">https://www.unicef.org/emergency/operations</a>
<b>CRISIS</b>	Comprehensive Risk assessment of basic services and transport infrastructure	Cross-border prevention and preparedness and marine pollution (Track 2)	GIS platform	UCPM	Attitudinal and human induced hazards	National	Georgia, Albania and North Macedonia	Y	Y	N	Y	N	N	Y	N	N	N	N	N	N	N	Closed	<a href="https://www.unicef.org/emergency/operations">https://www.unicef.org/emergency/operations</a>

Evidence to Policy in Disaster Risk Management Summer school 2024	Summer School on generating Evidence for Policy in Disaster Risk Management (SPM)	Ad hoc training courses, thematic seminars & workshops	Summer school	EU	Multi-hazard	N.D.	EU	N	Y	N	N	N	N	Y	N	N	N	N	N	Ongoing	<a href="https://www.zdrzecz.eu/en/summer-school-2024">https://www.zdrzecz.eu/en/summer-school-2024</a>
FORHAT2323	Full-Operational Response to Major Accidents Triggered by Natural Hazards	Full-scale exercises		UCIP	CBRN, chemical, Food	Local / National	Danish Region	Y	Y	Y	Y	N	Y	N	Y	N	N	Y	N	Closed	<a href="https://www.kommunikat.dk/">https://www.kommunikat.dk/</a>
Adaptation to Climate Change through Transboundary Food Risk Management in the Western Balkans				German Federal Ministry for Economic Cooperation and Development (GIZ)	Food	Regional / Local	Dan, Czechia, (Albania, Kosovo, Montenegro)	Y	N	N	Y	Y	N	N	N	N	N	N	N	Closed	<a href="https://www.fao.org/press-releases/2023/01/en/">https://www.fao.org/press-releases/2023/01/en/</a>
PROCUVER-NET	Projecting Cultural Heritage from the Consequences of Disasters Network	Knowledge Network Partnership	establish a European thematic community based on projecting cultural heritage with relevant knowledge and skills.	EU	multi-hazard	European		N	Y	U	Y	Y	N	Y	N	Y	Y	Y	Closed	<a href="https://www.euro-culture.eu/en/procuvern-net">https://www.euro-culture.eu/en/procuvern-net</a>	
Paragon UCPM - Benelux and NRW	Analysis of the needs and requirements for making a Crisis Information Management System (retail only) and cross-border usable within the Benelux.	Single country grants or disaster risk management (Track 1)	Validation of Crisis Information Management System Paragon to national context	EU	multi-hazard	national	Benelux	Y	Y	N	Y	N	N	Y	N	N	N	N	Closed	<a href="https://www.universiteitszorg.nl/en/paragon-ucpm">https://www.universiteitszorg.nl/en/paragon-ucpm</a>	
MONORIS219	Report of the MONORIS 2019 project to test the applicability of the UCPM in an alpine region using a discussion based exercise and a full scale drill protection exercise.			UCPM	Earthquake	National	Austria	N	N	N	Y	Y	N	N	N	N	N	Y	Closed	<a href="https://www.fonerie.eu/en/monoris/">https://www.fonerie.eu/en/monoris/</a>	
IFA-MAR	Improving the Integrated Response to pollution accident at sea and chemical risk in port.	Cross-border prevention and preparedness and marine pollution (Track 2)	look, training material to improve operational knowledge and response	EU (DG-ECHO)	marine pollution	Mediterranean region	Spain, France, Italy, F	Y	Y	N	Y	Y	N	Y	N	Y	U	Closed	<a href="https://www.maritime-efor.eu/en/ifa-mar/">https://www.maritime-efor.eu/en/ifa-mar/</a>		
KNOWENS	Knowledge Network of Maritime Emergency Medical Systems	Knowledge for Action in Prevention & Preparedness (KAPP)	create an European network of Emergency Medical Services (EMS) connected with civil protection and emergency responders	EU	multi-hazard, pandemic	European	European	U	Y	Y	Y	N	Y	Y	Y	Y	Y	Ongoing	<a href="https://www.danishmaritimeefor.eu/en/knowens/">https://www.danishmaritimeefor.eu/en/knowens/</a>		
Ad hoc protective prevention efforts in ports	Ad hoc protective prevention efforts (PrePiv)	Single country grants or preparedness management (Track 1)	Web-based map	EU	Fire	Local	Denmark	N	N	Y	Y	N	N	Y	U	N	N	Closed	<a href="https://www.maritimeefor.eu/en/prepiv/">https://www.maritimeefor.eu/en/prepiv/</a>		
ACTION	Disaster Management Medical Intelligence Knowledge Network	Knowledge Network Partnership		EU	N.D.	N.D.	N.D.	U	U	U	Y	N	Y	Y	N	U	U	Closed	<a href="https://www.maritimeefor.eu/en/action/">https://www.maritimeefor.eu/en/action/</a>		
MAIOS	Improve rescue capability and understanding the environmental impacts of new generation low sulphur Marine High Oil Spills	Cross border prevention and preparedness and marine pollution (Track 2)		UCPM	Marine pollution	Regional	EU	Y	N	N	N	Y	N	N	N	N	N	Closed	<a href="https://www.maritimeefor.eu/en/maios/">https://www.maritimeefor.eu/en/maios/</a>		
LODE	Local Data Enhancement for DRR and CCA Management	Cross-border prevention and preparedness and marine pollution (Track 2)	Damage and loss dataset and system	EU (DG-ECHO)	Earthquake, floods and wildfires	European, National	Italy (Coordinating), Portugal, France, Greece, Finland	U	Y	Y	Y	N	Y	Y	Y	Y	N	Closed	<a href="https://www.maritimeefor.eu/en/lode/">https://www.maritimeefor.eu/en/lode/</a>		
MAGNITUDE	Full-Scale Earthquake Response Exercise in the cross-border region of Germany, Austria and Switzerland.	Full-scale exercises	Full-scale exercise and practicing including cross-border procedures	EU	Earthquake	European	Germany, Baden wuerttemberg together with cross-border partners	Y	N	U	Y	Y	N	Y	Y	Y	Y	Ongoing	<a href="https://www.maritimeefor.eu/en/magnitude/">https://www.maritimeefor.eu/en/magnitude/</a>		





Disaster Risk Management Capacity Assessment (Montenegro)	Track 1: Disaster Risk Management Capacity Assessment (Montenegro)	Single country grants for Track 1	EU	Multi-hazard	National / Regional	Montenegro	N	Y	N	Y	N	N	N	N	N	N	N	N	N	N	Closed
DOMINO	EU-Smart Europe! DOMINO 2023 France	Full scale exercises	UCPFM	Chemical / pollution	Local	For-sunder (France)	N	N	N	N	Y	N	N	N	N	N	N	N	Y	N	Closed
Demanda	Building Disaster Risk Reduction Awareness Status, Guidelines and Disaster Loss Data & Assessment System	Single country grants for disaster risk management (Track 1)	EU	Multi-hazard	National	Republic of Croatia	N	Y	N	Y	N	N	N	N	Y	N	N	N	N	N	Closed
DRM Investment project in Lithuania	Preparation of an investment project proposal addressing disaster risk management due to possible threats from a pressurised nuclear power plant (L1)	Single country grants for disaster risk management (Track 1)	EU	Nuclear	National	Lithuania	N	N	U	Y	N	N	N	Y	N	N	Y (Nuclear power plants)	N	N	N	Closed
DRM SHINE	Strategy for Disaster Risk Reduction for the Government of Montenegro with the Action Plan for the period 2023-2030	Single country grants for disaster risk management (Track 1)	EU	Multi-hazard	National	Montenegro	N	Y	N	Y	N	N	N	Y	N	N	N	N	N	N	Ongoing
EU-SMRT Europe	Enhancing digital based solutions for disaster risk management in the context of Emergency (EU-SMRT Europe)	Single country grants for disaster risk management (Track 1)	EU	Multi-hazard	Local / National	Turkey	N	Y	N	Y	N	N	N	Y	N	N	N	N	N	N	Ongoing
EMMERA	East Med Cross-border Marine Environmental Risk Assessment through E Platform Integrated DRR Management	Knowledge for Action in (KAP) Prevention & Preparedness (KAP)	EU	Population	National	Eastern Mediterranean region	Y	N	Y	Y	N	N	N	Y	N	Y (Coastal infrastructure)	N	N	N	N	Ongoing
EMMERA-2	Development of strategic framework that incorporates the needs of persons with disabilities in the disaster management cycle	Single country grants for disaster risk management (Track 1)	EU	Multi-hazard	National	Lithuania	N	Y	N	Y	U	N	N	Y	N	N	N	N	N	N	Ongoing
Enhancing public warning and crisis communication	Enhancing human and technical aspects of public warning and crisis communication	Single country grants for disaster risk management (Track 1)	EU	Multi-hazard	National	Republic of Croatia	N	Y	U	N	N	N	N	Y	Y	N	N	N	N	N	Ongoing
EMMERA-2	EU Network of Training Centres for preparedness in CSRN Events	Knowledge for Action in (KAP) Prevention & Preparedness (KAP)	UCPFM	Chemical, biological, radiological, and nuclear (CSRN)	-	BI	Y	N	N	Y	N	N	N	Y	N	Y	Y	Y	Y	Y	Ongoing
Establishment of comprehensive EU production and disaster management training for governmental institutions	Establishment of comprehensive EU production and disaster management training for governmental institutions	Single country grants for disaster risk management (Track 1)	EU	N.D.	National	Spain	N	U	N	N	N	N	N	Y	N	N	N	N	N	N	Ongoing
EU/INS/Johns Top exercise outside EU	The objective of the contract is to design, plan, conduct and evaluate two table top exercises (TTX) with host nation support (HNS)	Other exercises	EU	N.D.	EU	Republic of Jordan and the Hashemite Kingdom of Jordan	N	U	N	N	Y	N	N	N	N	N	N	N	Y	Y	Closed
EU/INS/EXT Training of Trainers Course	The Crisis Staging Consortium is currently responsible for the implementation of this framework contract, being led by CF-Atlantic	Advance training courses, training of trainers, and thematic seminars & workshops	EU	N.D.	National	Belgium	N	U	N	N	N	N	N	Y	N	N	N	N	N	N	Ongoing

EDNA	Creating a European Higher Education Network for Masters Programs in Disaster Risk Management.	Knowledge for Action in KAAP		UCPH	N/D.	National	EU	N	Y	N	N	N	N	N	N	N	N	N	N	N	Ongoing	
EU/MSD-HEACT	Aligning European Neighbourhood Policy countries with Union Civil Protection Mechanism and EU tools through series of exercises	First scale exercises		UCPH	N/D.	Local / National	Ukraine, Moldova	N	U	N	Y	Y	N	Y	N	N	N	N	Y		Closed	
ERC	European Women Early Warning System	Cross-border awareness and preparedness and marine pollution (Track 2)		UCPAP	Vulcanic	Regional	EU	N	N	N	Y	Y	N	N	N	N	N	N	N		Closed	
EWED	Extreme Weather Events Data Hubs for Improved Decision Making	Knowledge for Action in KAAP	Open Data Portal	UCPAP	Vulcanic	National / Regional	EU	N	N	N	Y	Y	N	N	N	N	N	N	N		Ongoing	
Feasibility study for meso-scale protection	Feasibility study on the evaluation of the current situation and development of solutions for the introduced on the optimal model.	Single country plans or disaster risk management (Track 1)		EU	Vulcanic	National / Regional	Lithua	N	N	N	Y	N	N	N	N	N	N	N	N		Ongoing	
Field exercises food for forest fires and CERN Opex 11	Field exercises food, forest fires and CERN.	Modular field and table top exercises (MOEX)		EU	Biotech, forest fires or chemical, biological, radiological or nuclear hazards	Local / National	EU, Spain, Romania, France, Portugal, Poland, Czech Republic	N	Y	N	N	Y	N	Y	N	N	N	N	Y		Closed	
Field exercises for emergency medical teams Opex 11	Field exercises for emergency medical teams, other response scenarios, EU Civil Protection Teams and Technical Assistance Support Teams.	Modular field and table top exercises (MOEX)		EU	Medical	Local / National	EU (Romania, Italy, Turkey)	N	N	N	N	Y	N	N	N	N	N	N	Y		Closed	
Field exercises for EU Civil Protection Teams Opex 11	Field exercises for EU Civil Protection Teams and Technical Assistance Support Teams.	Modular field and table top exercises (MOEX)		EU	N/D.	Local / National	EU / Non EU	N	N	N	Y	Y	N	N	N	N	N	N	Y		Closed	
Field exercises for EU/CP and NIST Assistance Support Teams	Field exercises for EU Civil Protection Teams and Technical Assistance Support Teams.	Modular field and table top exercises (MOEX)		EU	Vulcanic, wildfire	Local / National	EU	N	Y	N	Y	Y	N	N	N	N	N	N	Y		Ongoing	
Field exercises for urban search & rescue modules Opex 11	Field exercises for urban search and rescue modules and other response capacities.	Modular field and table top exercises (MOEX)		EU	Earthquake	Local / National	EU (Italy, Austria, Portugal, Bulgaria, Austria)	N	N	N	N	Y	Y	N	N	N	N	N	Y		Closed	
Field exercises for urban search & rescue modules/UCP/FAST/winter response capacities	Field exercises for urban search and rescue modules, medical teams, UCP/FAST and other response capacities.	Modular field and table top exercises (MOEX)		EU	Metereological, Earthquake	Local / National	EU (Italy, Austria, Portugal, Poland, Austria, Denmark, Switzerland)	N	Y	N	Y	Y	N	N	N	N	N	N	Y		Ongoing	
Field exercises for winter-related forest firefighting and CERN	Field exercises food, forest fires and CERN. Two of the exercises include the participation of UCP/FAST and NIST.	Modular field and table top exercises (MOEX)		EU	Flood, forest fire, CERN	Local / National	EU (Austria, Italy, Portugal, Spain, Republic of Moldova)	N	Y	N	Y	Y	N	N	N	N	N	N	Y		Ongoing	
PREPARE	European Program for Wildfire-Prepared Communities.	Knowledge for Action in KAAP		EU	Vulcanic	Local / National	Bosnia (Spain, Italy, Austria, and Germany) (Sweden)	N	N	N	Y	N	N	N	N	N	N	N	Y		Ongoing	

FoodNet/ALB	Managing Centre or Focus in North Korea through Cross border Health Value Support and Joint Cooperation	Full scale exercises	FoodNet/ALB	Food	Local	Region of NorthWestern Albania	Y	N	N	Y	N	Y	N	Y	N	N	N	N	N	Ongoing
Fullproof/IE	Fullproof/IE	Single country/agents for disaster risk management (Track 1)	EU	Multi-hazard	N.D.	N.D.	N	Y	N	Y	N	Y	N	N	N	N	N	N	N	Closed
Grant for disaster risk management	Grant for disaster risk management in Lithuania (1)	Single country/agents for disaster risk management (Track 1)	EU	Performance	National	Lithuania	N	N	N	Y	N	N	N	N	N	N	N	N	N	Closed
HEURIBA	Civil Protection Knowledge Partnership Platform - Middle East Partnership	Knowledge Network Partnership	UCPPI	Earthquake, Flood, Climate	Regional	EU/ Middle East	Y	Y	N	Y	N	N	N	Y	N	N	N	N	N	Closed
High Level Crisis Management Courses	High Level Crisis Management Courses - Track 1	Single country/agents for disaster risk management (Track 1)	EU	N.D.	National	Estonia	N	U	N	Y	N	N	N	N	N	N	N	N	N	Closed
ISPE/AD	Innovative Solutions for Public Readiness and Emergency Response Management in Lithuania	Single country/agents for disaster risk management (Track 1)	EU	N.D.	National	Lithuania	N	U	N	Y	Y	N	N	Y	Y	N	N	N	N	Ongoing
Kenema	Improvements for Data Exchange of Emergency Data	Single country/agents for disaster risk management (Track 1)	EU	Radiation	National	Finland	N	N	N	Y	N	N	N	N	N	N	U	N	N	Ongoing
Impact	The project will develop a strategic framework for disaster risk management and an Platform to strengthen capacities for search and rescue.	Single country/agents for disaster risk management (Track 1)	EU	Aviation accidents	National	Romania	N	U	N	N	Y	N	Y	N	N	N	N	N	N	Ongoing
MAH03/2	Impacts and Response Options regarding air pollution in the area of Spain.	Knowledge for action in the area of air pollution & Preparedness (Kepp)	UCPPI	Marine pollution	Regional	EU	Y	N	N	Y	Y	Y	Y	N	N	N	N	N	N	Ongoing
IMPACT	Implementation of margin access services	Single country/agents for disaster risk management (Track 1)	EU	Multi-hazard	National	Belgium	Y	Y	N	N	N	N	N	N	N	N	N	N	N	Ongoing
IMPACTO	Development of a Spanish national disaster risk database (IMPACTO).	Single country/agents for disaster risk management (Track 1)	EU	Multi-hazard	N.D.	Spain	N	Y	U	Y	N	N	N	N	U	U	N	N	Ongoing	
IPRES	Indoor Outdoor Positioning for Emergency Staff	Cross-border prevention and preparedness and marine pollution (Track 2)	EU	Multi-hazard	European	European	N	Y	Y	Y	N	N	N	Y	Y	N	N	U	Closed	
IPP	Increasing Knowledge and Partnerships on Mental Health and Psychological Support for Helpers in Pandemics	Knowledge Network Partnership	EU	Multi-hazard, pandemic	European and Georgian	European and Georgia	U	Y	N	N	Y	N	N	Y	Y	Y	Y	U	Closed	



ISRA	Integrative strengthening of seismic risk awareness.	Cross-border prevention and preparedness and resilience (Track 2)	collection of existing hazard and risk	EU	seismicity, ground motion, tsunamis	western systems	western Balkans	U	Y	N	Y	N	N	Y	Y	N	U	Ongoing
Local DDM	Strengthening Disaster Risk Management Capability at Local Level	Single country grants for disaster risk management (Track 1)	establish an advanced local network of disaster risk management	EU	multi-hazard	National	Armenia	N	Y	N	Y	N	N	Y	Y	U	U	Ongoing
Long term Wildfire Prevention Framework	This project will demonstrate the previously developed wildfire management strategy (from the 2020 project).	Single country grants for disaster risk management (Track 1)	Action plan and capacity building for implementing wildfire management strategy	EU	Wildfires	National	Turkey	N	Y	U	Y	N	N	Y	Y	U	N	Closed
MD ALERT STUDY	Feasibility study, technical requirements and estimated costs for National Early Warning System.	Single country grants for disaster risk management (Track 1)	Technical requirements, feasibility study for national early warning system	EU	multi-hazard	National	Moldova	N	Y	U	Y	N	N	Y	Y	U	N	Closed
MEMASUS	Network of European Multi-hazard capacities hubs of Scientific Understanding and Sharing - MEMASUS	Knowledge Network Partnership	Groundwork/Blueprint for future center of expertise on forest fires and wildfires	EU	forest and wild fires	European (FR)	Nineve Gurons	N	N	N	Y	Y	N	Y	Y	N	U	Closed
OVERCOM.E	OVERCOM.E - Cross-border Cooperation in Managing Emergency	Cross-border prevention and preparedness and resilience (Track 2)	Tool for response, hazard detection and communication; data management system; virtual operation room	EU	multi-hazard (biological, chemical, technological)	European	Italy and France	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Ongoing
PAUIS	Funding resilient (future) Existing building practices in the field of disaster risk management	Single country grants for disaster risk management (Track 1)	Guidelines to help access to grants and resources to DDM stakeholders	EU	multi-hazard	National	Belgium	N	U	N	Y	N	N	Y	Y	N	N	Ongoing
PreparE.U	This project will support the implementation of the first Disaster Resilience Crisis (UDRC), and 2 "PreparE" and the Rapidly Initiative prepared.	Knowledge for Action in Prevention & Preparedness (KAPP)	Feasibility study for EU risk awareness and preparedness initiatives, with recommendations	EU	multi-hazard	European	Italy, Spain, Portugal and Greece	N	U	N	Y	N	N	Y	Y	N	N	Ongoing
PREBALL	Prevention Action increases (large) fire response preparedness.	Cross-border prevention and preparedness and resilience (Track 2)	Decision support system to manage fire prevention and response measures in case of fires	EU	fires	European	Italy, Spain, Portugal and Greece	N	Y	U	Y	N	N	Y	Y	Y	N	Closed
PRODIGHERNET 2	Protecting Cultural Heritage from the Consequences of Disasters - Network 2.	Knowledge for Action in Prevention & Preparedness (KAPP)	Based on previous PRODIGHERNET, establish a thematic protection of cultural heritage at risk within the ICPKN	EU	multi-hazard	European	EU	N	Y	U	Y	Y	N	Y	Y	N	Y	Ongoing
PrePPLAN	Public warning messages in preferred language	Single country grants for disaster risk management (Track 1)	System to send alerts and through the E-ALARM in the preferred communication language of the receiver.	EU	multi-hazard	National	Estonia	Y	Y	Y	Y	N	N	Y	Y	U	U	Ongoing
PrePLAN	Networking for Cross-border Risk Management Plan	Cross-border prevention and preparedness and resilience (Track 2)		UCPM	N.D.	National	Slovakia and Czechia	Y	U	N	Y	N	N	Y	N	N	N	Closed
Ready to Respond	Ready to Respond: Measuring Preparedness and Response Capability in South Caucasus	Cross-border prevention and preparedness and resilience (Track 2)		UCPM	Disaster preparedness	outside EU	Armenia, Georgia	Y	N	Y	Y	Y	N	Y	N	N	Y	Closed





# ANNEX B

Name	Description	Type	Product	Funding	Peril	Scale	Geographic focus	Cross-border	Cascading or multi-risk	Application to urban scale	Prevention and preparedness	Emergency response	Recovery	Capacity building	Communication	Critical/Special infrastructures	Exercise / Scenario	Closed/Ongoing	References
<b>PHARIS</b>	Promoting disaster preparedness and resilience by co-developing stakeholder support tools for managing the systemic risk of compounding disasters.	Select CDP/DPH-related Horizon projects	Cloud-based Online Service Platform that offers support in reducing dynamic risk scenarios and systemic vulnerability caused by multi-hazard disasters	EU	Multi-hazard	European	Four case study areas (including the Caribbean, Romania, Istanbul, and Alpine areas).	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Ongoing	<a href="https://www.pharis-project.eu/">https://www.pharis-project.eu/</a>
<b>CRISIS</b>	Comprehensive risk assessment of land services and transport infrastructure	Cross-border prevention and preparedness and resilience (Track 2)	SIS platform	UCPH	Multi-hazard and hydrological hazards	National	Spain, Albania and North Macedonia	Y	Y	N	Y	Y	N	N	N	Y	N	Closed	<a href="https://www.crisis-project.org/">https://www.crisis-project.org/</a>
<b>COVALEX</b>	Community of Valued Experts in Hydro-meteorological and Technological Multi-hazards.	Knowledge Network Partnership	Portfolio of scenario-based exercises, web-learning content combined with open-source support tools	UCPH	Hydrological	International and local	EU	Y	Y	N	Y	N	N	Y	Y	N	Y	Ongoing	
<b>CHSAFE</b>	Critical infrastructure early warning system and population awareness for multi-hazard cascading events.	Knowledge for Action in Prevention & Preparedness (KAPP)	IT platforms	EU	Multi-hazard (heavy rainfall, flooding, earthquake and liquefaction)	N.D.	ALL Europe (Ukraine, Netherlands & Italy)	N	Y	Y	Y	N	N	N	U	Y	Y	Ongoing	
<b>OVERFLOW</b>	Vulnerability assessment of embankments and bridges exposed to flooding hazards - overflow	Cross-border prevention and preparedness and resilience (Track 2)	Technology to assess state and fragility of flood defences; flood risk forecasting tool based on numerical models	EU	Flood	European	Netherlands and Croatia	Y	N	U	N	Y	N	Y	N	Y	U	Closed	<a href="https://infrastructure.universiteitleiden.nl/">https://infrastructure.universiteitleiden.nl/</a>
<b>CROSSSCALE</b>	Cross-border cascading risk management for critical infrastructure in Sava river Basin.	Cross-border prevention and preparedness and resilience (Track 2)	Problem to reuse knowledge, tool and policies; open source software policy recommendations	UCPH	Earthquake, flood	N.D.	Sava River Basin (Slovenia, Croatia)	Y	Y	N	Y	N	N	N	N	Y	N	Closed	<a href="https://crossscale.eu/">https://crossscale.eu/</a>
<b>MYRIAD EU</b>	MYRIAD EU's mission is to establish a paradigm shift in how risks are currently assessed and managed.	Select CDP/DPH-related Horizon projects		EU	Multi-hazard	European	5 pilot regions	Y	Y	U	Y	N	N	Y	Y	U	U	Ongoing	<a href="https://www.myriadproject.eu/">https://www.myriadproject.eu/</a>
<b>DPH SEE</b>	DPH SEE enhances disaster management in the region by boosting resilience through training, standardising policies, raising public awareness, and improving risk assessment and early warning systems. This initiative aims to strengthen regional resilience against various disasters.	Cross-border prevention and preparedness projects	Reports and Publications, Training Materials, Public Awareness Campaigns, Technical Maps, Standardised Procedures and Protocols	EU	Seasonal threats such as flooding and forest fires	European	Southern East Europe	Y	Y	U	Y	N	N	Y	Y	N	N	Ongoing	<a href="https://www.dph-see.eu/">https://www.dph-see.eu/</a>
<b>Disaster Risk Reduction Roadmap 2021-2030</b>	The EDRN Roadmap 2021-2030 outlines the objectives of the Sendai Framework for Disaster Risk Reduction 2015-2030. It serves as a regional platform for 55 countries across Europe and Central Asia.	Cross-border prevention and preparedness projects	Support regional, national, and local disaster risk reduction strategies and actions; collaboration between national and local levels to share successful practices, avenues, and strategies; programs, and approaches by gender, and age sensitivity.	UNDRP, EC/CE, UNDRP, EC/CE	Multi-hazard	Regional	Europe and Central Asia	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Ongoing	<a href="https://www.drr-roadmap.eu/">https://www.drr-roadmap.eu/</a>