



Strengthening the Resilience of EU Border Regions

Mapping Risks & Crisis Management Tools and Identifying Gaps

Written by Technopolis Group, CMCC, and Nordregio
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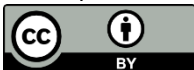
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Abbreviations

| Abbreviation | Full name |
|--------------|---|
| AEBR | Association of European Border Regions |
| APC EG | The Accident Prevention and Control Expert Group |
| CBC | Cross-border crisis |
| CBCRII | Cross-Border Crisis Response Integrated Initiative |
| CBRN | Chemical, biological, radiological, and nuclear |
| CBSS | Council of the Baltic Sea States |
| CCA | Climate change adaptation |
| CDP | Carbon Disclosure Project |
| CECIS | Common Emergency Communication and Information System |
| CEMS | Copernicus Emergency Management Service |
| CER | Critical Entities Resilience Directive |
| CMCC | Centro Euro-Mediterraneo sui Cambiamenti Climatici |
| CPI | Civil Protection Financial Instrument |
| DG ECHO | Directorate-General for European Civil Protection and Humanitarian Aid Operations |
| DG ENV | Directorate-General for Environment |
| DG RTD | Directorate-General for Research and Innovation |
| DG SANTE | Directorate-General for Health and Food Safety |
| DPEG | Disaster Prevention Expert Group |
| DRM | Disaster risk management |
| DRMKC | Disaster Risk Management Knowledge Centre |
| RDH | Risk Data Hub |
| DRR | Disaster risk reduction |
| EC | European Commission |
| ECDC | European Centre for Disease Prevention and Control |
| EDO | European Drought Observatory |

| Abbreviation | Full name |
|--------------|---|
| EEA | European Economic Area |
| EFAS | European Flood Awareness System |
| EFFIS | European Forest Fire Information System |
| EMRIC | Euregio Maas-Rhine Incident Response and Crisis Management |
| ERC | European River Catchments |
| ERCC | European Response Coordination Centre |
| ESG | Environmental, social, and corporate governance |
| ESSL | European Severe Storms Laboratory |
| ESWD | European Severe Weather Database |
| EU | European Union |
| EUSDR | EU Strategy for the Danube region |
| EWRS | Early Warning and Response System |
| FI | Flagship Initiative |
| GHSL | Global human settlement layer |
| GI | Green Infrastructure |
| GIS | Geographic information systems |
| HEU | Horizon Europe |
| HSC | Health Security Committee |
| ICLEI | Local Governments for Sustainability |
| ICPDR | International Commission for the Protection of River Danube |
| ICT | Information and communication technology |
| IHR | International Health Regulations |
| INFORM | Index for Risk Management |
| IPA | Instrument for Pre-accession Assistance |
| JRC | Joint Research Centre |
| KCMD | Knowledge Centre on Migration and Demography |
| MAP | Mediterranean Action Plan |

| Abbreviation | Full name |
|--------------|--|
| MIRG-EX | Maritime Incident Response Group |
| MoU | Model Memorandums of Understanding |
| MS | Member States |
| NGO | Non-governmental organisation |
| NIS | National network and information systems |
| NRA | National risk assessment |
| NUTS | Nomenclature of territorial units for statistics |
| OECD | Organisation for Economic Co-operation and Development |
| PA | Priority Area |
| PAP/RAC | Priority Actions Programme/Regional Activity Centre |
| PHEIC | Public Health Emergencies of International Concern |
| PwD | Persons with Disabilities |
| RRF | Recovery and Resilience Fund |
| RVA | Risk and vulnerability assessment |
| TEN-T | Trans-European Transport Network |
| TMF | Tailings Management Facilities |
| ToR | Terms of Reference |
| UCPKN | Union Civil Protection Knowledge Network |
| UCPM | Union Civil Protection Mechanism |
| UN | United Nations |
| UNDRR | United Nations Office for Disaster Risk Reduction |
| UNECE | United Nations Economic Commission for Europe |
| WFD | Water Framework Directive |
| WG | Working Group |
| WWF | World Wildlife Fund |

Glossary

| Concepts and terminology | Description |
|----------------------------|---|
| Border region | Region comprised in the NUTS 3 classification with a land border and NUTS 3 regions where more than half of the population lives 25 km from a land border. |
| Cross-border region | Territory comprised by two or more contiguous border regions on different sides of at least one national border. |
| Cross-border territory | Territory composed of the cross-border regions along the entire border. |
| Basin area | Whenever interventions in border areas is not necessarily based on a precise distance (e.g. 25 km) but rather on practical geographical considerations (e.g. concrete forests, the concrete flooding area, etc.) |
| Disaster risk | The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity. |
| Disaster Risk Management | Disaster risk management is the application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses. It covers four main phases: prevention, preparedness, response, and recovery and lessons learnt. |
| Exposure | The situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas. |
| Hazard | A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption, or environmental degradation. Also referred to as “risk” in the study. |
| Probability | Degree of likelihood for an event to occur. |
| Risk management capability | The ability of a Member State or its regions to reduce, adapt to or mitigate risks (impacts and likelihood of a disaster), identified in its risk assessments to levels that are acceptable in that Member State. Risk management capability is assessed in terms of the technical, financial and administrative capacity. |
| Vulnerability | The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards. |

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Abstract

The study 'Strengthening the resilience of EU border regions: Mapping risks & crisis management tools and identifying gaps' was conducted from January 2023 to March 2024 to assist the European Commission in enhancing capacities for disaster and risk management (DRM) in cross-border regions.

The assignment encompassed identifying the primary risks faced by territories in cross-border areas and mapping existing agreements, tools, and institutional processes facilitating risk management by border authorities. Additionally, it involved extensive consultations with stakeholders at EU, national, and regional levels.

Ten case studies were prepared to highlight effective practices in Disaster Risk Management within cross-border territories. The outcome included the production of maps and border fiches, each delineating risk levels and the collaborative capabilities of countries on both sides of the border in addressing these risks.

The study also identified gaps and recommendations to strengthen the resilience of EU border regions against potential disasters by addressing shortcomings and leveraging existing resources and mechanisms. This phase amalgamated the analysis of inventories, stakeholder consultations, and case studies. Recommendations spanned various areas, encompassing EU and national legal frameworks relevant to border regions, including sectoral legislation, governance mechanisms for DRM at both EU and national levels impacting border areas, among others.

Executive summary

The study on Strengthening the resilience of EU border regions: Mapping risks & crisis management tools and identifying gaps aims to assist the European Commission in strengthening capacities for disaster risk management in cross-border areas.

This was to be achieved through four objectives:

- identifying the main risks territories in cross-border areas are exposed to;
- identifying the existing agreements, tools, and institutional processes that allow the competent authorities in the same territories to manage the risks identified and analyse the governance used to effectively apply such agreements / tools;
- identifying the main gaps affecting cross-border territories in their risk management capabilities, and formulate proposals to address these gaps at local, regional, national and European levels; and last but not least;
- identifying good practices in cross-border risk management, outlining how they are good practices, and extrapolating lessons learned.

The data analysed was large covering 53 borders and 12 types of hazards (meteorological and hydrological, geohazards, biological, technological and societal). This final report presents all the findings of the study.

The study shows that the approaches to Disaster Risk Management (DRM) vary widely across countries achieving different levels of performance. Several gaps were identified, as well as areas for improvement. A large set of inspiring transferable examples of good practices on different risks is included. The analysis provides evidence confirming that cooperation at cross-border level is an effective and efficient way to maximise the DRM capabilities of the different authorities at all levels of governance.

The study was carried out from December 2022 to March 2024 by a consortium led by Technopolis Group with CMCC and Nordregio as partners on behalf of the European Commission (Directorate-General Regional and Urban Policy and in cooperation with Directorate-General European Civil Protection and Humanitarian Aid Operations).

Structure of the final report

The study included a major mapping exercise and the inventories produced are presented in the following chapters: **Inventory of global and EU policies** (Chapter 2); **inventory of risks at borders** (Chapter 3); **inventory of agreements, tools, institutions and processes** (Chapter 5) and **inventory of EU-level platforms and tools for Disaster Risk Management** (Chapter 6). In these chapters inventories are analysed in terms of available entries and the classification of these entries and a set of graphs have been drafted. The inventories themselves are available separately in Excel format.

Chapter 4 of the report is on the **Geographical analysis and maps** and summarises the process of GIS based map making. A set of maps is separately available, together with the respective border fiches, in a separate publication.

Chapter 7 presents the main findings of the work on the ten **case studies** developed within the study based on a rich selection of inspiring and potentially transferable examples of good practice.

Chapter 8 is focused on the **gap analysis of EU, national and local legal frameworks for DRM** and is an important part of the report as it brings together the work carried out on the study inventories, complemented with the inputs collected through the consultation activities and the case studies.

Methodological approach and caveats

Different **methodological methods** as well as primary and secondary data sources have been used for the study, including extensive desk research, literature review, and broad consultations at EU, national and local levels, informing all deliverables but primarily the gap analysis and recommendation formulation. The country-level work was conducted by individual country experts.

Several **methodological limitations** have influenced the reliability and generalisability of the findings. Data availability constrained the depth and breadth of the analysis, potentially underrepresenting certain regions or risk factors due to data gaps or access restrictions. Data comparability across countries or regions, pose challenges in synthesising findings and drawing meaningful comparisons; and methodological constraints, such as analytical limitations or reliance on secondary data sources impacted the robustness of the analysis. Similarly, despite thorough data cleaning, discrepancies in data quality may have affected accuracy; subjective interpretations by study experts could have influenced the analysis, potentially leading to overestimation or underestimation of risks or impacts. It is also worth stressing that the complex nature of border areas posed challenges in capturing interactions between multiple risk factors and stakeholders, potentially resulting in oversimplifications or omissions; and dynamic changes in risk profiles may not have been fully captured, affecting the relevance of findings over time.

It is also important to stress that **this study is not an evaluation**. Accordingly, its findings are only meant to suggest possible avenues to relevant institutional stakeholders for strengthening resilience against disasters and risks through cross-border cooperation. The study is by no means a fitness check of existing legal frameworks, programmes, or initiatives and their analysis is instrumental to achieve the objectives of the study previously described.

Despite these limitations, the study offers valuable insights into improving data availability and comparability in border risk assessment to address these methodological limitations to advance understanding of risk dynamics in border areas, but it also acknowledges the need for further research in this domain, with evidence sometimes lacking conclusiveness.

Inventory of risks in cross-border territories

The identification of risks per cross border territory covers the entire geographical area in scope for this study, namely all 27 EU Member states, Switzerland, Liechtenstein, Norway, North Macedonia, Montenegro, and Serbia. The inventory contains **individual sheets for each border analysed containing assessment of probability, exposure/vulnerability, risk assessment, and expert assessment of the capacity to jointly address risks across the same border**. This is complemented by a table showing any **discrepancy in the assessment** of the probability of each risk to materialise, and in the **level of governance readiness** to jointly respond to those risks across the borders.

The authors of the report include an important **disclaimer** that the capability to address risks jointly across the border differs significantly from the capability to address risks per se on a national/regional or local level on one side of the border only. Any comments addressing capabilities throughout the report should be understood as 'capabilities/capacities for joint cross-border prevention, preparedness, and response.

Geographical analysis and maps

The Inventory of risks is the main data source for the mapping. This database has then been joined with a **GIS-based geographic representation of each border region**. The data has been visualised as a **set of maps for each border region with clear infographics describing risk assessment (probability and impact)**. Such an approach offers the opportunity to get a synthetic overview of the whole range of relevant hazards

and to spot the main risks and differences in assessment between countries across the same border, as well as any opportunity for improvement of capabilities to address the risks through cross-border cooperation.

Inventory of global and EU policies

The Inventory of global and EU policies with relevance to Disaster Risk Management, includes **37 European policies and five global ones**. EU Directives (9) (binding in their entirety when transposed), Commission communications (10) (non-binding) and EU strategies (3) represent the biggest number of the legal instruments inventoried. Several additional legal instruments are also included in the inventory, either binding in their entirety [EU Regulations (2), Council conclusions (3), EU decisions (2), EU Treaty (1)], or non-binding, i.e. Council recommendations (1), Resolutions of the European Parliament (1), UN Conventions (2), UN Framework (1), UN Regulation (1) and Council of Europe conventions (1).

Inventory of agreements, institutions, tools and processes for DRM

The identification of agreements, institutions, tools and processes for DRM has been done both by a central management team and by a pool of country experts. Interviewed stakeholders have also contributed to building the inventory by drawing experts' attention to prominent examples of good practice or offering complementary insights for the analysis.

While the inventory is as comprehensive as possible, agreement, tools and processes change over time and there is always a possibility that more information and data become available. This is especially true for the tools, as there is a multitude of relevant cross-border projects resulting in numerous individual tools, guidelines, platforms, etc. that could not be entirely covered by the study. Another limitation is the fact that despite the attempt to only include entries relevant to borders, in some cases the border dimension is weaker.

The inventory has been structured in two parts: the first is dedicated to agreements and the second one to institutions, tools and processes. 268 agreements have been identified. There are 192, which cover one border, whereas 76 are multi-border. It could be observed that there are borders with high number of bilateral agreements depending on the legal systems of the countries concerned. Sometimes, one horizontal overall agreement is sufficient to enable bilateral cooperation, while in other cases there are individual agreements covering different risks. Overall, it could be concluded that a bigger number of agreements lead to more tailored cooperation frameworks and should be encouraged.

More than **half of all agreements are multi-risk** (149), 33 cover nuclear and radiological accidents, 30 flooding, 11 mass migration, 9 disruption of critical infrastructure, and 8 wildfires. Very few agreements have been identified in droughts (2); geophysical risks (4), animal and plant diseases (1), terrorism (2), droughts (2) and epidemics/pandemics (4). There generally is a direct correlation between the severity of the risks and the availability of agreements.

339 entries have been included in the Inventories of Institutions, Processes and Tools. The biggest numbers of entries are associated with tools (61), institutions (38) and working groups (31) followed by early warning systems (22) and processes (22), guidelines (18), etc. Moreover, there are action plans (15), joint exercises (19), joint planning (9) and joint protocols (3). There are individual examples of an atlas, an observatory, a management plan and a protocol. Nearly 60% of the entries cover multiple borders and one of the reasons for this distribution is the fact that many of the entries originate from projects (INTERREG, UCPM, etc.) and these include more than two countries. In addition, one third of the tools cover the phase of 'preparedness' (96/339), followed by "preparedness and response" (78), 'all phases' of the DRM cycle (67) and prevention (42). It must be noted that many of the entries can be classified in more than one way.

Inventory of EU-level platforms, mechanisms, and databases for DRM

The identification of platforms, mechanisms, databases is not a formal deliverable within the study, but it is a **pre-requisite for providing a full picture to the EU capabilities to address hazards in cross-border context**. The Inventory of EU-level platforms, mechanisms, databases is presented in the second tab of a separate Excel file named *Inventory of EU and global policies, platforms, institutions and initiatives*, available in the study-dedicated online shared environment.

Finally, **25 information systems, platforms, initiatives, data hubs** have been identified during the study which play an important role in providing the information and data for DRM including in a cross-border context.

Inventory of projects

An inventory of relevant projects has been drafted to inform all other inventories, especially the Inventory of institutions, processes and tools and the Inventory of platforms, mechanisms, and initiatives. Moreover, projects could also be interpreted as tools hence it makes sense to include it in the overall inventory of agreements, institutions, processes, tools. **110 relevant projects have been identified**. The big **majority have been funded by INTERREG programmes and by the UCPM**. 52 of the projects are bilateral and cover one border while the rest (58) cover multiple borders. Half of the projects are multi-risk, followed by projects addressing geophysical risks (17) and flooding (15). There are very few projects on risks such as terrorism, industrial and chemical risks, nuclear and radiological accidents, droughts and disruption of critical infrastructure.

Case studies

Drawing on the work on drafting the inventories and the stakeholder consultation a balanced set of good practices in DRM in border territories has been identified in consultation with the Commission. These have been used to develop **ten case studies which could inspire other national, regional, and local authorities to develop similar DRM solutions**. The report enumerates the criteria and the process used for the selection of the case studies.

The case studies have been informed by desk research and interviews and they are available in a separate deliverable. Each of them contains an Executive Summary and mentions other initiatives of the same type across Europe.

Chapter 7 on case studies contains boxes with main findings from each of the case study. The insights and findings of the case studies have been integrated in Chapter 8 and 9 on Gap analysis and recommendations.

Gaps and recommendations

The gaps analysis and recommendations are **structured along the topics of the research questions** in the Terms of Reference of the study, namely: The European legal framework and border areas; EU sectoral legislation and border regions; Legal framework on Disaster Risk Management on a national and regional/local level impacting border territories; European disaster prevention, preparedness and response mechanisms and their adequacy for cross-border territories; DRM governance framework on a national and regional/local level impacting border territories; Interoperability of systems.

The following additional themes have been addressed: risk communication with population, civic engagement in resilience building, volunteering; inclusivity in disaster risk management 'leaving no one behind', vulnerable groups, special target groups; nature-based solutions; cooperation with the private sector, cross-border infrastructure, critical infrastructure management; and comprehensive approaches for cooperation over a longer period.

Under each of the above topics, there is an introductory part presenting EU or national legal frameworks and governance tools leading to the gaps and recommendations. Moreover, gaps and recommendations have been based on several methodological tools – literature review, stakeholder consultations, interviews, analysis of maps and datasets.

The European legal framework and border areas

The **Union Civil Protection Mechanism (UCPM)** plays a crucial role in coordinating disaster response and enhancing resilience across Europe. However, recent assessments have identified areas for improvement, particularly in cross-border cooperation and disaster risk management (DRM). Stakeholders have provided a series of **recommendations** to address these challenges and strengthen the strategic vision and effectiveness of the UCPM.

Key recommendations include clarifying the strategic vision of the UCPM and determining key objectives in collaboration with Member and Participating States. There is a call to strengthen prevention and preparedness aspects, explore cross-border dimensions, and **adopt a holistic approach to the DRM cycle**. Moreover, methodologies and procedures for prevention and preparedness need further development to **ensure coherence among UCPM countries**.

Common risk assessments and DRM capability assessments are essential for enhancing resilience. Specific requirements and guidance from the European Commission (EC) are needed to achieve a more homogeneous approach and consistent assessments, especially in cross-border territories. Efforts should also focus on encouraging the development of common risk assessments by improving data exchange and fostering collaboration with scientific institutions.

In addition, **leveraging existing structures and relationships**, such as the Maritime Incident Response Group, can enhance local and regional preparedness and response. There is a need to **explore reasons for the limited uptake of the European Grouping of Territorial Cooperation (EGTC) mechanism** and devise incentives to encourage its application in DRM.

Member States should **integrate Union disaster resilience goals into their DRM planning**, improve risk assessments, and enhance cross-border cooperation and **interoperability** in areas such as public warning and information exchange. By implementing these recommendations, the UCPM can enhance coordination, consistency, and resilience in disaster management across borders, ultimately mitigating the impacts of disasters in Europe.

To enhance disaster risk management (DRM) and bolster resilience across European borders, it is important to **complement various national perspectives with cohesive EU-wide strategies**. The European Commission (EC) can play a pivotal role by focusing on the development of regional risk assessments, methodologies, and tools, alongside risk management and response plans. Strengthening the Emergency Response Coordination Centre (ERCC) and aligning efforts with the Sendai Framework for Disaster Risk Reduction (DRR) are crucial steps in this direction.

Increasing funding for cross-border projects is important. Full Union financial assistance should target **capacity building** for responding to low probability/high impact risks. However, challenges persist, including limited national and local capacities to absorb EU funding. Addressing these hurdles requires streamlining funding processes, simplifying administrative procedures, and empowering local authorities to proactively design and implement cross-border projects.

Efficient information exchange is vital for effective DRM. Establishing a policy framework to collect, store, and share DRM-related data and good practices can facilitate collaboration. Furthermore, developing a centralised web-based platform for accessing relevant information and funding opportunities would enhance transparency and promote cross-border cooperation.

Creating **common units and joint crisis centres** between neighbouring countries is crucial. Examples like Benelux demonstrate the effectiveness of such arrangements in advancing cross-border cooperation. Strengthening cooperation in supplies and logistics contingency planning, along with pooling resources, can further enhance operational synergies.

Conducting **joint exercises and trainings in border areas** is essential for enhancing cooperation and preparedness. However, the quality and intensity of cooperation vary across different borders. Additionally, developing **technical tools** to assess post-disaster damage, including considerations for border territories, is essential for informed decision-making and effective response.

EU sectoral legislation and border regions

The study analyses relevant multi-risk and sectoral policies to assess their implications for DRM and identifies areas for improvement. The analysis emphasises the need for enhanced coherence between DRM-relevant policies and other sectoral policies, especially in border areas. It highlights the importance of aligning sectoral policies with climate change adaptation efforts and calls for closer collaboration between sectoral authorities and climate/environmental agencies.

Challenges in implementing the Floods Directive are discussed, particularly in managing rare flooding events and basin-level management. The report advocates for stronger alignment across borders and suggests the European Commission play a more significant role in promoting harmonised approaches.

Discussions on **critical infrastructure protection** policy underscore the necessity for coordinated efforts across various levels of governance. While cooperation on critical infrastructure response is robust, the report identifies areas for improvement in preparedness, especially in sectors like food, transport, and energy.

The COVID-19 pandemic highlights the importance of EU-level coordination in addressing **cross-border health threats**. Recommendations include mapping capacities and cooperation to enhance preparedness and response measures.

Regarding **geophysical risks**, the report suggests strengthening links between building policies and DRM to enhance seismic resilience. It also recommends increased involvement of local authorities and industry in addressing technological risks in border territories.

Legal framework on Disaster Risk Management on a national and regional/local level impacting border territories

The analysis addressed Disaster Risk Management (DRM) policy frameworks in border regions within the European Union, highlighting the critical **need for improved coherence and integration among DRM-relevant policies and sectoral legislation**, especially in border areas. Closer collaboration between sectoral authorities and climate/environmental agencies is vital to align risk reduction measures with changing climate conditions.

Identified **gaps** in the legal framework at national, regional, and local levels impacting border territories emphasise the need for clarity, better understanding, streamlined responsibilities, and stronger links between bilateral agreements and the EU legal framework.

Challenges in governance frameworks for DRM, particularly in coordinating cross-border cooperation and clarifying roles and responsibilities, necessitate initiatives to enhance national-level focus and engagement, as well as ongoing training for local governments.

The **recommendations** formulated against this background include strengthening cross-border collaboration and alignment between sectoral policies and DRM efforts. That seems crucial to effectively manage risks in border regions. This includes mapping legislation, fostering bilateral agreements, and promoting complementary approaches to the EU legal framework. It is also important to **clarify roles and responsibilities** at national, regional, and local levels, alongside ongoing training for local governments, to improve coordination and preparedness for DRM activities in border areas. Furthermore, the adaptation of effective communication frameworks and the establishment of mandatory channels for discussions at various organisational levels is suggested to facilitate information flow and enhance cooperation in DRM efforts.

Some practical examples from different countries illustrate successful cross-border collaboration models and initiatives, highlighting the importance of structured exercises, flexible legal frameworks, and ongoing training to enhance preparedness and resilience.

European disaster prevention, preparedness and response mechanisms and their adequacy for cross-border territories

Financial resources and support are essential for executing cross-border projects effectively. Full Union financial assistance should be provided to address capacity gaps identified by national civil protection authorities and the Commission, particularly for responding to low probability risks with high cross-border impacts. However, accessing EU funds can be challenging for local authorities due to administrative complexities. Efforts to simplify funding mechanisms and increase awareness among local authorities are necessary.

INTERREG is a key financial instrument for cross-border cooperation, funding a significant number of DRM projects. The **forthcoming post-2027 EU INTERREG Cooperation Programme** is poised to play a pivotal role in fostering cross-border collaboration to address contemporary challenges, including Disaster and Risk Management. In anticipation of this, based on the analysis of the study a set of recommendations has been formulated to enhance the programme's effectiveness. They are available in Annex 8.

Firstly, there's a call for increased **funding allocation** to support disaster management projects and capacity-building activities, particularly in light of escalating extreme weather events and pandemics. This includes resources for training, knowledge exchange, and bolstering the capabilities of local authorities and emergency responders.

Ensuring the **sustainability** of cross-border cooperation initiatives is paramount, hence the need to develop mechanisms for long-term partnerships and institutionalised collaboration frameworks. Diversification of funding sources beyond INTERREG funding is proposed to provide additional support, leveraging funding from national, regional, and international sources.

Promotion of cross-border collaboration is emphasised to develop joint strategies, action plans, and exercises for disaster preparedness, response, and recovery. **Integration of climate adaptation measures into disaster management projects** is also crucial, supporting the development of climate-resilient infrastructure.

The **adoption of innovative technologies** such as remote sensing and artificial intelligence is encouraged to enhance early warning systems and disaster response capabilities. **Community engagement and empowerment** are highlighted to strengthen local resilience, involving communities in project design and implementation.

Promoting **nature-based solutions** for disaster risk reduction, mainstreaming disaster risk reduction principles, and maintaining **flexibility** in programme design and implementation

are also key recommendations. These initiatives aim to build resilience, enhance collaboration, and ensure a coordinated response to disasters across borders, safeguarding communities and ecosystems while fostering a more resilient and sustainable future for Europe.

Illustrative examples described in the study highlight successful cross-border collaborations, highlighting the importance of joint trainings, exercises, and international support. In several instances, the illustrative examples have been further analysed and developed in dedicated case studies made available as separate publications.

DRM governance framework on a national and regional/local level impacting border territories

The analysis of the legal frameworks surrounding Disaster Risk Management (DRM) at national and regional/local levels, with a focus on their impact on border territories reveals several key findings and recommendations derived from expert consultations and case studies.

The evidence collected confirms the importance of understanding legal frameworks, enhancing cross-border cooperation, and streamlining responsibilities to effectively address DRM challenges in border territories. Collaboration, coordination, and alignment with EU frameworks are also key to ensuring resilience and preparedness in the face of disasters.

Several **horizontal factors hampering cross-border cooperation** have been detected. First, a lack of knowledge about legislation in neighbouring countries, stressing the need to map and increase the understanding of governance arrangements across borders. Similarly, there is the necessity for heightened focus and understanding of DRM challenges affecting border regions.

Bilateral or multilateral agreements play a crucial role in enhancing cross-border cooperation, necessitating adjustments to national laws and regulations. Such agreements should complement the EU legal framework to avoid overlap and ensure effectiveness.

Balance is needed between bottom-up incentives for cross-border cooperation and strengthening the national level for better coordination. This also entails streamlining responsibilities within national legal frameworks to the end of improving clarity and coordination, particularly in defining roles at the local and regional levels, e.g. Civil Protection authorities. It also helps to provide ongoing training to enhance cooperation and boost collaboration capacities in border regions.

Various examples of good practices and recommendations have been identified in the study, pointing out the importance of tailored approaches to specific borders and hazards. Initiatives such as mapping health legislation, revamping DRM systems, and strengthening cross-border cooperation demonstrate effective strategies for addressing DRM challenges.

A range of illustrative examples from different countries highlight existing challenges, good practices, and areas for improvement in DRM legal frameworks and cross-border cooperation. Some of those examples have been further analysed and developed in case studies which are made available as a separate publication.

A set of possible recommendations was also developed addressing several issues, including insufficient availability of tools and processes, i.e. for certain risks like droughts, terrorism, migration, cyber threats, chemical accidents, and animal/plant diseases; ineffective enforcement of existing bilateral agreements, especially highlighted during events like the COVID-19 pandemic.

The opportunity was also stressed to promote a **shift in the focus of bilateral agreements from response to prevention and preparedness** and to achieve a further harmonised process for risk assessment using common approaches, data, and models.

Another recommendation concerns **joint Initiatives to connect disconnected Institutions functioning in silos** which may pose challenges particularly in addressing high-probability or high-impact risks.

As a major gap, there are also the discrepancies in post-event information analysis on both sides of the border, which may be solved by **linking regional platforms to the European Commission's Risk Data Hub** and thus facilitate data dissemination and access, as in the case of the INTERREG BORIS project.

Last but not least, there are the increase in bottom-up and cross-border awareness raising efforts, aiming at empowering local municipalities and at strengthening regional governance levels to enhance DRM effectiveness, and the lack of alignment in data management practices, which particularly in early warning systems, poses challenges.

Interoperability of systems

Effective **cross-border emergency communication networks** are paramount for addressing crises in interconnected regions. The Nordred case study underscores the significance of collaborative efforts among countries, leveraging technology and formal agreements, to enable swift and coordinated responses to emergencies. Success hinges on committed partnerships, adequate funding, high visibility, and continuous end-user engagement.

Critical to this endeavour is the identification of **common data sets**, including geo-referenced data, rescue intervention procedures, damage assessments, and building data. Challenges such as data reliability, completeness, and usability require joint solutions between neighbouring countries or at the EU level.

Synchronising alert systems and mapping services across borders is essential for interoperability during emergencies. Regulatory frameworks at the EU level can facilitate this process by establishing interoperability criteria.

The involvement of the private sector is crucial, particularly in operating critical infrastructure. Continued efforts in data collection and exchange, even with private sector involvement, are vital.

Drawing from past projects and existing initiatives, such as the Data-ESTAG Initiative and the European Digital Innovation Hubs, can provide valuable insights and resources. Member States should fully capitalise on these initiatives, supported by a reinforced interoperability policy funded by the Digital Europe Programme.

In conclusion, establishing frameworks for data collection, retrieval, and sharing at the local level on both sides of the border is essential. This will enhance cooperation between neighbouring countries and improve the effectiveness of cross-border emergency communication networks.

Other themes

This executive summary also encapsulates key insights and recommendations on other relevant topics related to disaster risk management, including risk communication, citizen engagement, nature-based solutions, cooperation with the private sector, and cross-border infrastructure management.

Analysis of gaps and recommendations by individual borders

An analysis based on the assessment of risk, and governance readiness was conducted on each border and relevant risks and governance gaps have been identified.

This approach provides a detailed overview of the situation in each border, which is useful to answer questions related to risks along each EU border territory; discrepancies in the

assessment of risks identified as relevant on both sides of the borders; readiness of border territories, in terms of governance, to address different hazards in a joint coordinated manner across the border. The findings of this approach have been summarised in analytical tables per each individual border, including key highlights regarding hazards and governance, opportunities for joint action, and tailored recommendations, which can be found in a separate publication, inclusive of maps.

Résumé exécutif

L'étude sur le renforcement de la résilience des régions frontalières de l'UE « Cartographie des risques et des outils de gestion de crise et identification des lacunes » vise à aider la Commission européenne à renforcer les capacités de gestion des risques de catastrophe (GRC) dans les zones transfrontalières.

Pour ce faire, quatre objectifs ont été définis :

- Identifier les principaux risques auxquels sont exposés les territoires dans les zones transfrontalières ;
- Identifier les accords, outils et processus institutionnels existants qui permettent aux autorités compétentes des mêmes territoires de gérer les risques identifiés et analyser la gouvernance utilisée pour appliquer efficacement ces accords/outils ;
- Identifier les principales lacunes affectant les territoires transfrontaliers dans leurs capacités de gestion des risques, et formuler des propositions pour combler ces lacunes aux niveaux local, régional, national et européen ; et enfin
- Identifier les bonnes pratiques en matière de gestion des risques transfrontaliers, expliquer en quoi elles sont bonnes et extrapoler les enseignements tirés.

Les données analysées étaient nombreuses et couvraient 53 frontières et 12 types de risques (météorologiques et hydrologiques, géorisques, biologiques, technologiques et sociétaux). Ce rapport final présente toutes les conclusions de l'étude.

L'étude montre que les approches de la GRC varient considérablement d'un pays à l'autre, atteignant des niveaux de performance différents. Plusieurs lacunes ont été identifiées, ainsi que des domaines à améliorer. L'étude comprend un grand nombre d'exemples de bonnes pratiques transférables et inspirantes concernant différents risques. L'analyse confirme que la coopération transfrontalière est un moyen efficace et efficient de maximiser les capacités de gestion des risques de catastrophe des différentes autorités à tous les niveaux de gouvernance.

L'étude a été réalisée de décembre 2022 à mars 2024 par un consortium dirigé par Technopolis Group avec CMCC et Nordregio comme partenaires pour le compte de la Commission européenne (Direction générale de la Politique régionale et urbaine et en coopération avec la Direction générale de la protection civile et des opérations d'aide humanitaire européennes).

Structure du rapport final

L'étude comprenait un important exercice de cartographie et les inventaires produits sont présentés dans les chapitres suivants : **Inventaire des politiques mondiales et européennes** (chapitre 2) ; **inventaire des risques aux frontières** (chapitre 3) ; **inventaire des accords, outils, institutions et processus** (chapitre 5) et **inventaire des plateformes et outils de GRC au niveau de l'UE** (chapitre 6). Dans ces chapitres, les inventaires sont analysés en termes d'entrées disponibles et de classification de ces entrées, et une série de graphiques a été élaborée. Les inventaires eux-mêmes sont disponibles séparément en format Excel.

Le chapitre 4 du rapport est consacré à l'**analyse géographique et aux cartes** et résume le processus d'élaboration des cartes à l'aide des Systèmes d'information géographique (SIG). Un ensemble de cartes est disponible séparément.

Le chapitre 7 présente les principales conclusions des dix **études de cas** développées dans le cadre de l'étude sur la base d'une riche sélection d'exemples de bonnes pratiques inspirantes et potentiellement transférables.

Le chapitre 8 est consacré à l'**analyse des lacunes des cadres juridiques européens, nationaux et locaux en matière de gestion des risques de catastrophe**. Il s'agit d'une partie importante du rapport, car il rassemble le travail réalisé dans le cadre des inventaires de l'étude, complétés par les contributions recueillies dans le cadre des activités de consultation et des études de cas.

Approche méthodologique et limitations

Différentes **méthodes méthodologiques** ainsi que des sources de données primaires et secondaires ont été utilisées pour l'étude, notamment des recherches documentaires approfondies, une analyse de la littérature et de vastes consultations aux niveaux européen, national et local, qui ont alimenté tous les produits livrables, mais principalement l'analyse des lacunes et la formulation des recommandations. Le travail au niveau national a été réalisé par des experts nationaux.

Plusieurs **limites méthodologiques** ont eu un impact sur la fiabilité et la généralisation des résultats. La disponibilité des données a limité la profondeur et l'étendue de l'analyse, avec une sous-représentation potentielle de certaines régions ou de certains facteurs de risque en raison de lacunes dans les données ou de restrictions d'accès. La comparabilité des données entre les pays ou les régions pose des problèmes pour synthétiser les résultats et établir des comparaisons significatives ; et les contraintes méthodologiques, telles que les limites analytiques ou la dépendance à l'égard de sources de données secondaires, ont eu une incidence sur la solidité de l'analyse. De même, malgré un nettoyage approfondi des données, des divergences dans la qualité des données ont pu affecter la précision ; les interprétations subjectives des experts de l'étude ont pu influencer l'analyse, conduisant potentiellement à une surestimation ou à une sous-estimation des risques ou des impacts. Il convient également de souligner que la nature complexe des zones frontalières a posé des difficultés pour saisir les interactions entre les multiples facteurs de risque et les parties prenantes, ce qui a pu entraîner des simplifications excessives ou des omissions, et que les changements dynamiques dans les profils de risque n'ont peut-être pas été entièrement saisis, ce qui a affecté la pertinence des résultats dans le temps.

Il est également important de souligner que **cette étude n'est pas une évaluation**. Par conséquent, ses conclusions visent uniquement à suggérer aux acteurs institutionnels concernés des pistes pour renforcer la résilience face aux catastrophes et aux risques par le biais de la coopération transfrontalière. L'étude n'est en aucun cas une vérification de l'adéquation des cadres juridiques, des programmes ou des initiatives existants, et leur analyse est essentielle pour atteindre les objectifs de l'étude décrits précédemment.

Malgré ces limites, l'étude donne des indications précieuses sur l'amélioration de la disponibilité et de la comparabilité des données dans l'évaluation des risques aux frontières, afin de remédier à ces limites méthodologiques et de mieux comprendre la dynamique des risques dans les zones frontalières, mais elle reconnaît également la nécessité de poursuivre les recherches dans ce domaine, les preuves manquant parfois d'être concluantes.

Inventaire des risques dans les territoires transfrontaliers

L'identification des risques par territoire transfrontalier couvre l'ensemble de la zone géographique couverte par cette étude, à savoir les 27 États membres de l'UE, la Suisse, le Liechtenstein, la Norvège, la Macédoine du Nord, le Monténégro et la Serbie. L'inventaire **contient des fiches individuelles pour chaque frontière analysée, contenant une évaluation de la probabilité, de l'exposition/vulnérabilité, une évaluation des risques et une évaluation par des experts de la capacité à traiter conjointement les risques de part et d'autre de la même frontière**. Il est complété par un tableau indiquant toute **divergence dans l'évaluation** de la probabilité de matérialisation de chaque risque et dans

le **niveau de préparation de la gouvernance** pour répondre conjointement à ces risques de part et d'autre des frontières.

Les auteurs du rapport **insistent sur** le fait que la capacité de faire face aux risques conjointement de part et d'autre de la frontière diffère considérablement de la capacité de faire face aux risques en tant que tels au niveau national/régional ou local d'un seul côté de la frontière. Tout commentaire concernant les capacités dans le rapport doit être compris comme « capacités pour la prévention, la préparation et la réponse transfrontalières conjointes ».

Analyse géographique et cartes

L'inventaire des risques est la principale source de données pour la cartographie. Cette base de données a ensuite été associée à une **représentation géographique de chaque région frontalière basée sur un SIG**. Les données ont été visualisées sous la forme d'un **ensemble de cartes pour chaque région frontalière avec des infographies claires décrivant l'évaluation des risques (probabilité et impact)**. Cette approche permet d'obtenir une vue d'ensemble synthétique de toute la gamme des dangers pertinents et de repérer les principaux risques et les différences d'évaluation entre les pays situés de part et d'autre d'une même frontière, ainsi que toute possibilité d'amélioration des capacités à faire face aux risques par le biais de la coopération transfrontalière.

Inventaire des politiques mondiales et européennes

L'inventaire des politiques mondiales et européennes relatives à la GRC comprend **37 politiques européennes et cinq politiques mondiales**. Les directives de l'UE (9) (contraignantes dans leur intégralité une fois transposées), les communications de la Commission (10) (non contraignantes) et les stratégies de l'UE (3) représentent le plus grand nombre d'instruments juridiques inventoriés. Plusieurs autres instruments juridiques sont également inclus dans l'inventaire, qu'ils soient contraignants dans leur intégralité [règlements de l'UE (2), conclusions du Conseil (3), décisions de l'UE (2), traité de l'UE (1)] ou non contraignants, à savoir les recommandations du Conseil (1), les résolutions du Parlement européen (1), les conventions des Nations unies (2), le cadre des Nations unies (1), le règlement des Nations unies (1) et les conventions du Conseil de l'Europe (1).

Inventaire des accords, des institutions, des outils et des processus pour la gestion des risques de catastrophe

L'identification des accords, des institutions, des outils et des processus de gestion des risques de catastrophe a été réalisée à la fois par une équipe de gestion centrale et par un groupe d'experts nationaux. Les parties prenantes interrogées ont également contribué à l'élaboration de l'inventaire en attirant l'attention des experts sur des exemples marquants de bonnes pratiques ou en apportant des éclairages complémentaires à l'analyse.

Bien que l'inventaire soit aussi complet que possible, les accords, les outils et les processus évoluent avec le temps et il est toujours possible que de nouvelles informations et données deviennent disponibles. Ceci est particulièrement vrai pour les outils, car il existe une multitude de projets transfrontaliers pertinents qui ont donné lieu à de nombreux outils, lignes directrices, plateformes, etc. qui n'ont pas pu être entièrement couverts par l'étude. Une autre limite est le fait que, malgré la tentative d'inclure uniquement les entrées relatives aux frontières, dans certains cas, la dimension frontalière est plus faible.

L'inventaire a été structuré en deux parties : la première est consacrée aux accords et la seconde aux institutions, outils et processus. 268 accords ont été identifiés. 192 d'entre eux couvrent une frontière, tandis que 76 sont multi-frontaliers. On peut observer que certaines frontières sont couvertes par un grand nombre d'accords bilatéraux, en fonction des systèmes juridiques des pays concernés. Parfois, un seul accord horizontal global suffit pour permettre la coopération bilatérale, tandis que dans d'autres cas, il existe des accords

individuels couvrant différents risques. Dans l'ensemble, on peut conclure qu'un plus grand nombre d'accords conduit à des cadres de coopération mieux adaptés et devrait être encouragé.

Plus de la **moitié des accords sont multirisques** (149), 33 couvrent les accidents nucléaires et radiologiques, 30 les inondations, 11 les migrations de masse, 9 les perturbations des infrastructures critiques et 8 les incendies de forêt. Très peu d'accords ont été recensés pour les sécheresses (2), les risques géophysiques (4), les maladies animales et végétales (1), le terrorisme (2), et les épidémies/pandémies (4). Il existe généralement une corrélation directe entre la gravité des risques et la disponibilité des accords.

339 entrées ont été incluses dans les inventaires des institutions, des processus et des outils. Le plus grand nombre d'entrées est associé aux outils (61), aux institutions (38) et aux groupes de travail (31), suivis par les systèmes d'alerte précoce (22) et les processus (22), les lignes directrices (18), etc. En outre, il existe des plans d'action (15), des exercices communs (19), une planification commune (9) et des protocoles communs (3). Il existe des exemples individuels d'atlas, d'observatoire, de plan de gestion et de protocole. Près de 60 % des entrées couvrent plusieurs frontières et l'une des raisons de cette répartition est que de nombreuses entrées proviennent de projets (INTERREG, Mécanisme de protection civile de l'Union (UCPM), etc.) et qu'elles incluent plus de deux pays. En outre, un tiers des outils couvrent la phase de « préparation » (96/339), suivie de « préparation et réponse » (78), de « toutes les phases » du cycle de GRC (67) et de la prévention (42). Il convient de noter que de nombreuses entrées peuvent être classées de plusieurs manières.

Inventaire des plates-formes, mécanismes et bases de données de l'UE pour la gestion des risques de catastrophe

L'identification des plates-formes, mécanismes et bases de données n'est pas un résultat formel de l'étude, mais c'est une **condition préalable pour donner une image complète des capacités de l'UE à faire face aux dangers dans un contexte transfrontalier.** L'inventaire des plateformes, mécanismes et bases de données au niveau de l'UE est présenté dans le deuxième onglet d'un fichier Excel séparé intitulé *Inventaire des politiques, plateformes, institutions et initiatives européennes et mondiales*, disponible dans l'environnement partagé en ligne dédié à l'étude.

Enfin, l'étude a permis d'identifier **25 systèmes d'information, plateformes, initiatives et centres de données** qui jouent un rôle important dans la fourniture d'informations et de données pour la GRC, y compris dans un contexte transfrontalier.

Inventaire des projets

Un inventaire des projets pertinents a été dressé pour informer tous les autres inventaires, en particulier l'inventaire des institutions, des processus et des outils et l'inventaire des plates-formes, des mécanismes et des initiatives. En outre, les projets peuvent également être interprétés comme des outils et il est donc logique de les inclure dans l'inventaire global des accords, institutions, processus et outils. **110 projets pertinents ont été identifiés.** La grande **majorité d'entre eux ont été financés par les programmes INTERREG et par l'UCPM.** 52 des projets sont bilatéraux et couvrent une frontière, tandis que les autres (58) couvrent plusieurs frontières. La moitié des projets sont multirisques, suivis par les projets concernant les risques géophysiques (17) et les inondations (15). Il y a très peu de projets sur des risques tels que le terrorisme, les risques industriels et chimiques, les accidents nucléaires et radiologiques, les sécheresses et les perturbations des infrastructures critiques.

Études de cas

Sur la base du travail de rédaction des inventaires et de la consultation des parties prenantes, un ensemble équilibré de bonnes pratiques en matière de GRC dans les territoires frontaliers a été identifié en consultation avec la Commission. Celles-ci ont été utilisées pour développer **dix études de cas qui pourraient inspirer d'autres autorités nationales, régionales et locales à développer des solutions similaires de GRC**. Le rapport énumère les critères et le processus utilisés pour la sélection des études de cas.

Les études de cas ont été réalisées à partir de recherches documentaires et d'entretiens et sont disponibles dans un document séparé. Chacune d'entre elles contient un résumé et mentionne d'autres initiatives du même type à travers l'Europe.

Le chapitre 7, consacré aux études de cas, contient des encadrés présentant les principales conclusions de chacune des études de cas. Les idées et les résultats des études de cas ont été intégrés dans les chapitres 8 sur l'analyse des lacunes et les recommandations.

Lacunes et recommandations

L'analyse des lacunes et les recommandations sont **structurées selon les thèmes des questions de recherche des termes de référence de l'étude**, à savoir : Le cadre juridique européen et les zones frontalières et les mécanismes européens de prévention, de préparation et de réponse aux catastrophes et leur adéquation aux territoires transfrontaliers ; la législation sectorielle de l'UE et les régions frontalières ; le cadre juridique et le cadre de gouvernance de la GRC au niveau national et régional/local ayant un impact sur les territoires frontaliers ; l'interopérabilité des systèmes.

Les thèmes supplémentaires suivants ont été abordés : communication des risques avec la population, engagement civique dans le renforcement de la résilience, volontariat ; inclusivité dans la gestion des risques de catastrophe « ne laisser personne de côté », groupes vulnérables, groupes cibles spéciaux ; solutions basées sur la nature ; coopération avec le secteur privé, infrastructures transfrontalières, gestion des infrastructures critiques ; et approches globales pour une coopération à plus long terme.

Pour chacun des thèmes susmentionnés, une partie introductive présente les cadres juridiques et les outils de gouvernance nationaux ou de l'UE, ce qui permet de dégager les lacunes et les recommandations. En outre, les lacunes et les recommandations sont fondées sur plusieurs outils méthodologiques - analyse documentaire, consultation des parties prenantes, entretiens, analyse de cartes et d'ensembles de données.

Le cadre juridique européen et les zones frontalières

Le **mécanisme de protection civile de l'Union (UCPM) joue** un rôle crucial dans la coordination de la réponse aux catastrophes et le renforcement de la résilience à travers l'Europe. Toutefois, des évaluations récentes ont mis en évidence des domaines à améliorer, notamment en ce qui concerne la coopération transfrontalière et la GRC. Les parties prenantes ont formulé une série de **recommandations** pour relever ces défis et renforcer la vision stratégique et l'efficacité du mécanisme de protection civile.

Les principales recommandations portent sur la clarification de la vision stratégique de la GPUC et la détermination des objectifs clés en collaboration avec les États membres et les États participants. Il est demandé de renforcer les aspects de prévention et de préparation, d'explorer les dimensions transfrontalières et d'**adopter une approche holistique du cycle de gestion des risques de catastrophe**. En outre, les méthodologies et les procédures de prévention et de préparation doivent être développées davantage pour **assurer la cohérence entre les pays**.

Des évaluations communes des risques et des capacités de gestion des risques de catastrophe sont essentielles pour renforcer la résilience. Des exigences spécifiques et des

orientations de la Commission européenne (CE) sont nécessaires pour parvenir à une approche plus homogène et à des évaluations cohérentes, en particulier dans les territoires transfrontaliers. Les efforts devraient également se concentrer sur l'encouragement du développement d'évaluations communes des risques en améliorant l'échange de données et en favorisant la collaboration avec les institutions scientifiques.

En outre, l'**exploitation des structures et des relations existantes**, telles que le groupe de réaction aux incidents maritimes, peut améliorer la préparation et la réaction aux niveaux local et régional. Il est nécessaire d'**étudier les raisons de l'utilisation limitée du mécanisme du groupement européen de coopération territoriale (GECT)** et de concevoir des mesures incitatives pour encourager son application à la gestion des risques de catastrophe.

Les États membres devraient **intégrer les objectifs de l'Union en matière de résilience aux catastrophes dans leur planification de la gestion des catastrophes**, améliorer l'évaluation des risques et renforcer la coopération et l'**interopérabilité** transfrontalières dans des domaines tels que l'alerte publique et l'échange d'informations. En mettant en œuvre ces recommandations, la UCPM peut améliorer la coordination, la cohérence et la résilience de la gestion des risques de catastrophe à travers les frontières, ce qui, en fin de compte, atténuera l'impact des catastrophes en Europe.

Pour améliorer la GRC et renforcer la résilience à travers les frontières européennes, il est important de **compléter les différentes perspectives nationales par des stratégies cohérentes à l'échelle de l'UE**. La Commission européenne (CE) peut jouer un rôle central en se concentrant sur le développement d'évaluations des risques, de méthodologies et d'outils régionaux, ainsi que de plans de gestion des risques et de réponse. Le renforcement du Centre de coordination des interventions d'urgence (ERCC) et l'alignement des efforts sur le cadre de Sendai pour la réduction des risques de catastrophe (RRC) sont des étapes cruciales dans cette direction.

Il est important d'augmenter le financement des projets transfrontaliers. L'aide financière totale de l'Union devrait cibler le **renforcement des capacités** pour répondre aux risques à faible probabilité et à fort impact. Toutefois, des difficultés persistent, notamment des capacités nationales et locales limitées pour absorber les fonds de l'UE. Pour surmonter ces obstacles, il faut rationaliser les processus de financement, simplifier les procédures administratives et donner aux autorités locales les moyens de concevoir et de mettre en œuvre des projets transfrontaliers de manière proactive.

Un échange d'informations efficace est essentiel pour une gestion efficace des risques de catastrophe. La mise en place d'un cadre pour collecter, stocker et partager les données et les bonnes pratiques liées à la gestion des risques de catastrophe peut faciliter la collaboration. En outre, le développement d'une plateforme centralisée sur le web permettant d'accéder aux informations pertinentes et aux possibilités de financement améliorerait la transparence et favoriserait la coopération transfrontalière.

La création d'**unités communes et de centres de crise conjoints** entre pays voisins est cruciale. Des exemples comme celui du Benelux démontrent l'efficacité de tels arrangements pour faire progresser la coopération transfrontalière. Le renforcement de la coopération en matière d'approvisionnement et de planification logistique d'urgence, ainsi que la mise en commun des ressources, peuvent encore améliorer les synergies opérationnelles.

L'organisation d'**exercices et de formations conjoints dans les zones frontalières** est essentielle pour renforcer la coopération et la préparation. Toutefois, la qualité et l'intensité de la coopération varient d'une frontière à l'autre. En outre, le développement d'**outils techniques permettant** d'évaluer les dommages après une catastrophe, y compris les considérations relatives aux territoires frontaliers, est essentiel pour une prise de décision éclairée et une réponse efficace.

Législation sectorielle de l'UE et régions frontalières

L'étude analyse les politiques multirisques et sectorielles pertinentes afin d'évaluer leurs implications pour la gestion des risques de catastrophe et d'identifier les domaines à améliorer. L'analyse souligne la nécessité de renforcer la cohérence entre les politiques relatives à la GRC et les autres politiques sectorielles, en particulier dans les zones frontalières. Elle souligne l'importance d'aligner les politiques sectorielles sur les efforts d'adaptation au changement climatique et appelle à une collaboration plus étroite entre les autorités sectorielles et les agences climatiques/environnementales.

Les défis liés à la mise en œuvre de la directive sur les inondations sont abordés, notamment en ce qui concerne la gestion des inondations rares et la gestion au niveau du bassin. Le rapport plaide en faveur d'une plus grande harmonisation transfrontalière et suggère que la Commission européenne joue un rôle plus important dans la promotion d'approches harmonisées.

Les discussions sur la politique de **protection des infrastructures critiques** soulignent la nécessité de coordonner les efforts entre les différents niveaux de gouvernance. Bien que la coopération en matière de réponse aux infrastructures critiques soit solide, le rapport identifie des domaines où la préparation peut être améliorée, en particulier dans des secteurs tels que l'alimentation, les transports et l'énergie.

La pandémie de COVID-19 met en évidence l'importance de la coordination au niveau de l'UE pour faire face aux **menaces sanitaires transfrontalières**. Les recommandations portent notamment sur la cartographie des capacités et la coopération en vue d'améliorer les mesures de préparation et de réaction.

En ce qui concerne les **risques géophysiques**, le rapport suggère de renforcer les liens entre les politiques de construction et la gestion des risques naturels afin d'améliorer la résistance aux séismes. Il recommande également d'impliquer davantage les autorités locales et l'industrie dans la gestion des risques technologiques dans les territoires frontaliers.

Cadre juridique de la gestion des risques de catastrophe aux niveaux national et régional/local ayant un impact sur les territoires frontaliers

L'analyse a porté sur les cadres politiques de gestion des risques de catastrophe dans les régions frontalières de l'Union européenne, soulignant le **besoin critique d'améliorer la cohérence et l'intégration des politiques et de la législation sectorielle relatives à la GRC**, en particulier dans les zones frontalières. Une collaboration plus étroite entre les autorités sectorielles et les agences climatiques/environnementales est essentielle pour aligner les mesures de réduction des risques sur les conditions climatiques changeantes.

Les lacunes identifiées dans le cadre juridique aux niveaux national, régional et local ayant un impact sur les territoires frontaliers soulignent le besoin de clarté, d'une meilleure compréhension, d'une rationalisation des responsabilités et d'un renforcement des liens entre les accords bilatéraux et le cadre juridique de l'UE.

Les défis posés par les cadres de gouvernance pour la GRC, en particulier la coordination de la coopération transfrontalière et la clarification des rôles et des responsabilités, nécessitent des initiatives visant à renforcer l'attention et l'engagement au niveau national, ainsi qu'une formation continue pour les gouvernements locaux.

Les **recommandations** formulées dans ce contexte incluent le renforcement de la collaboration transfrontalière et l'alignement entre les politiques sectorielles et les efforts de gestion des risques de catastrophe. Cela semble essentiel pour gérer efficacement les risques dans les régions frontalières. Il s'agit notamment de cartographier la législation, de favoriser les accords bilatéraux et de promouvoir des approches complémentaires au cadre juridique de l'UE. Il est également important de **clarifier les rôles et les responsabilités** aux niveaux national, régional et local, ainsi que la formation continue des gouvernements locaux, afin d'améliorer la coordination et la préparation des activités de GRC dans les zones frontalières. En outre, l'adaptation de cadres de communication efficaces et la mise en place de canaux de discussion obligatoires à différents niveaux organisationnels sont suggérées pour faciliter le flux d'informations et renforcer la coopération dans les efforts de GRC.

Certains exemples pratiques provenant de différents pays illustrent des modèles et des initiatives de collaboration transfrontalière réussis, soulignant l'importance d'exercices structurés, de cadres juridiques souples et d'une formation continue pour améliorer la préparation et la résilience.

Mécanismes européens de prévention, de préparation et de réaction aux catastrophes et leur adéquation aux territoires transfrontaliers

Les ressources et le soutien financiers sont essentiels à la mise en œuvre efficace des projets transfrontaliers. Une soutien financier complet de l'Union devrait être fournie pour combler les lacunes en matière de capacités identifiées par les autorités nationales de protection civile et la Commission, en particulier pour répondre aux risques de faible probabilité ayant des incidences transfrontalières importantes. Toutefois, l'accès aux fonds de l'UE peut s'avérer difficile pour les autorités locales en raison des complexités administratives. Des efforts sont nécessaires pour simplifier les mécanismes de financement et sensibiliser les autorités locales.

INTERREG est un instrument financier clé pour la coopération transfrontalière, qui finance un nombre important de projets de gestion des risques de catastrophe. Le **prochain programme de coopération INTERREG de l'UE pour la période post-2027** est appelé à jouer un rôle central dans la promotion de la collaboration transfrontalière afin de relever les défis contemporains, y compris la GRC. En prévision de cela, sur la base de l'analyse de l'étude, une série de recommandations a été formulée pour améliorer l'efficacité du programme. Elles sont disponibles à l'annexe 8.

Tout d'abord, il est demandé d'augmenter les **fonds alloués** pour soutenir les projets de gestion des catastrophes et les activités de renforcement des capacités, en particulier à la lumière de l'escalade des phénomènes météorologiques extrêmes et des pandémies. Cela inclut des ressources pour la formation, l'échange de connaissances et le renforcement des capacités des autorités locales et des intervenants en cas d'urgence.

Il est primordial d'assurer la **durabilité** des initiatives de coopération transfrontalière, d'où la nécessité de développer des mécanismes de partenariats à long terme et des cadres de collaboration institutionnalisés. La diversification des sources de financement au-delà du financement INTERREG est proposée pour fournir un soutien supplémentaire, en tirant parti du financement de sources nationales, régionales et internationales.

L'accent est mis sur la **promotion de la collaboration transfrontalière** afin d'élaborer des stratégies, des plans d'action et des exercices communs pour la préparation, la réponse et le rétablissement en cas de catastrophe. L'**intégration de mesures d'adaptation au climat dans les projets de gestion des catastrophes** est également cruciale pour soutenir le développement d'infrastructures résistantes au climat.

L'**adoption de technologies innovantes** telles que la télédétection et l'intelligence artificielle est encouragée pour améliorer les systèmes d'alerte précoce et les capacités de réaction aux catastrophes. L'**engagement et l'autonomisation des communautés** sont mis en avant pour renforcer la résilience locale, en impliquant les communautés dans la conception et la mise en œuvre des projets.

La promotion de **solutions fondées sur la nature** pour la réduction des risques de catastrophes, l'intégration des principes de réduction des risques de catastrophes et le maintien de la **flexibilité** dans la conception et la mise en œuvre des programmes sont également des recommandations clés. Ces initiatives visent à renforcer la résilience, à améliorer la collaboration et à assurer une réponse coordonnée aux catastrophes par-delà les frontières, en protégeant les communautés et les écosystèmes tout en favorisant un avenir plus résilient et plus durable pour l'Europe.

Les exemples décrits dans l'étude mettent en lumière des collaborations transfrontalières réussies, en soulignant l'importance des formations et des exercices conjoints, ainsi que du soutien international.

Cadre de gouvernance de la gestion des risques de catastrophe aux niveaux national et régional/local ayant un impact sur les territoires frontaliers

L'analyse des cadres juridiques entourant la GRC au niveau national et régional/local, en mettant l'accent sur leur impact sur les territoires frontaliers, révèle plusieurs conclusions et recommandations clés issues de consultations d'experts et d'études de cas.

Les données recueillies confirment l'importance de la compréhension des cadres juridiques, du renforcement de la coopération transfrontalière et de la rationalisation des responsabilités pour relever efficacement les défis de la GRC dans les territoires frontaliers. La collaboration, la coordination et l'alignement sur les cadres de l'UE sont également essentiels pour garantir la résilience et la préparation face aux catastrophes.

Plusieurs **facteurs horizontaux entravant la coopération transfrontalière** ont été détectés. Tout d'abord, le manque de connaissances sur la législation des pays voisins, ce qui souligne la nécessité de cartographier et d'améliorer la compréhension des accords de gouvernance transfrontaliers. De même, il est nécessaire d'accorder une attention et une compréhension accrues aux problèmes de gestion des risques de catastrophe affectant les régions frontaliers.

Les accords bilatéraux ou multilatéraux jouent un rôle crucial dans le renforcement de la coopération transfrontalière, nécessitant des ajustements des lois et réglementations nationales. Ces accords doivent compléter le cadre juridique de l'UE afin d'éviter les chevauchements et de garantir l'efficacité.

Un équilibre est nécessaire entre les incitations ascendantes à la coopération transfrontalière et le renforcement du niveau national pour une meilleure coordination. Cela implique également de rationaliser les responsabilités au sein des cadres juridiques nationaux afin d'améliorer la clarté et la coordination, notamment en définissant les rôles aux niveaux local et régional, par exemple les autorités chargées de la protection civile. Il est également utile de fournir une formation continue pour améliorer la coopération et renforcer les capacités de collaboration dans les régions frontaliers.

Plusieurs exemples de bonnes pratiques et de recommandations ont été identifiés dans l'étude, soulignant l'importance d'approches adaptées à des frontières et à des risques spécifiques. Des initiatives telles que la cartographie de la législation sanitaire, la réorganisation des systèmes de GRC et le renforcement de la coopération transfrontalière témoignent de stratégies efficaces pour relever les défis de la GRC.

Une série d'exemples tirés de différents pays met en lumière les défis existants, les bonnes pratiques et les domaines à améliorer dans les cadres juridiques de la GRC et la coopération transfrontalière.

Une série de recommandations possibles a également été élaborée pour traiter plusieurs questions, notamment la disponibilité insuffisante d'outils et de processus, par exemple pour certains risques tels que les sécheresses, le terrorisme, les migrations, les cybermenaces, les accidents chimiques et les maladies animales et végétales ; l'application inefficace des accords bilatéraux existants, particulièrement mise en évidence lors d'événements tels que la pandémie de COVID-19.

L'occasion a également été soulignée de promouvoir un **changement d'orientation des accords bilatéraux, de la réaction à la prévention et à la préparation**, et de parvenir à une harmonisation plus poussée du processus d'évaluation des risques en utilisant des approches, des données et des modèles communs.

Une autre recommandation concerne les **initiatives conjointes visant à relier les institutions déconnectées fonctionnant en silos**, ce qui peut poser des problèmes, en particulier lorsqu'il s'agit de faire face à des risques à forte probabilité ou à fort impact.

Cette lacune peut être comblée en **reliant les plateformes régionales au Risk Data Hub de la Commission européenne** et en facilitant ainsi la diffusion et l'accès aux données, comme c'est le cas dans le projet INTERREG BORIS.

Enfin, il y a l'augmentation des efforts de sensibilisation ascendants et transfrontaliers, visant à responsabiliser les municipalités locales et à renforcer les niveaux de gouvernance régionaux pour améliorer l'efficacité de la GRC, et le manque d'alignement des pratiques de gestion des données, qui pose des problèmes, en particulier dans les systèmes d'alerte précoce.

Interopérabilité des systèmes

Des réseaux de communication d'urgence transfrontaliers efficaces sont essentiels pour faire face aux crises dans les régions interconnectées. L'étude de cas Nordred souligne l'importance des efforts de collaboration entre les pays, en tirant parti de la technologie et des accords formels, pour permettre des réponses rapides et coordonnées aux situations d'urgence. Le succès dépend de partenariats engagés, d'un financement adéquat, d'une grande visibilité et d'un engagement continu des utilisateurs finaux.

L'identification d'**ensembles de données communes**, y compris des données géoréférencées, des procédures d'intervention de sauvetage, des évaluations des dommages et des données sur les bâtiments, est essentielle à cette entreprise. Des défis tels que la fiabilité, l'exhaustivité et la facilité d'utilisation des données nécessitent des solutions communes entre les pays voisins ou au niveau de l'UE.

La synchronisation des systèmes d'alerte et des services de cartographie transfrontaliers est essentielle à l'interopérabilité en cas d'urgence. Les cadres réglementaires au niveau de l'UE peuvent faciliter ce processus en établissant des critères d'interopérabilité.

La participation du secteur privé est cruciale, en particulier pour l'exploitation des infrastructures critiques. Il est essentiel de poursuivre les efforts en matière de collecte et d'échange de données, même avec la participation du secteur privé.

Les projets antérieurs et les initiatives existantes, telles que l'initiative Data-ESTAG et les centres européens d'innovation numérique, peuvent fournir des informations et des ressources précieuses. Les États membres devraient tirer pleinement parti de ces initiatives, soutenues par une politique d'interopérabilité renforcée financée par le programme « Europe numérique ».

En conclusion, il est essentiel d'établir des cadres pour la collecte, l'extraction et le partage des données au niveau local, de part et d'autre de la frontière. Cela permettra de renforcer la coopération entre les pays voisins et d'améliorer l'efficacité des réseaux de communication d'urgence transfrontaliers.

Autres thèmes

Ce résumé présente également des idées et des recommandations clés sur d'autres sujets pertinents liés à la gestion des risques de catastrophe, notamment la communication sur les risques, l'engagement des citoyens, les solutions basées sur la nature, la coopération avec le secteur privé et la gestion des infrastructures transfrontalières.

Analyse des lacunes et recommandations par frontière

Une analyse basée sur l'évaluation des risques et de l'état de préparation à la gouvernance a été réalisée pour chaque frontière et les risques et lacunes en matière de gouvernance ont été identifiés.

Cette approche fournit un aperçu détaillé de la situation à chaque frontière, ce qui est utile pour répondre aux questions relatives aux risques le long de chaque territoire frontalier de l'UE ; aux divergences dans l'évaluation des risques identifiés comme pertinents de part et d'autre des frontières ; à l'état de préparation des territoires frontaliers, en termes de gouvernance, pour faire face aux différents risques d'une manière conjointe et coordonnée de part et d'autre de la frontière.

Les résultats de cette approche ont été résumés dans des tableaux analytiques pour chaque frontière, y compris les points essentiels concernant les risques et la gouvernance, les possibilités d'action commune et des recommandations personnalisées, qui peuvent être trouvées dans une publication distincte, comprenant des cartes.

1. Introduction

1.1. Objective of the study

Natural and man-made disasters defy national borders. The role of the European Union is “to complement, support and coordinate national action and promote cross-border cooperation”¹.

Countries engage in more cooperation across borders “to better address the transboundary nature of disaster risk”. Moreover, “the complexity of threats also calls for closer cooperation and synergies across sectoral, institutional and national borders”.

The current assignment is implemented in this context. The aim of the study is to assist the European Commission in strengthening capacities for disaster risk management in cross-border areas. This is to be achieved through four objectives:

- identifying the main risks territories in cross-border areas are exposed to;
- identifying the existing agreements, tools, and institutional processes that allow the competent authorities in the same territories to manage the risks identified and analyse the governance used to effectively apply such agreements / tools;
- identifying the main gaps affecting cross-border territories in their risk management capabilities, and formulate proposals to address these gaps at local, regional, national and European levels; and last but not least;
- identifying good practices in cross-border risk management, outlining how they are good practices, and extrapolating lessons learned.

The study was commissioned by DG REGIO in December 2022. The Contractor’s consortium consists of Technopolis Group (leader) in association with CMCC and Nordregio.

The current document is the Final Report (deliverable D8) for the assignment on Strengthening the resilience of EU border regions: Mapping risks & crisis management tools and identifying gaps, for the European Commission, Directorate-General for Regional and Urban Policy (DG REGIO) Specific Contract No 2021CE160AT171.

1.2. Structure of the final report

The Final Report aims to bring together all work streams under the study and to present final versions of all deliverables as per the Terms of Reference.

Following this introduction, the Final Report is structured as follows:

- **Chapter 2** presents the global and EU policy with relevance to Disaster Risk Management. It analyses the available legislation by types and provides an overview of the cross-border implications of different policies.
- **Chapter 3** is focused on the Inventory of risks at borders, which informs the analysis conducted in other parts of the study.

¹ EC, 2021, Overview of natural and man-made disaster risks the European Union may face.

- **Chapter 4** describes the part of the study focused on the Geographical analysis and the development of a new set of maps. It summarises the mapping process and illustrates a sample map and legend for one border, which has been applied for the full set of maps which has been submitted as a self-standing deliverable.
- **Chapter 5** introduces the inventory of DRM-relevant agreements and the inventory of institutions, processes, tools. While some statistical analysis is presented in this chapter and a reference is made to the inventories, the substantial part of the analytical work carried out on these inventories has been triangulated with the other sources.
- **Chapter 6** is dedicated to the production of the new inventory on EU-level platforms and tools for Disaster Risk Management. These have been separated from the other tools as they reflect the relevance and effectiveness of EU intervention on DRM as opposed to national interventions across the borders.
- **Chapter 7** presents the work for the identification, selection, and development of the required set of examples of good practices of risk management experiences. An overview is made on the ten case studies that represent the final output of this part of the study, as well as on the main findings extracted.
- **Chapter 8** provides the gap analysis carried out to answer to the key findings of the study and brings together the complementary work carried out for the creation of the inventories, the valuable insights collected through stakeholder consultation activities and the depth provided in the research undertaken for the case studies.

The report includes the following **Annexes**:

- Annex 1. Bibliography;
- Annex 2. Interview guidelines;
- Annex 3. Global, non-EU level policies and their implications for DRM in cross-border territories;
- Annex 4. EU coordination systems, platforms, initiatives, data hubs and knowledge portals;
- Annex 5. Overview of key EU legal framework in DRM;
- Annex 6. EU Directives with relevance to DRM in cross-border territories;
- Annex 7. Overview of key EU multi-risk and sectoral legislation with relevance for DRM;
- Annex 8. Recommendations for the post-2027 EU INTERREG Cooperation Programme for DRM.

The report also refers to the following set of individual deliverables which are provided separately because of their size and Excel-based format:

- Inventory of risks (D3);
- Inventory of existing agreements/tools to manage risk in a cross-border context and Inventory of institutions, processes and tools (D4);
- Inventory global and EU policies for Disaster Risk Management and Resilience (not a formal deliverable);

- Presentation of case studies (D9).

The formal deliverable Gaps and Recommendations (D5) consists of Chapter 8 and of a separate publication with border fiches and maps.

1.3. Methodological approach and limitations of the study

Different methodological tools have been used throughout the assignment including desk research, literature review and expert judgement for the risk inventory, interviews on EU and national levels which informed all deliverables but mainly the gap analysis and the formulation of recommendations, and the development of the case studies. The country-level work has been carried out by individual country experts.

The study aims to make a tangible contribution to addressing the challenge of availability and comparability of data on risk exposure and impact in border areas. However, it is essential to highlight that more work remains to be done in this domain, and the evidence collected was not always conclusive. In particular, several methodological limitations have influenced the reliability and generalisability of the findings:

- **Data availability:** Despite efforts to gather comprehensive data, limitations in data availability have constrained the depth and breadth of the analysis. Certain border regions or specific risk factors may have been underrepresented or overlooked due to data gaps or restrictions on access to publicly available information.
- **Data comparability:** Variations in data collection methodologies, definitions, and reporting standards across different countries, regions or sources has sometimes hindered comparability and consistency in the analysis. This led to challenges in synthesising findings and drawing meaningful comparisons between border areas or DRM approaches.
- **Methodological constraints:** The study has faced methodological constraints, such as limitations in analytical techniques or reliance on secondary data sources or extrapolation to fill data gaps, which could have impacted the robustness of the analysis. Despite the extensive and thorough data cleaning process, incomplete or outdated data, as well as discrepancies in data quality, may have affected the accuracy of the analysis.
- **Interpretation bias:** in several instances, the study experts' subjective interpretations or assumptions about risk exposure and impact in border areas could have influenced the analysis and conclusions, potentially leading to overestimation or underestimation of certain risks or impacts.
- **Complexity of border dynamics:** The complex nature of border areas, including geopolitical, socio-economic, and environmental factors, presents inherent challenges in data collection and analysis. Interactions between multiple risk factors and stakeholders have in some cases been difficult to capture comprehensively, potentially leading to oversimplifications or omissions in the analysis.
- **Temporal limitations:** Dynamic changes in risk profiles, such as emerging threats or shifting border dynamics, may not have been fully captured, affecting the relevance and currency of the findings.

Despite these limitations, the study provides valuable insights into the challenges and opportunities for improving data availability and comparability in border risk assessment. Future research efforts should aim to address these methodological limitations and build upon

the findings of the study to advance our understanding of risk dynamics in border areas. Notably, the recommendations formulated in Chapter 8 – and in a separate publication with border fiches and maps – concern innovative ideas and concrete suggestions. However, in a situation of information asymmetry it may happen that the European Commission and/or the Participating States have already taken action stemming from a recommendation.

It is also important to stress that this study is not an evaluation. Accordingly, its findings are only meant to suggest to the relevant institutional stakeholders possible avenues for strengthening resilience against disasters and risks through cross-border cooperation. The study is by no means a fitness check of existing legal frameworks, programmes, or initiatives and their analysis is instrumental to achieve the objectives of the study previously described.

The sections below present the main methodological features of the methodological approach followed for the development of the different components of the study, as well as the respective limitations that complete what already described under this section.

1.3.1. Global and EU policy with relevance to Disaster Risk Management (Chapter 2)

In the course of the assignment, the team performed policy analysis, as comprehensively as possible, of global and EU policies which are directly or indirectly relevant to the core subject matter of the report, namely Disaster Risk Management in border territories and all associated aspects.

The policies have been compiled based on the suggestions of the European Commission and the contractor's knowledge of the policy context. The list of policies has been complemented with the suggestions of experts interviewed on EU level.

1.3.2. Identification of risks in cross-border territories (Chapter 3)

The identification of risks per cross border territory has been conducted through a network of country experts covering the entire geographical area in scope for this study, namely all 27 EU countries, Switzerland, Liechtenstein, Norway, North Macedonia, Montenegro, and Serbia. Each border territory has been analysed by experts from the two sides of the border, using a common template approved by the Commission.

The identification of risks and assessment of the level of exposure was carried out through **literature review** and **interviews with national, regional and local level experts**. To address data gaps, country experts have relied on extrapolation, and when relevant and possible they have triangulated the evidence gathered with stakeholder interviews at EU, international and national level.

Through different assessments, analysis and reports:

- Latest National Risk Assessment reports and the types of cross-border risks, risk exposure and their severity as assessed in these reports;
- National Risk Reduction Strategies and assessments where these are available;
- Regional risk assessment reports where these are available within the countries;
- Sectoral risk assessments;
- National and subnational platforms and data portals for disaster risk prevention and reduction;
- Risk analysis drawn by Border Guards;

- Information contained in databases within relevant projects;
- Datasets, reports and conclusions of observatories and/or other relevant organisations monitoring individual risks.

Through extrapolation:

- Where a risk assessment is available for a segment of one border, the risk is extrapolated to the whole border;
- Where the information is presented for the whole country or region, the risks have been extrapolated for the border territory. The extrapolation has been carried out by the country teams and has been based on a link between scenarios (hazard, likelihood), assets and potential impacts.

Through interviews with relevant national and regional experts:

- Once the above steps have been implemented the country teams have complemented the missing information through interviews.

The challenges encountered for this part of the study mainly concern the lack of information publicly available on border regions in several National Risk Assessment reports. Furthermore, in few cases, the risk and vulnerability scores were not reported in the NRAs and relevant key information was restricted for security reasons or kept confidential.

These issues were addressed through consultation of other documents and/or extrapolation from other sources, including available national/sub-national DRM and data portals. In cases where the data was covered by confidentiality, the scores are not reported in the study.

Another challenge is due to the subjectivity of the scoring, which in the case of extrapolation is inevitable. For instance, the difference between a score 3 and a 4 or between a 2 and a 3 on a 5-level Likert scale can always be questioned. The assumption is that what matters the most is the response to the risk in terms of agreements, processes and tools.

It also has to be underlined that the capability to address risks jointly across the border differs significantly from the capability to address risks per se on a national level in the border area. Any comments addressing capabilities throughout the report should be understood as 'capabilities/capacities for joint cross-border prevention, preparedness, and response.

1.3.3. Geographic analysis and maps (Chapter 4)

The approach followed to define the geographical area of the border regions for the design and development of the maps is based on EUROSTAT's methodology manual on territorial typologies.

Notably, the definition is based on NUTS 3 level and regions are considered as border regions if they either have a land border or more than 50% of their population lives within 25km from the border.

The set of maps covers only land borders because maritime border regions are not defined geographically.

As it regards data processing and database assembly, the main data source is the Inventory of the Risks presented under Chapter 3. The data, that was collected by the consortium's experts in the countries concerned, was compiled into a database including all hazards, the probability of the hazard happening, the impact this said hazard might have on the region, the capability to address these risks, the differences in risk assessment on both sides of the border as well as differences in capabilities to address them. This database has then been joined with

a geographic representation of each border region with infographics describing risk assessment (probability and impact).

1.3.4. Inventory of agreements, institutions, tools and processes for risk management (Chapter 5)

The data for the creation of the Inventory of agreements, institutions, tools, and processes have been collected from the following sources:

- National Risk Assessment reports;
- National, regional (within the countries) and local platforms;
- Platforms of transnational cooperation initiatives;
- Bilateral agreements;
- Bilateral or multilateral projects.

Borders and risks with very few publicly available agreements have been explored as well to ensure that the inventory is as comprehensive as possible.

The identification of agreements is the result of a review of the EU-level and international sources, complemented by targeted expert interviews, combined with border-specific reviews and interviews.

A specific challenge encountered concerned the fragmentation and volume of information, which was addressed by extensive verifications and focus on the quality of the data collected. This particularly concerns agreements from countries (e.g. Czechoslovakia) which do not exist any longer, for which it was difficult to verify whether the legal instruments were still in force.

Furthermore, there were issues regarding classification, as some entries could sometimes be classified in more than one way. Linked to this, in several instances, projects contained more than one 'tool' and/or 'process'. This was addressed by differentiating between cases whereby projects represent the very framework of cooperation from other cases where projects have produced tools, methodologies, processes which can be listed separately and have a 'life' of their own beyond the project.

Although the final inventory offers an extremely vast and overall reliable overview of the existing agreements, it remains a dynamic document. The information it provides is not fully complete and warrants further research that could not be carried out under the present study. Likewise, future updates will be necessary given the evolving nature of the subject matter.

1.3.5. EU-level platforms, mechanisms and databases for DRM (Chapter 6)

The identification of platforms, mechanisms, databases has been conducted throughout the development of the study as a pre-requisite for providing a full picture about the EU capabilities to address hazards in cross-border context.

The data collected has been notably used for the analysis as a complementary source, as well as for triangulation purposes across sources, although it may not be fully complete.

1.3.6. Case studies (Chapter 7)

Drawing on the work carried out for the development of Chapter 2 Global and EU policy with relevance to DRM, in Chapter 3 identification of risks in cross-border territories, in Chapter 5

Inventory of agreements, institutions, tools and processes, and in Chapter 6 EU-level platforms, mechanisms and databases for DRM, as well as on the information and data collected through expert and stakeholder consultations, a balanced set of good practices in DRM in border territories was identified to produce ten inspirational case studies.

The criteria used for the selection of good practices (Identified good governance practices, utilised tools and successful processes) were:

- Geographical balance (North, South, East, West);
- Type of risk, aiming at covering most or all risks in the case studies;
- Coverage of internal and external EU borders (e.g. Russia, Belarus, Norway, Switzerland, Western Balkans, Turkey);
- Coverage of different types of borders (Land border, Maritime border, Mainly rural border, Mainly urban border, Sparsely populated border, Densely populated border, Continuous landscape, Territory divided by natural border);
- Transferability/replicability;
- A balanced distribution between the following themes:
 - Risk assessment, vulnerability assessment, foresight, data-collection, mapping/GIS of risks;
 - Planning, prevention measures planning, response contingency planning, financial planning investments, pooling of response resources;
 - Early warning, public warning, situational awareness, real-time data exchange;
 - Response cooperation, structures/arrangements for joint response, training/exercises;
 - Risk communication with population, civic engagement in resilience building, volunteering;
 - Inclusivity in disaster risk management 'leaving no one behind', vulnerable groups, special target groups;
 - Innovation using new technologies, digital tools;
 - Nature-based solutions, working with natural processes (floods, wildfire, droughts, climate-proof building) including building partnerships with stakeholders;
 - Cooperation/Partnerships with private sector, cross-border infrastructure, critical infrastructure management;
 - Comprehensive approaches for cooperation over a longer period.

A long list of potential case studies was drafted, which includes 37 entries (individual agreements, tools, and processes) to be used for the **identification** of the case studies.

Based on the long list of potential good practices, and in agreement with the Contracting Authority, an updated **selection** of case studies was made following the criteria and keywords below.

- Geographical balance (North, South, East, West);
- Coverage of internal and external EU borders (e.g. Russia, Belarus, Norway, Switzerland, Western Balkans, Turkey);

- Coverage of most (or all) risks – an effort was made to cover most or all risks in the case studies;
- Coverage of maritime borders;
- Identified good governance practices, utilised tools and successful processes;
- Transferability/replicability of the good practice.

The criteria above have been enriched with key themes proposed by the EC² and the tagging has made clearer. On this point it is important to flag that the themes indicated under each case study remain indicative, as the team may have had to focus on some of them more than on others during the development of the case study to ensure the best use of the most relevant information and data.

- Removal of proposed case studies considered not fully relevant:
 - Ireland/Northern Ireland border;
 - Horizontal topic on volunteers for civil protection;
 - NERCISU network.
- A suggestion for a new case study has been added on a maritime border (Central Baltic);
- Including one or more external borders: 3 (Norway, Serbia).

For **structuring the case studies**, a tailored template was developed. It begins with an executive summary with the key highlights, followed by an introduction to the main theme/-s and by the actual “examples”, by a description of what was done, why it was needed, how was it done (with particular focus on the concrete application of the example/-s), what were the resources utilised, who was involved. The cross-border aspects have been highlighted. The general outline of the template of the case studies is as follows:

- Executive summary;
- Introduction;
- Brief summary;
- Illustrations/maps (where relevant);
- Description of the Action (what was done?);
- Need (why it was needed?);
- Stakeholders involved (who was involved?);
- Resources (what resources were utilised?);

² Risk assessment, vulnerability assessment, foresight, data-collection, mapping/GIS of risks; Planning, prevention measures planning, response contingency planning, financial planning investments, pooling of response resources; Early warning, public warning, situational awareness, real-time data exchange; Response cooperation, structures/arrangements for joint response, training/exercises; Risk communication with population, civic engagement in resilience building, volunteering; Inclusivity in disaster risk management 'leaving no one behind', vulnerable groups, special target groups; Innovation using new technologies, digital tools; Nature based solutions, working with natural processes (floods, wildfire, droughts, climate-proof building) including building partnerships with stakeholders; Cooperation/Partnerships with private sector, cross-border infrastructure, critical infrastructure management; Comprehensive approaches for cooperation over a longer period.

- How was it done/used? (concrete application & highlight cross-border aspects);
- Conclusions on:
 - Evidence of benefits and impact of the practice on DRM;
 - Transferability of the practice.

For each case study the inclusion of maps, charts, or images has been considered whenever relevant.

1.3.7. Expert consultations

Interviews have been carried out as one of the complementary sources of the analysis and constitute an integral part of the methodology used for the overall study.

As regards the approach/protocol followed for such consultations, given the diversity between the target stakeholders, the format chosen was semi-structured. Accordingly, a clear interview questionnaire was developed and used for all interviews.

Supporting interview guidelines were developed for interviewers to ensure the comparability of results in spite of the interviewers and thus reduce subjectivity, while providing guidance to ensure gaps could be filled, e.g. for the identification of examples of best practices, and for the compilation of the inventories. The guidelines were presented before the study team in a dedicated webinar which was recorded and made easily accessible on the consortium's shared environment. Likewise, at the webinar all the templates were illustrated, and a helpdesk service was set up to timely assist interviewers in case of queries.

Due to the challenge related to the overall lack of publicly available sources and the consequent difficulty in accessing granular information required for the research, the evidence collected through this type of sources – and the way it is organised and made available throughout the study – is very valuable. Nevertheless, it is only partially complete and some of the findings certainly require additional integration and verification.

The team has conducted interviews with 21 experts operating at EU, supra-regional and global level. Sometimes more than one stakeholder per entity has been interviewed whenever different departments oversaw different aspects covered by the study.

Moreover, 65 national and regional stakeholders have been interviewed by country experts. Last, but not least, additional 28 individual experts have been interviewed at the time of drafting of the case studies.

The insights from the interviews have been integrated in the following ways:

- EU/international level: These have been integrated the various parts of the report;
- National/regional level: work on different inventories on national level;
- Interviews related to the case studies – integrated in the case studies.

The sections below provide further details about this part of the study.

Consultations at EU (and international) level

21 interviews have been carried out with relevant experts and stakeholders on EU and global level. These interviews have focused on discussing the policy frameworks with relevance for the different risks and EU borders and their level of implementation. Interviews have also discussed different platforms, tools, etc. with relevance to border territories.

Policy insights shared during the interviews have been incorporated in the analysis to the extent possible.

Consultations at National / regional level

64 interviews have been carried out with relevant stakeholders at national and or regional level. Interviews have been carried out in all countries covered by the study with a few exceptions. Experts come mainly from national or regional authorities in charge of civil protection. Their opinions represent a valuable perspective despite the fact that in certain instances experts were not fully up to date with latest developments of EU policy.

These interviews have been used mainly for collecting relevant details and enrich the results of the desk research and literature review, as well as to triangulate the assessment carried out on a given border, in order to spot and possibly address gaps.

They have enabled the collection of additional information to make the inventory of institutions, processes and tools, as comprehensive as possible, as well as to gather examples of good practice or to verify complementary information regarding the assessment of risks.

Importantly, the interviews also informed the formulation of gaps and recommendations. The country of origin of the recommendations has been kept in brackets for easy identification of the originating suggestion.

Consultations for the development of the case studies

Approximately **30 interviews** have been conducted during the process of the drafting of the case studies. References to the organisations and experts interviewed can be found in each of the case studies.

Other consultation activities

In addition to the consultation activities described above, an online meeting facilitated by the Contracting Authority was held with the Disaster prevention expert group (DPEG) on 22/06/2023 to present the objectives of the study and for gathering relevant information to complement the data collection.

Additionally a workshop on “Building resilience across borders: Strengthening regional disaster risk and crisis management”, held on 11 October 2023, during the EU Week for Regions and Cities, offered a concrete opportunity for presenting the study and its preliminary results, as well as for collecting additional feedback from the participants.

1.3.8. Gap analysis and recommendations of EU, national and local legal framework (Chapters 8)

The analysis of available legal instruments and mechanisms and the identification of gaps and recommendations relied on the following complementary sources of information:

- Desk research, literature review;
- Inventories produced under the study (i.e. of agreements, institutions, tools, and processes for DRM; of EU-level platforms, mechanisms and databases, of illustrative projects, and of risks);
- The ten case studies;

- A brief overview of the main pillars of the EU legal framework with relevance to DRM specifically in border areas;
- A brief overview of EU disaster prevention, preparedness, and response mechanisms with an emphasis of their relevance to border territories;
- Interviews carried out at EU, national and local level with relevant experts.

Likewise, an analysis based on the assessment of risk, and governance readiness was conducted for each border. Relevant risks and governance gaps have been identified as follows:

- A hazard has been defined as “high risk” for the overall border when the average between the assessments between the individual sides of the same border is 3,5 and above (as the full Likert Scale goes from level 1 to level 5, and level 3 is set as “average”).
- Discrepancies in risk assessment have been defined as “significant” if they are equal or larger than level 2 (i.e. if the assessment on one side of the border is scored two-units or more than the other/-s).
- Governance readiness to act jointly across the border has been defined as “low” if the average assessment of governance in the overall border has been assessed as 1,5 or lower (as the Likert scale ranges from level 0, where no initiative, tool or agreement is in place, to level 3 where a full governance structure is in place).
- Governance readiness to act jointly across the border has been defined as “variable” in the overall border if the difference between the individual border assessments is 2 or 3.
- This approach provides a snapshot of the situation in each overall border, which is useful to answer the following research questions.
 - Which are the risks each EU border territory is most exposed to (including different segments of the borders)?
 - Are there any discrepancies in the assessment of risks identified as relevant on both sides of the borders (cross-border territory and cross-border region? [current and future risks])
 - Are the border territories ready, in terms of governance, to address different hazards in a joint coordinated manner across the border?

The analysis undertaken resulted in the identification of several gaps and in the formulation of corresponding recommendations whenever possible. Future follow up work could focus on the elaboration of specific roadmaps per border informed by the information provided in this part of the study.

The findings, highlights and recommendations are based on all inventories developed within the assignment – risks, agreements and tools.

2. Global and EU policy with relevance to Disaster Risk Management

This chapter presents the Inventory of global and EU policies with relevance to Disaster Risk Management. After a brief illustration of the structure of the inventory, an analysis is described of the available legislation by type, providing an overview of the cross-border implications of different policies.

2.1. Structure of the inventory of global and EU policies

The inventory of global and EU policies for Disaster Risk Management and Resilience is presented in a separate Excel file.

The worksheet contains a number of elements and features of each entry, namely:

- Name of the policy;
- Brief description;
- Type (UN convention, EU Directive, decision, regulation, etc.) ;
- The types of risks covered by the instrument;
- Borders concerned;
- Information of relevance to cross-border cooperation on DRM;
- Relevant tools;
- Link to the instrument.

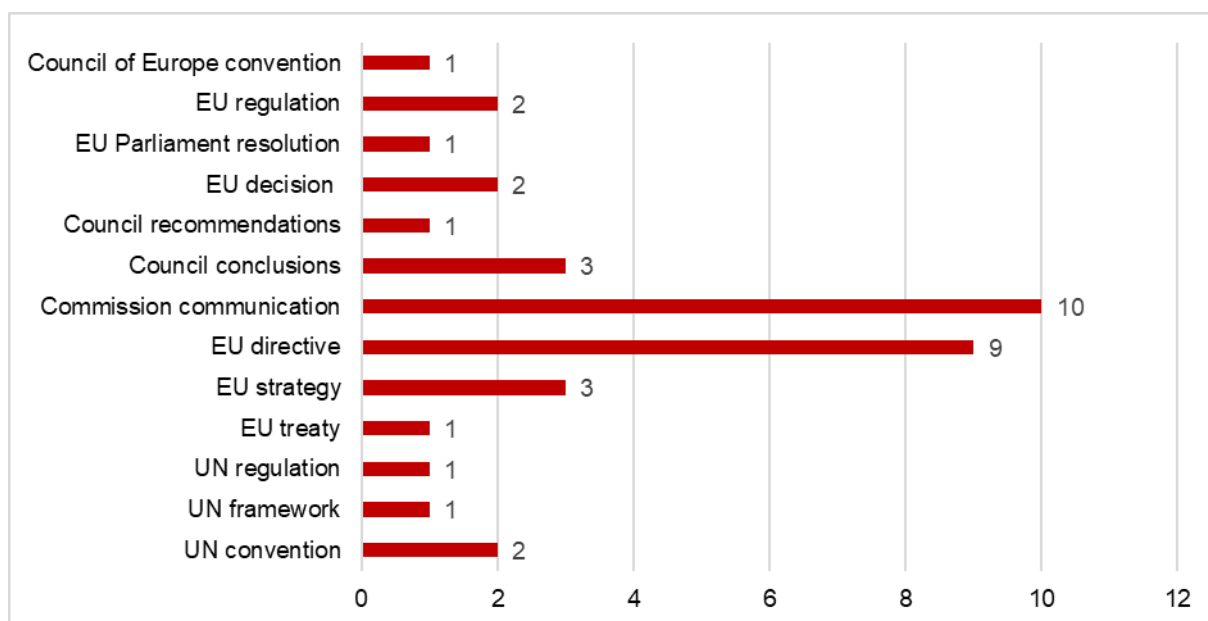
2.2. Analysis

As regards the **distribution of global and EU policies by type**, it is noteworthy that five global and 37 European policies have been identified as relevant for the Inventory of EU and global policy framework.

In terms of typology of legal instruments, EU Directives (9) (binding in their entirety when transposed), Commission communications (10) (non-binding) and EU strategies (3) represent the biggest number of legal instruments.

Several additional legal instruments are also included in the inventory, either binding in their entirety [EU Regulations (2), Council conclusions (3), EU decisions (2), EU Treaty (1)], or non-binding, i.e. Council recommendations (1), Resolutions of the European Parliament (1), UN Conventions (2), UN Framework (1), UN Regulation (1) and Council of Europe conventions (1).

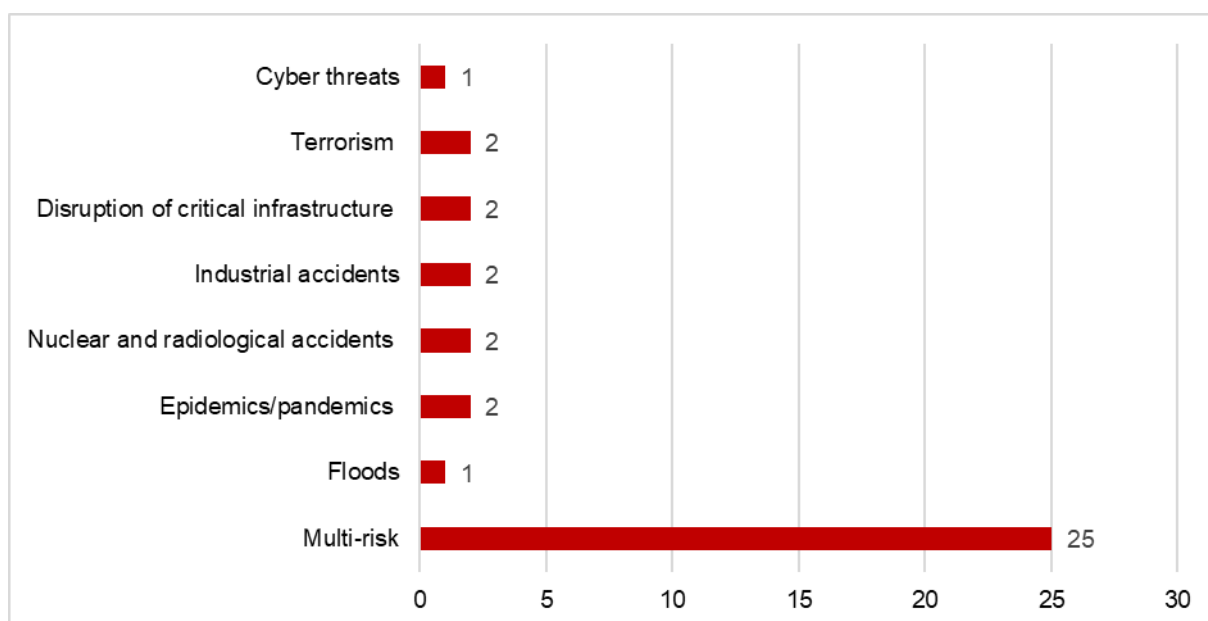
Figure 1 Types of legal instruments



In terms of **types of risk(s) covered**, the **biggest number of legal instruments are multi-risk (25)**. The other risks are covered only by one or two legal instruments. It has to be taken into consideration that the ones covering multiple risks sometimes cover only a few risks (e.g. floods, wildfires).

No specific legal instruments have been identified on migration and extreme weather which have relevance to border territories. However, extreme weather is very often an integral part of the multi-risk policy instruments.

Figure 2 Types of legal instruments by risks covered



Most legal instruments cover all DRM phases, followed by those instruments covering 'Prevention and preparedness', 'Preparedness'.

While the full description of the policies is provided under Chapter 6 in the **Inventory of EU and global policies, platforms, institutions and initiatives**, some additional information on

global, non-EU level policies and their implications for DRM in cross-border territories is presented in Annex 3.

The analysis of the EU, national and local legal and strategic frameworks and their implications for DRM in cross-border territories is examined more extensively in Chapter 8.

3. Identification of risks in cross-border territories

This Chapter is focused on the Inventory of risks at borders and informs the analysis conducted in other parts of the study.

3.1. Inventory of Risks

The Inventory of Risks is presented in a separate Excel file. It opens with a practical Index allowing the user to navigate across the risk assessments of the **53 borders in scope**, which are developed as individual analytical worksheets.

Each worksheet includes a brief description of a specific border/segment (e.g. AT-CH, CH-AT), followed by the **risk assessment from the two sides of the border/segment concerned** on top of each other. Each assessment addresses several elements:

- Hazards (12 types divided in five categories)³;
- The probability of the hazard happening (on a 1-5 scale) including justification for the score;
- Exposure/vulnerability by type of assets (housing, production capacities, and infrastructure);
- Risk assessment, defined as the potential impact of the disaster on the population, a number of assets and sectors (economy and security of supply; infrastructure; functional capacity of the population and services⁴; international and EU activities; defence capability; internal security) including justification for the score;
- Expert assessment of the capacity to address risks jointly across the border.
- This is followed by a table showing any discrepancy in the assessment of the probability of each risk to materialise, and in the level of governance readiness to respond to those risks jointly across the borders. Notably, the elements below are presented:
 - the probability assessed for each risk on each side of the same border/segment;
 - the average probability resulting from comparing the analysis carried out on each side of the same border;
 - the discrepancy in the assessment of probability;
 - the assessed governance capability to address each risk in a joint coordinated way across the border;
 - the average governance capabilities resulting from comparing the analysis carried out on each side of the same border;
 - the discrepancy in governance capabilities to address each risk in a joint coordinated way across the border.

³ Meteorological and hydrological: Extreme weather, Flooding, Drought, Wildfires. Geohazards: Geophysical risk. Biological: Epidemics/pandemics, Animal and plant diseases. Technological: Nuclear and radiological accidents, Disruption of critical infrastructure. Societal: Terrorism, Cyber threats, and Mass population displacements in emergencies (hereinafter: Migration).

⁴ The definition of functional capacity of the population includes available estimates of impact on people (e.g., how many people at risk).

4. Geographical analysis and maps

This chapter describes the part of the study focused on the geographical analysis and the development of a new set of maps. It summarises the visualisation and mapping process, which has been applied for the production of the full set of maps submitted as self-standing deliverables. A sample map and legend for one border is also presented next. A full set of border fiches and maps will be also made available in a separate publication.

4.1. Visualisation and development of border maps

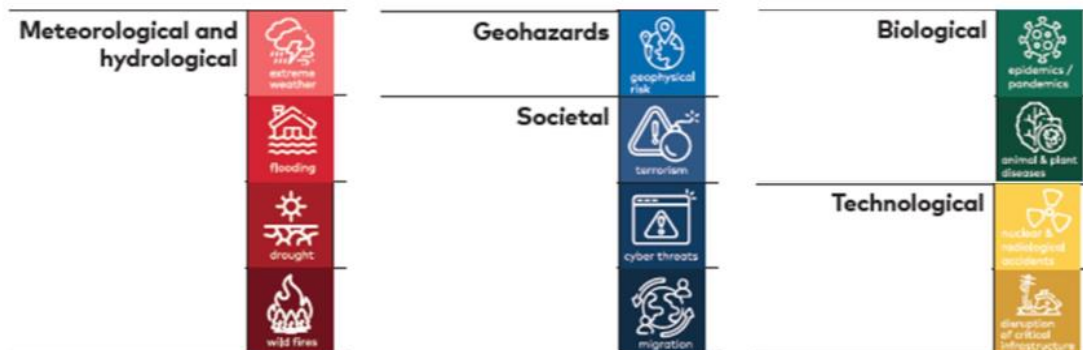
The data has been visualised as a set of maps for each border region with infographics describing risk assessment (probability and impact).

The capability of the countries to act jointly to address the risk (all DRM phases) across the borders is presented in a table below the maps.

Such an approach gives an opportunity to get an overview of the whole range of hazards and spot the main risks and differences in assessment between the countries as well as weaknesses in terms of capabilities to address the risks in a joint collaborative manner across the border.

More specifically, for each border there is a designated map that provides overview of key geographic features of the border region: landscape, hydrography, major cities. The border region is also marked according to the agreed definition. Each risk has been assigned an icon and each risk group a colour, as shown in the figure below.

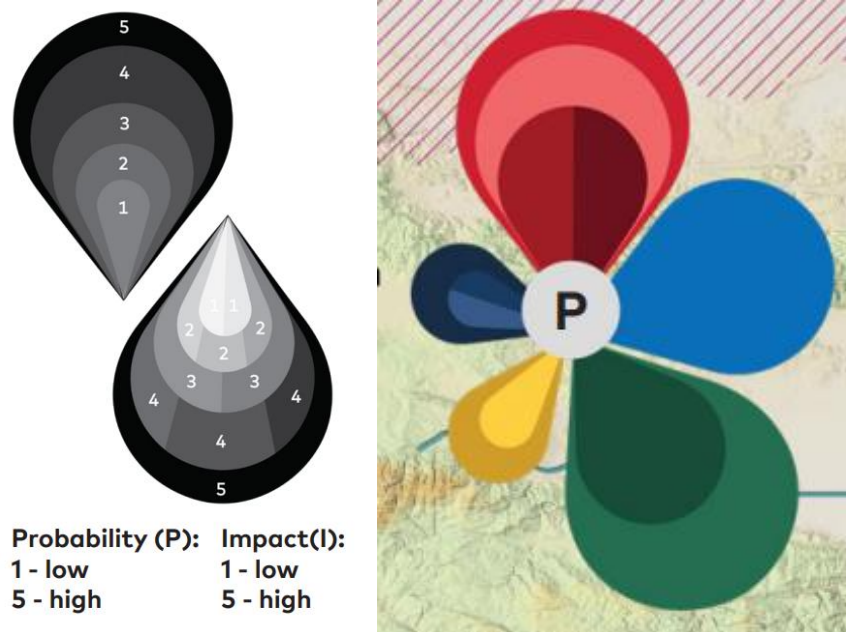
Figure 3 Hazard grouping and icons



Each map highlights the most critical information regarding the probability of risks and their potential impact by visualising 12 hazards in flower-shaped figures.

Hazard probability is formed in a 'flower', where each of the five petals represents a distinct hazard category. Probability levels from 1 to 5 correspond to a specific petal size. If two or more risks from the same group have the same probability, the petal is divided into a relevant number of same-sized parts (*Fig.4 Flower infographic used*). The legend is provided on the side to serve as a reference scale to the level of hazard probability or impact. For each map, there are four figures in total: two representing probabilities of risks on either side of the border, and the other two showcasing impacts on both sides.

Figure 4 Flower infographic used



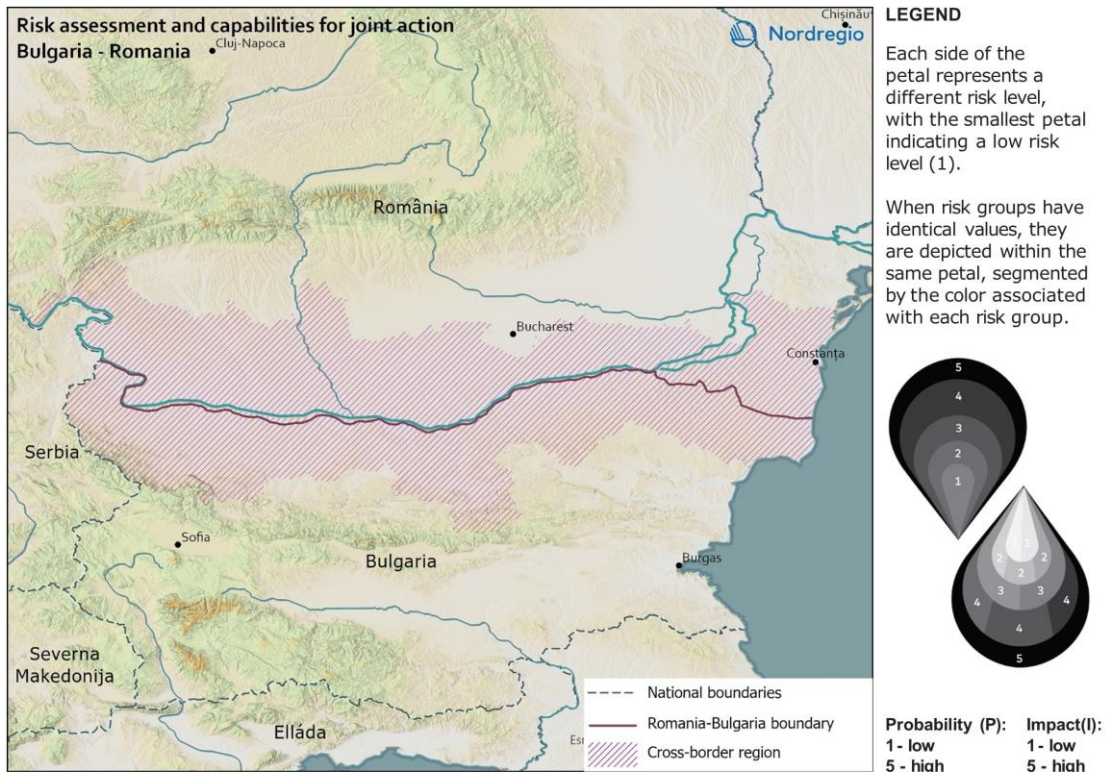
A similar approach is used for visualising potential impacts. When displayed next to probability assessments, the potential impact draws attention to those hazards, that may not have a high probability, but potential impacts are significant. Unlike probabilities, impact calculation results produce bigger variations in scale. For the sake of keeping the infographic accessible and readable, the resulting number was rounded to two decimal places.

The information about the gaps in capability for joint action, which emerges from the juxtaposition of the two sides of the border, is presented in a table below the map, accompanied by an explanatory text to draw attention to the cases where there is one of the two cases: high probability/low capability and high impact/low capability. Risks with a high probability (above 3) and low capability (below 1,5) are highlighted in orange in the table, those with high impact (above 3) and low capability (below 1,5) are highlighted in red in the figure below, while those with low capability but both high probability and high impact are highlighted in dark red.

4.2. Sample map

A sample map (Figure 5) in the next page has been designed for the Romanian-Bulgarian border. The template has been discussed with the Contracting authority, further improved (e.g. adding icons for each risk, making only the relevant information visible, etc.), and finalised integrating the feedback received.

Figure 5 Romania-Bulgaria border region



| | | Probability | | Impact | | Capability |
|---------------------------------|--|-------------|----------|---------|----------|------------|
| | | Romania | Bulgaria | Romania | Bulgaria | Average |
| Meteorological and hydrological | weather | 3 | 4 | 1,67 | 2,00 | 1 |
| | flooding | 4 | 5 | 2,67 | 3,00 | 3 |
| | drought | 4 | 3 | 2,67 | 2,50 | 0,5 |
| | wild fire | 2 | 3 | 1,50 | 1,83 | 2 |
| Geohazards | geophysical risk | 4 | 4 | 3,00 | 3,17 | 2 |
| Biological | epidemics / pandemics | 4 | 5 | 2,67 | 1,83 | 0,5 |
| | animal & plant diseases | 3 | 3 | 1,67 | 1,50 | 1 |
| Technological | nuclear technologies | 1 | 1 | 3,00 | 3,17 | 3 |
| | disruption of critical infrastructures | 1 | 2 | 3,00 | 3,17 | 1 |
| Societal | terrorism | 1 | 1 | 1,0 | 1,0 | 0,5 |
| | cyber threats | 1 | 1 | 1,0 | 1,0 | 0,5 |
| | migration | 1 | 2 | 1,0 | 1,0 | 1,5 |

5. Inventory of agreements, institutions, tools and processes for risk management

This chapter presents the Inventory of agreements, institutions, tools and processes for DRM, which was developed to provide a valuable resource for EU, national and regional policymakers and stakeholders, and to offer valuable insights into the dynamics and potential of cross-border cooperation in the domain of DRM.

The Inventory is structured in two main parts. First, the part of the Inventory dedicated to **bilateral and multilateral agreements** is illustrated, followed by the description of the part dedicated to **institutions, processes and tools**. For each part, the underpinning methodology is detailed in the next sections, as well as the process followed for their development, and the key findings resulting from the analysis. A more elaborated presentation of findings, gaps and recommendations is also available in Chapter 8.

5.1. Inventory of bilateral and multi-lateral agreements

5.1.1. Structure of the Inventory of Agreements

The **Inventory of Agreements** is presented in the first tab of a separate Excel file.

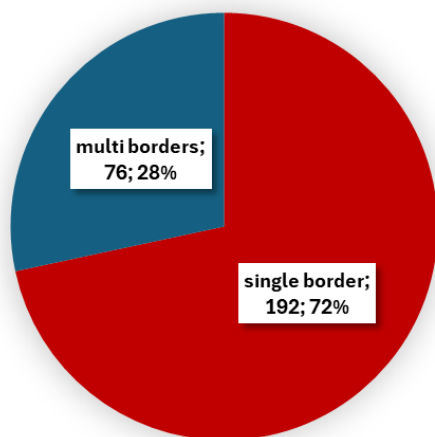
The inventory includes the fields below:

- Name of the agreement and a hyperlink (if available);
- Indication if it is a single- or a multiple-border agreement;
- Governance level;
- Types of risks covered.

5.1.2. Analysis

Overall, **268 agreements** have been identified. There are 192 which cover one border only, whereas 76 are multi-border, as shown in the next figure.

Figure 6 Agreements per type (single border and multiple borders)



As regards the **distribution of single-border agreements per geography**, certain borders emerge as focal points with a substantial number of agreements, highlighting the significance of these regions in cross-border collaboration. Noteworthy examples include all the Austrian borders (43 agreements with the Czech Republic, Slovakia, Italy, Germany, Slovenia, and Hungary), the border between the Czech Republic and Slovakia (CZ/SK) and the one between France and Italy (FR-IT) with 11 agreements each, and the border between Spain and Portugal (ES/PT) with ten agreements. The prevalence of agreements in these regions underscores the commitment to addressing shared

risks and challenges through robust cross-border cooperation mechanisms.

Overall, it could be concluded that a higher number of agreements indicates the presence of more tailored cooperation frameworks and should be encouraged, notably where no single-border agreement could be found (e.g. HU/HR; LV/LT).

Table 1 Number of agreements covering a single border

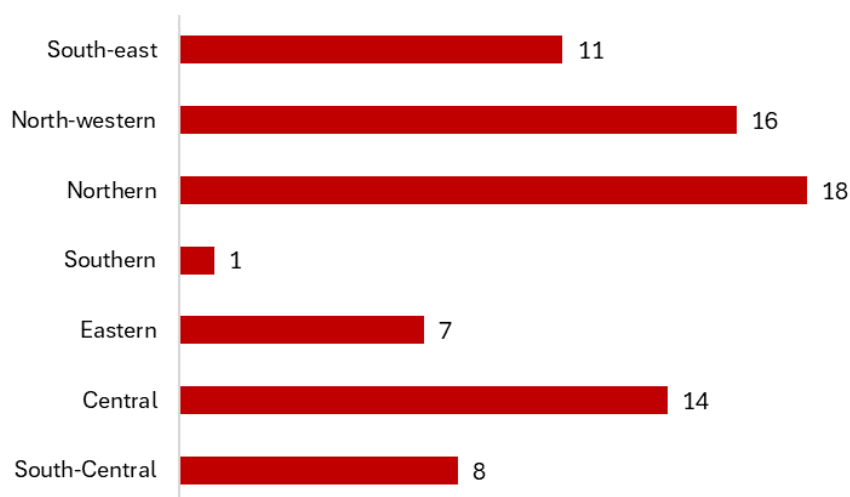
| Border | No. of agreements | Border | No. of agreements |
|--------|-------------------|-----------------------------|-------------------|
| AT-CH | 12 | DK-DE | 2 |
| CZ-SK | 11 | DK-SE | 2 |
| FR-IT | 11 | FR-BE | 2 |
| ES-PT | 10 | FR-LU | 2 |
| SK-AT | 10 | HR-RS | 2 |
| IT-CH | 9 | HU-AT | 2 |
| DE-NL | 7 | HU-RO | 2 |
| DE-CZ | 6 | IRL-UK (Northern Ireland) | 2 |
| IT-AT | 6 | MK-BG | 2 |
| DE-AT | 5 | RO-BG | 2 |
| DE-PL | 5 | RS-HR | 2 |
| LT-PL | 5 | SE-NO | 2 |
| PL-CZ | 5 | SI-HR | 2 |
| PL-SK | 5 | SK-HU | 2 |
| RS-BG | 5 | BE-LU | 1 |
| AT-SI | 4 | BE-NL | 1 |
| BE-DE | 4 | EE-LV | 1 |
| CZ-AT | 4 | ES-FR | 1 |
| FR-CH | 4 | FI-EE (assimilated to land) | 1 |
| SI-IT | 4 | FI-NO | 1 |
| DE-CH | 3 | FR-DE | 1 |

| Border | No. of agreements | Border | No. of agreements |
|--------|-------------------|--------|-------------------|
| ES-FR | 3 | HU-SI | 1 |
| IT-ME | 3 | IT-HR | 1 |
| MT-IT | 3 | LU-DE | 1 |
| SE-FI | 3 | MK-EL | 1 |
| BG-EL | 2 | | |
| CH-LI | 2 | | |

As illustrated in the next figure, the **geographical distribution of the 76 agreements covering multiple borders** is relatively even between different parts of Europe. Nearly one-fourth of this type of agreements concern Northern Europe (18; 24%), followed by North-western Europe (16; 21%), Central Europe (14; 18%), and South-Eastern Europe (11; 14%). In comparison, South Central Europe (8; 11%), Eastern Europe (7; 9%), and Southern Europe (1; 1%) show a lower number of multiple-border agreements, and none have been identified for West Europe.

This indicates the presence of more structured cooperation frameworks in DRM across several borders, notably in the Alpine area, in Scandinavia and the Baltics, in Benelux, and along the Danube, but also in the Balkans and over some maritime Mediterranean borders (e.g. France, Italy, Malta, Croatia).

Figure 7 Number of multi-border agreements per part of Europe



The analysis of the **distribution of the 268 agreements per type of risk** reveals that more than half of them is multi-risk (149; 55%), demonstrating a proactive approach to handling a range of potential challenges. This is followed by nuclear and radiological accidents (33; 12%), flooding (30; 11%), migration (11; 4%), disruption of critical infrastructure and Industrial and chemical risks (each at 9; 3%) and wildfires (8; 2.9%). Very few agreements have been identified in geophysical risks and epidemics/pandemics (each at 4; 1.5%), terrorism or drought

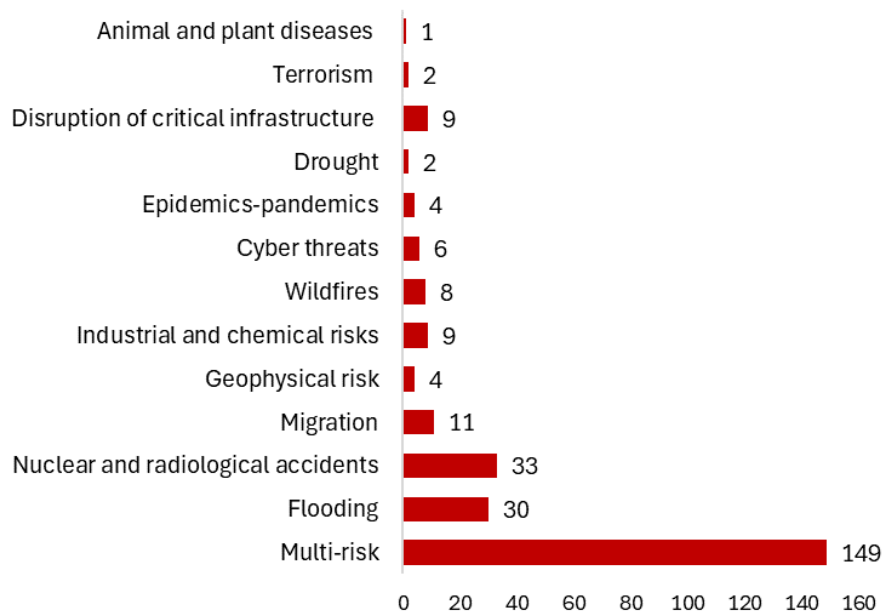
(each at 2; 0.7%), and animal and plant diseases (1; 0.3%). There generally is a direct correlation between the severity of the risks and the availability of agreements.

As a general rule, the multi-risk agreements are on mutual assistance and cooperation in civil protection. One notable example of a multi-risk agreement is the Nordred Framework Agreement, to which is dedicated a case study.

The type of agreement (single-border or multi-border) does not appear to be a variable of the scope of the agreements (single risk or multi-risk) as the distribution is almost the same for the two typologies. The only exception is disruption of critical infrastructure, for which the use of single-border agreements seems to be the most chosen approach.

While it is not possible to conclusively determine the level of cooperation between two countries solely based on the number of bilateral agreements, the lack of specific bilateral agreements indicates the need for a more detailed and specific approach to bilateral cooperation in Disaster Risk Management. At the same time, it has to be taken into consideration that the legal systems of certain countries may not permit the signing of agreements between regions or municipalities hence the need to rely on national level bilateral agreements even if a more tailored, specific, regional approach might be more adapted and suitable. Encouragingly, the abundance of agreements signifies a commitment to tailored frameworks that address specific challenges.

Figure 8 Number of agreements per type of risk (single-border or multiple-borders)



5.1.3. Extreme weather

There are very few extreme weather-related tools that have been identified in the Inventory of tools. One of them is the Planning tool with extreme weather scenarios and Early warning systems: DEMA and the other one - SMHI's consequence-based warning system.

However, the tools developed within Intersucho (mentioned under droughts) are also relevant for extreme weather.

5.1.4. Flooding

There are 28 agreements on flooding in the inventory out of which 12 multi-border and 16 single-border agreements. These agreements regulate, among other things, DRM in common lakes (e.g. Lake Constance); technical maintenance of waterways (e.g. Danube); general water management (e.g. Czechia and Slovakia); and protection against pollution (e.g. Switzerland and Italy).

In addition to the legal framework and governance mechanisms provided by the Floods Directive, there are a number of frameworks and tools which function on a macro-regional and river basin level. Several examples are presented below.

- Coordinated management of the Danube River Basin is also crucial in the light of the increasing frequency of major flood events. It is of particular importance that all aspects of prevention, preparedness and response efforts are covered as part of the systemic and holistic cross-border collaboration.
- The Danube River Protection Convention⁵ forms the overall legal instrument for co-operation on transboundary water management in the Danube River Basin. The Danube Flood Risk Management Plan (2015, 2021)⁶ is one of the key product of ICPDR. In line with the Floods Directive a preliminary flood risk assessment is conducted as well as the preparation of flood risk maps and production of the Plan. Flood risk management plans are prepared by each MS and bilateral commissions are established in case of transboundary water bodies managed by two countries which is often the case.
- Danube Accident Emergency Warning System (AEWS)⁷ for pollution accidents is for the whole basin and focuses on accidents with transboundary effect. The Accident Risk Spots inventory⁸ encompasses operational industrial sites associated with a major risk of accidental pollution, due to the nature of the chemicals being produced, stored or used at the plants, as well as contaminated sites including landfills and dumps in areas liable to flooding. The Accident Prevention and Control Expert Group (APC EG)⁹ develops strategies to prevent or manage accidents. It works with pollution prevention and precautionary controls including inventories of accident risk spots.
- The EU Strategy for the Danube Region (EUSDR) was developed and endorsed by the European Council in 2011. It is a macro-regional strategy aiming to create synergies and coordination between existing policies including with the DRPC through the International Commission for the Protection of the Danube River (ICPDR) and initiatives taking place across the Danube Region.

⁵ <https://www.icpdr.org/about-icpdr/framework/convention>

⁶ <https://www.icpdr.org/tasks-topics/tasks/flood-risk-management/danube-flood-risk-management-plan-2021>

⁷ <https://www.icpdr.org/tasks-topics/tasks/accident-prevention-control/accident-emergency-warning-system#:~:text=The%20Accident%20Emergency%20Warning%20System,certain%20hazardous%20substances%20are%20exceeded.>

⁸ <https://www.icpdr.org/sites/default/files/ARS%20Inventory.pdf>

⁹ <https://www.icpdr.org/about-icpdr/organisation/expert-task-groups/accident-prevention-control-eg#:~:text=The%20Accident%20Prevention%20and%20Control,and%20promoting%20safety%20management%20measures.>

5.1.5. Drought

In terms of governance, there is no concrete obligation for Member States to have drought response plans in place. Some Member States have clear response plans for droughts, while others do not have such plans. Additionally, explicit agreements specifically related to drought are lacking, with only two agreements that could be indirectly related to drought being identified¹⁰.

With regards to tools, there are different national observatories: Alpine Drought Observatory¹¹; Drought Management Centre for South-Eastern Europe (DMCSEE)¹² managed by Slovenia and Czech Globe¹³.

One of the case studies - INTERSUCHO service – is dedicated to droughts. It analyses past and monitors current drought conditions, and explores future trends in the Czech Republic, Slovakia, and Central Europe. The service involves compiling high-resolution drought indicators and gathering original information about drought impacts through a network of voluntary drought impact reporters. These drought reporters assess the effects of drought within their geographic areas and fields of expertise.

This intensive collaboration, along with the exchange of research innovations, has not only improved data quality but has also offered valuable education opportunities for early career researchers. The cross-border dimension of this project is the common sharing of data, tools, methodology, innovation and approach of data collection from the local drought reporters.

The primary outcome of this service is a fully functional drought monitoring system equipped with early warning capabilities for local stakeholders. This service integrates data from models and satellite sensors with reports on drought impacts from farmers and foresters.

The methods and tools employed are replicable in other countries. Additionally, since some of the products are already offered at the European and global scale, and the approach of engaging local drought reporters from agriculture and forestry is user-friendly and easy to implement.

5.1.6. Wildfires

There are six bilateral cross-border agreements on wildfires and two – multi-lateral, six of them being relevant to one border mainly in Southern Europe – Spain, Portugal, France, and Italy.

One of the case studies within the assignment focused on the issue of wildfires in a cross-border context between Spain and Portugal. The National Civil Protection Emergencies Plan of Spain (PLEGEM)¹⁴ and that of Portugal (PNEPC)¹⁵ recognise the transborder dimension of forest fires risk and acknowledge it as a primary cross-border threat shared between the two countries. This recognition not only provides a solid legal foundation to more granular risk assessment on regional and municipal levels and attention to the interconnection of the forest

¹⁰ Agreement between Italy and France for the water supply of the municipality of Menton

¹¹ <https://ado.eurac.edu/md/about-the-project>

¹² <https://www.dmcsee.org/>

¹³ <https://www.czechglobe.cz/en/>

¹⁴ https://www.interior.gob.es/opencms/pdf/archivos-y-documentacion/documentacion-y-publicaciones/publicaciones-descargables/proteccion-civil/PLEGEM_126210029_web.pdf

¹⁵ <http://planos.prociv.pt/Documents/130313331474961281.pdf>

fires risk at the highest levels of national legislation, but also facilitates robust, coordinated, and communicative national monitoring and transnational coordination systems.

This common understanding of high and shared risks in regard to forest fires is also encompassed by a historical agreement between Spain and Portugal from 1992 - protocol between the Kingdom of Spain and the Portuguese Republic in Technical Cooperation and Mutual Assistance in the Matter of Civil Protection, allowing operational teams of both countries to act and intervene in each other's territory within 25 km from the border of each before a formal request of assistance is issued. The Protocol covers, among other aspects, scientific and technical cooperation between both countries; establishes that the competent authorities of both countries may, on a reciprocal basis, request help from the other party in cases of emergency or catastrophe (or in anticipation of these).

The Joint Cross-border Development Strategy between the two countries encompasses various aspects of cross-border collaboration and territorial cohesion, it also establishes significant legislative foundations for even more comprehensive and holistic collaboration concerning civil protection matters, among which, fighting forest fires along the border territories. The strategy not only urges both countries to continue cooperating on forest fires within the framework of existing protocols and through existing national and regional channels but also includes planned actions, such as the necessity to adapt the action protocols of fire and emergency teams on both sides of the border.

Wildfires are an annual reality in many European countries and border regions such as Spain/Portugal, Greece/Bulgaria, etc. If we take the example of the Spain-Portugal border, the focus on forest fires and the importance of robust prevention and preparedness mechanisms are further highlighted by the presence of dedicated competent entities and units in both countries. These entities complement the work and competences of central bodies in matters of civil protection and emergencies, with a strong focus on integrated spatial planning, observation, monitoring, preparedness, and response to in relation to wildfires risk.

Among one of the examples illustrating those competent entities and units in Spain are the National Forest Fire Information Coordination Centre (CCINIF)¹⁶, which serves as the national body responsible for coordinating forest fire-fighting efforts and disseminating vital information related to fire risk, resources, ongoing fires, and preventive measures. This body facilitates collaboration between state and regional administrations, ensuring seamless coordination of state firefighting resources and their mobilisation, emphasising a comprehensive and unified approach to forest fire prevention and combat.

At the local level Portuguese municipalities organise trainings and exercises with their counterparts across the border and do promote their own risk communication and awareness raising campaigns.¹⁷

5.1.7. Geophysical risk

There are four specific agreements that have been identified on geophysical risks (tsunamis and earthquakes) and three of them are multilateral agreements including MoUs. One of the multilateral agreements is on tsunami early warning between Italy, France, Croatia, Malta, Slovenia and others. In the case of Italy and France, it is complemented by a bilateral agreement on tsunami-related scientific collaboration. The second one is on the establishment

¹⁶ https://www.miteco.gob.es/es/biodiversidad/temas/incendios-forestales/coordinacion-institucional.html#centro-de-coordinacion-de-la-informacion-nacional-sobre-incendios-forestales-_ccinif_

¹⁷ Case study on wildfires between Spain and Portugal

of the “Central and East European Earthquake Research Network” (CE3RN or CE3R Network) involving Italy, Austria, Slovenia, Croatia, Romania, Hungary, Czechia, Albania and Bulgaria.

There are 26 tools that have been identified addressing geophysical risks. These include early warning systems, guidelines, information systems, joint exercises, networks, toolboxes, processes, and strategic plans. The tools cover concrete risks such as avalanches, landslides, earthquakes, and tsunamis. The big majority among them have been created within UCPM and/or INTERREG projects.

One of the case studies within the project addresses an excellent example of cross-border cooperation between Italy, Austria, and Slovenia in seismic risk management that could be replicated in other countries. The three countries had the foresight to improve their joint governance capacities in all DRM phases by bringing together both the scientific community and public institutions.

The continuous collaboration between actors involved in DRM at the border area achieved through different projects fostered joint development of know-hows and resources to deal with seismic risk and related impacts at the cross-border level. This initiative also enabled the consolidation of strong collaborative relationships among both the scientific communities and civil protection authorities.

The cross-border projects jointly implemented are aligned with existing EU policy in DRM and address the European Union Disaster Resilience Goals. The projects described significantly improved the transboundary resilience of the North-Eastern Alps by allowing the achievement of concrete results in better joint assessment and cross border management of seismic risk.

5.1.8. Epidemics/pandemic

There are four agreements on epidemics/pandemics out of which three are bilateral and one multilateral involving Romania, Serbia and Montenegro.

The Nordred Framework Agreement is another excellent example of cross-border cooperation in health. It is a Nordic co-operation for civil protection between Norway, Denmark, Sweden, Finland and Iceland. Accidents, crises and events such as forest fires or storms can occur in the border regions, which underlines the need for Nordic cross-border rescue services. The aim of Nordred is to enable borderless rescue services, so that the closest unit can answer to an alert even though it occurs on the other side of the national border.

The agreement obliges countries to adapt their national laws and regulations to remove obstacles to cooperation to the extent possible. Through the framework agreement, all Nordic countries undertake to support the other countries to the extent possible in the event of an accident or an immediate risk of an accident.

Three tools have been identified as being of relevance to this particular type of hazards. Two of them are alert plans between Austria and Bavaria and one is Pandemic - euregional early warning and monitoring dashboard.

Another successful example in Europe comes from one of the case studies developed within the project – The Nordic public health preparedness agreement (Nordhel). Nordhel has been complementary to the existing EU and other Nordic legal frameworks and has been used in cases where emergencies have not been covered by other legal instruments.

Nordhel has been widely recognised as a successful cooperation framework both on a practical and political levels. The agreement entails collaboration between the civil protection and social services which is a very positive example.

The work is mainly conducted within a joint Working Group called Svalbard Group which includes joint exercises, procedures, information, and skills exchange. It has been perceived

as an effective governance mechanism. Governance is innovative as it also incorporates mechanisms for correcting deficiencies such as the conflicts with other agreements and national rules.

There are several additional initiatives which take place within the Nordhel agreement such as the Nordic Mass Burn Casualty Incident Response Plan and the Nordic Mechanism for Sharing Situation Awareness in Health and Social care hence Nordhel is also a good environment for new ideas and efforts.

Overall, Nordhel has brought about a much stronger cross-border cooperation and preparedness level. Nevertheless, it has the potential to develop even further with additional spin-off projects and mechanisms.

5.1.9. Animal and plant diseases

There is one agreement on animal and plant diseases concerning the border between Germany and Austria.

No specific tools for cross-border cooperation have been identified per se but three of the identified tools also have cross-border relevance. The Inventory of tools includes several institutions in the Baltic countries which are in fact national agencies but which have been added as they engage in cross-border cooperation. In addition, there is the Plant Service Pest Monitoring Programme between Latvia, Lithuania and Poland.

5.1.10. Nuclear and radiological accidents

There are 30 agreements on nuclear and radiological risks confirming that the low probability, high impact risks are of particular attention to countries. Four of these agreements are multi-border (South-eastern Europe and the Visegrad countries) and 26 are one-border.

In the Inventory of tools there are 10 entries relevant to this particular hazard. Two of them are working groups in the Nordic countries - NEP (Nordic working group of emergency preparedness) and NKS - The Nordic Nuclear Safety Research (Sub-part of the NEP); three of them are early warning systems, e.g. Early notification of a nuclear accident as well as exchange of information related to nuclear facilities between Greece and Bulgaria and Nuclear Incident Warning System EUCURIE covering all EU Member States and Switzerland. There is also a good example of emergency planning - Radiological emergency planning under the CBSS Expert Group on Nuclear and Radiation Safety (EGNRS) since 1992 in the Baltic countries and an example of joint exercises - Simulation of a technical incident at Cattenom between Germany, France and Luxembourg.

5.1.11. Industrial accidents

There are overall six agreements addressing the risk of industrial accidents. Out of them, one is multilateral and five – one-border. Interestingly, three of these concern Switzerland and address the issue through the prism of water pollution.

5.1.12. Disruption of critical infrastructure

There are nine agreements relevant to disruption of critical infrastructure. Eight out of them relate to a single border. There are several bilateral agreements between Austria and neighbouring countries and between Italy and neighbouring countries. One example of such an agreement is the Agreement (between Italy and France) relating to the organisation of the first aid service rescue and fire-fighting intervention in the Mont Blanc tunnel. For example,

there is an Agreement supplementing the agreement of February 21, 1989, between the Republic of Austria and the Italian Republic on the facilitation of ambulance flights in border regions in the case of urgent transport of the injured or seriously ill.

There are seven entries related to disruption of critical infrastructure. Out of them there are three action plans. Notable examples include the Binational Relief Plan between the Prefecture of Turin and Savoy; and Öresund Bridge Consortium: Contingency plan for the coast-to-coast facilities of the Öresund Link. There are also two working groups, namely the NordBER - Nordic contingency Planning and Crisis Management Forum; and NordBER - Nordic Preparedness Forum.

5.1.13. Terrorism

There are two agreements on defence (including terrorism), one of them bilateral between Czechia and Slovakia while the other is multilateral and concerns the Visegrad countries Czechia, Slovakia, Hungary, and Poland.

There are two terrorism-related tools included in the Inventory of tools and processes, namely the NeBeDeAgPol working group: Euregio Meuse-Rhine - Consortium of police chiefs in the Euroregion to enable trilateral cooperation and also Risk assessment model by the Danish Security and Intelligence Service (published in 2019-2020) which is a national tool but of strong cross-border relevance.

5.1.14. Cyber threats

Six agreements directly or indirectly relevant to cyber threats have been identified in the inventory of agreements out of which four are one-border and two are multilateral agreements. It is interesting to note that Austria is a part in four of them. Most of the agreements address the issue of multiple protection of classified information and their relevance to borders is not direct and territorial.

Four items have been included in the Inventory of processes, institution and tools. Three of them are networks, namely Cyber Crisis Liaison Organisation Network (CyCLONe), GovCERT communication network and NIS Directive collaboration: European CSIRT (Computer Incident Response Team) network. All three of them are multi-border and while the first and the third cover all Member States, the second is only for the Northern countries. The Estonian Cybersecurity Strategy is also a part of the inventory as it foresees cross-border cooperation.

5.1.15. Migration

There are 14 agreements directly or indirectly relevant to migration. Nine out of them are bilateral and four – multilateral. In most cases, these are agreements on cooperation around crossing points, exchange of data on asylum matters, police units, etc. In the Inventory of tools, processes, and institutions there are three entries related to migration, two of them being Frontex joint operations and Operation Mare Nostrum - naval and air operation for refugee rescue between Malta and Italy.

5.1.16. Maritime

There are eight agreements directly or indirectly relevant to the maritime borders included in the study. Five of the agreements are on general multi-risk cooperation in civil protection; one is on migration matters and the last one is on industrial spills.

5.1.17. European regions

In this sub-section we will demonstrate the benefits of European regions as a motor for cross-border cooperation in DRM by looking at the example of the Euregio Meuse-Rhine. Euregio Meuse-Rhine encompasses the border triangle of Germany, Belgium, and the Netherlands and has a long tradition of cross-border municipal cooperation.

With regards to regional cooperation and preparedness for disasters, several support agreements have been signed between municipalities. For example, the City of Aachen and the Municipality of Vaals have a support agreement in place to ensure mutual aid in firefighting and rescue services.¹⁸ Another example is the bilateral assistance agreement between the provinces of Dutch Limburg and Belgian Limburg.

However, such agreements are necessary but not sufficient as the three countries have different methods, systems, and laws governing emergency services. It was decided that a platform for coordination and development of further cooperation would be needed. With the founding of EMRIC, which stands for Euregio Meuse-Rhine Incident Response and Crisis Management, such a platform was created in 2005. EMRIC brings together various government departments and services from the three countries.

5.2. Inventory of institutions, processes and tools

5.2.1. Structure of the Inventory of Institutions, Processes and Tools

The Inventory of Institutions, Processes and Tools is presented in the second tab of a separate Excel file.

It includes the following data: Name and a hyperlink (if available); Type; Border; DRM phase; Indication if it is a single- or multiple-border; Types of risks covered.

5.2.2. Analysis

The Inventory of Institutions, Processes and Tools includes **339 entries**.

Moreover, there are joint exercises (19), training, action plans (15), joint planning (9) and joint protocols (3). There are individual examples of an atlas, an observatory, a management plan and a protocol. It has to be kept in mind that some of the entries could be classified in more than one way.

¹⁸ Vereinbarung zwischen der Stadt Aachen und der Gemeinde Vaals über gegenseitige Hilfeleistung bei der Brandbekämpfung und Rettungsdienst' from 1994, available at https://aachen.de/de/stadt_buerger/politik_verwaltung/feuerwehr/downloads/vereinbarungen/Vaals.pdf.

Figure 9 Institutions, processes and tools per type

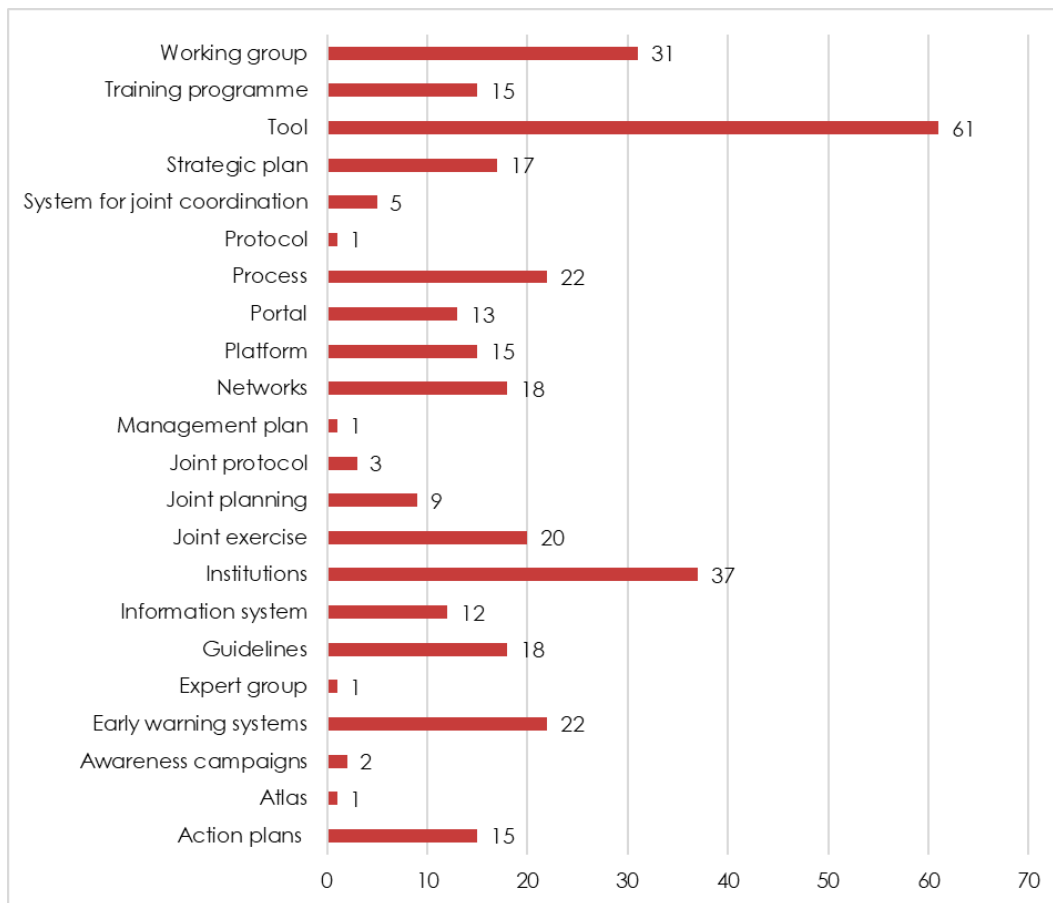
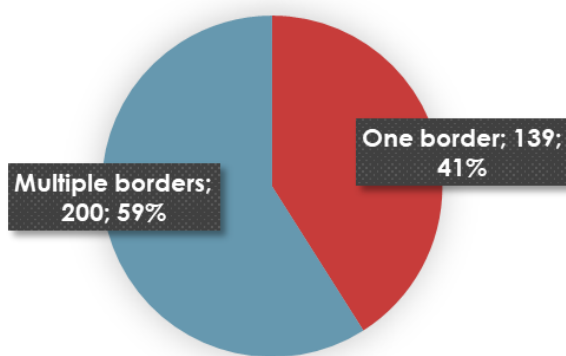


Figure 10 Distribution of tools, processes, and institutions per single border or multiple borders



As regards the **distribution of tools, processes and institutions on single borders or multiple ones**, displayed in the figure on the left, there is a clear prevalence of agreement covering multiple borders (200; 59%).

One of the reasons for this distribution is the fact that many of the entries originate from EU-funded projects (INTERREG, UCPM, etc.) and these include more than two countries, hence the respective deliverables

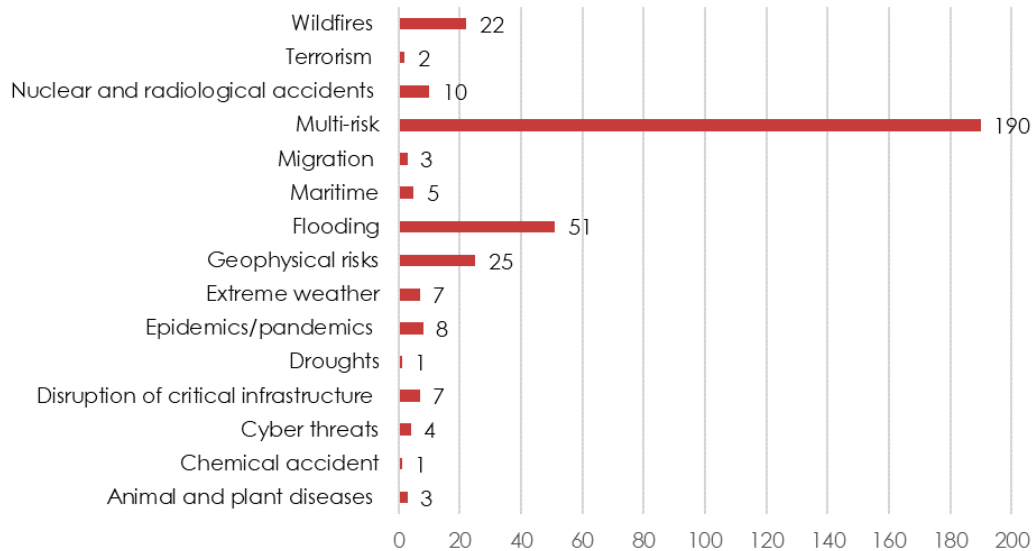
are applicable for all countries involved.

In terms of **type of risks addressed** by the set of institutions, processes and tools, the majority has a multi-risk scope (190; 56%), followed by Flooding (51; 15%), Geophysical risks (25; 7%; Wildfires (22; 6%); and Nuclear and radiological risk (10; 3%). This shows a pattern of cross-border cooperation to develop solutions on the types of hazards traditionally perceived as the most relevant in the concerned territories.

Less entries have been found for Epidemics/pandemics, Extreme weather, Disruption of physical infrastructure, and very few for Cyber threats, Mass migration, Animal and plant diseases, Chemical accidents, and Drought. This seems to be explained by the relatively lower perceived severity or exposure to the said risks in the past, although it seems likely that there

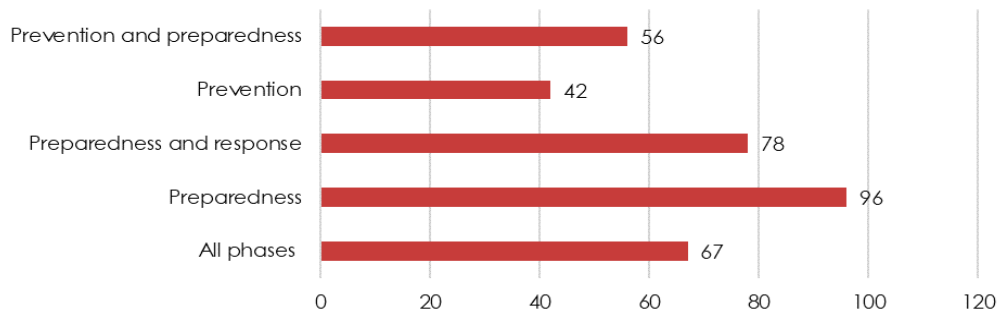
will be an intensification of cross-border cooperation in addressing some of those risks (e.g. migration, extreme weather, epidemics/pandemics and animal and plant diseases, as well as drought, given the higher priority they have progressively achieved in the EU, national, and regional agenda.

Figure 11 Institutions, processes and tools per risk



The analysis of the entries from the point of view of their **focus on the DRM phase** shows that nearly one-third of the tools cover the phase of 'preparedness' (96; 28%), followed by "preparedness and response" (78; 23%), 'all phases' of the DRM cycle (67; 20%); "prevention and preparedness" (56; 17%), and prevention (42; 12%). It has to be noted that many of the entries can be classified in more than one way.

Figure 12 Instruments by DRM phase



6. EU-level platforms, mechanisms and databases for DRM

This chapter illustrates the part of the study dedicated to the development of an Inventory of EU-level platforms, mechanisms, databases.

6.1. Structure of the Inventory of EU-level platforms, mechanisms, databases

The inventory of EU-level platforms, mechanisms, databases is presented **in the second tab of a separate Excel file named Inventory of EU and global policies, platforms, institutions and initiatives**. The worksheet contains a number of elements and features of the entry, namely:

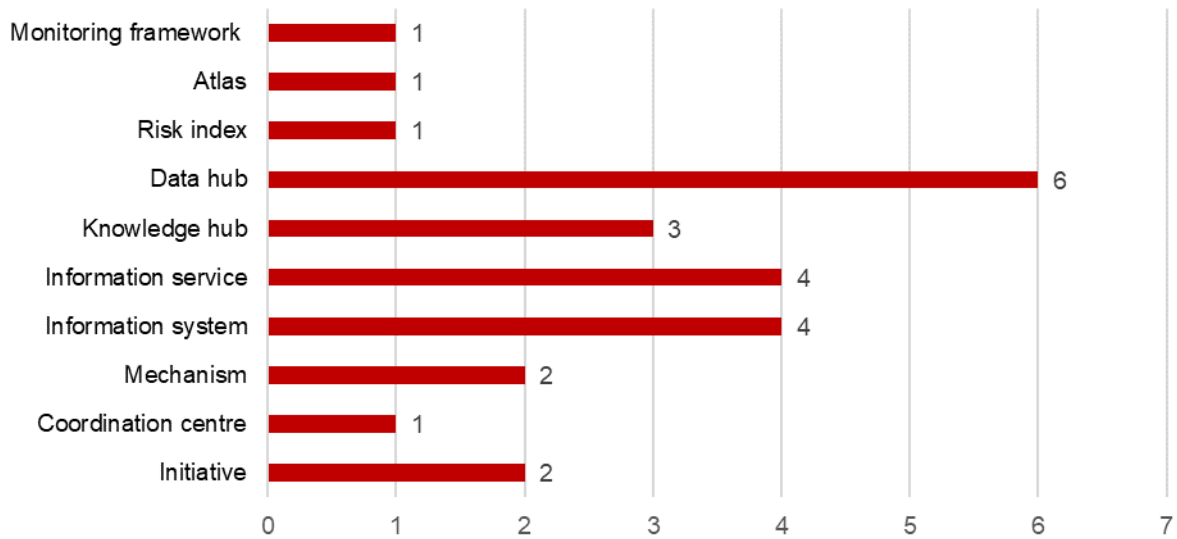
- Name;
- Brief description;
- Type (atlas, coordination centre, data hub, information system, information service, initiative, knowledge hub, mechanism, monitoring framework and a risk index);
- Relevant risks;
- Borders concerned;
- Information of relevance to cross-border cooperation on DRM;
- Relevant tools;
- Link to the instrument.

6.2. Analysis

25 information systems, platforms, initiatives, data hubs have been identified during the study which play an important role in providing the information and data for DRM including in a cross-border context.

The figure in the next page summarises the most relevant information for each of them, including a growing importance of Information and Communication Technologies solutions in disaster risk management (data and knowledge hubs, information systems or services, etc), as confirmed by the numerous tools and platforms identified throughout the study.

Figure 13 Number of mechanisms, platforms, initiatives, databases by type



6.3. Additional Inventory of illustrative projects

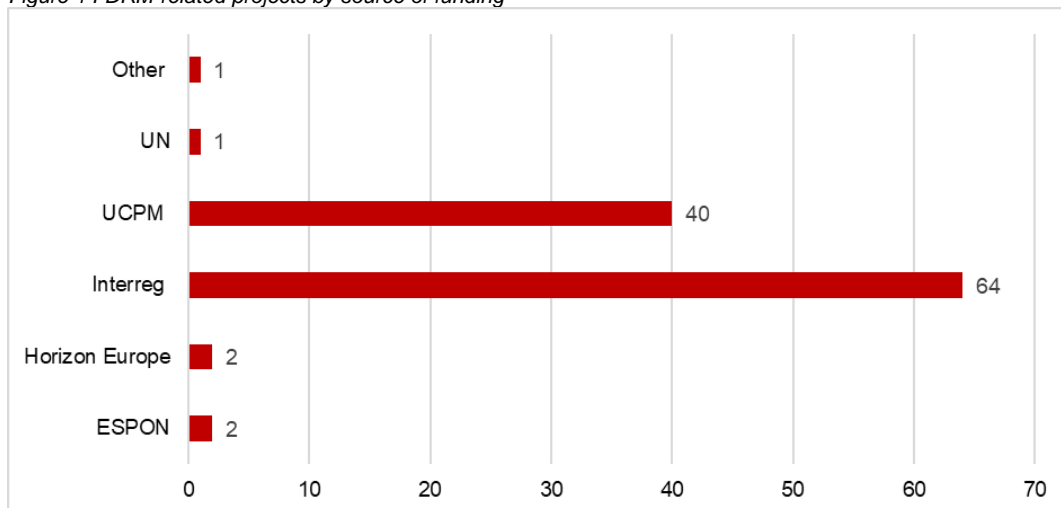
An inventory of relevant illustrative projects has been developed as an additional source to inform all other inventories, especially the Inventory of institutions, processes and tools and the Inventory of platforms, mechanisms and databases. Moreover, projects could also be interpreted as tools, hence it had been included in the overall inventory of agreements, institutions, processes, tools.

The **Inventory of projects** is available in the last tab of the **Inventory of agreements, institutions, processes and tools**. The inventory is organised according to the following fields: Name; Funding source; Border(s); DRM phase; and Hyperlink.

6.3.1. Analysis

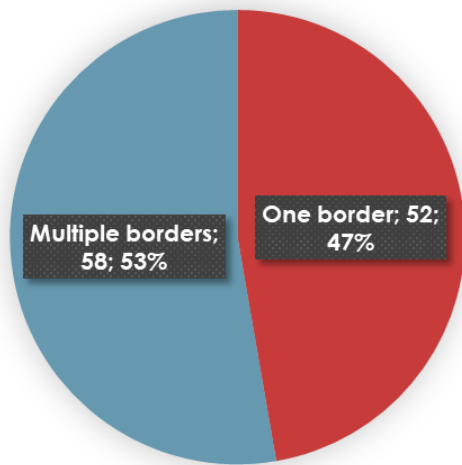
This inventory includes **110 relevant projects**, most of which funded by INTERREG programmes or by the UCPM.

Figure 14 DRM-related projects by source of funding



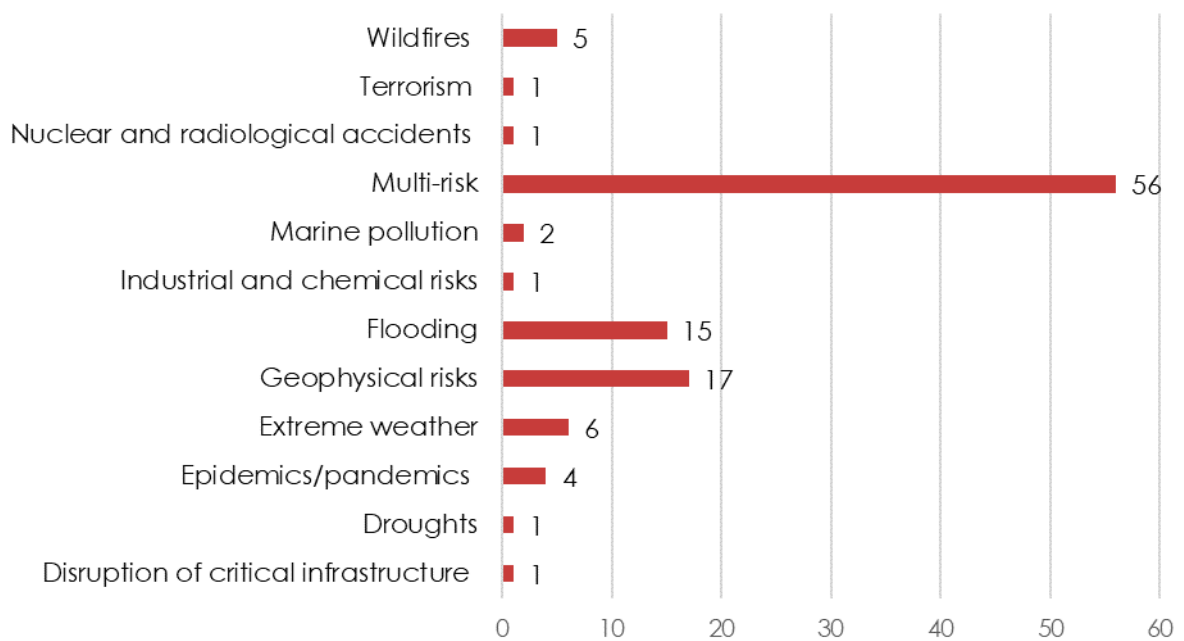
52 of the projects are bilateral and cover one border while the rest (58) cover multiple borders.

Figure 15 Project border coverage



The next figure shows that half of the projects (56) are multi-risk, followed by projects addressing geophysical risks (17) and flooding (15). There are very few projects focusing on other hazards such as terrorism, industrial and chemical risks, nuclear and radiological accidents, marine pollution, industrial and chemical risks, drought, or disruption of critical infrastructure.

Figure 16 Project distribution by risk



7. Case studies

This Chapter presents the part of the study dedicated to the identification, selection and structuring of case studies showcasing inspiring and replicable examples of cross-border cooperation practices, tools and processes.

The ten case studies are available as separate deliverables. A synthesis of the main findings resulting from the deliverables follows in the next section.

7.1. Main findings from the ten case studies

Fighting forest fires along the Spain/Portugal border

- Spain and Portugal demonstrate an exemplary, replicable case of cross-border collaboration in managing wildfire risk from national to regional frameworks, agreements and practices.
- Designated competent authorities and entities in forest fire prevention and preparedness in both countries strengthen the individual and collective efforts, from corrective measures to appropriate trainings and collaboration between state and regional administrations.
- The distinct legal and governance approaches of these two EU Member States, though presenting numerous challenges, demonstrate a unique chance for collaborative innovation, with the potential to develop state-of-the-art protocols and complementary data collection methods.
- Strong collaboration in civil protection matters via INTERREG POCTEP programme, albeit subject to time and budget-bound projects, has been pivotal in building the practices and frameworks in prevention, preparedness and response to forest fires along the Spain/Portugal border. Nevertheless, diversifying funding sources will be needed for long-term sustainability.
- Among the areas for improvement lie strengthened forest management practices, up-to-date revisions, and studies that would quantify transborder risks with current scientific evidence, as well as increased awareness among society, politicians, and stakeholders.

EMRIC - Euregio Maas-Rhine Incident Response and Crisis Management

- EMRIC is a good example of international cooperation at the local level by aligning methods and regulations of disaster management and emergency response.
- The EMRIC office coordinates the collaboration within the network. There are thematic focus groups developing solutions to enhance the cooperation in case of emergency. The results flow into the respective planning processes of the network partners for cross-border cooperation. Furthermore, the member organisations have also access to a shared pool of equipment in case of emergency.

- The collaboration is not limited to the focus groups or the stakeholders. The International Knowledge and Information Centre is a project that brings together universities, research institutes and education institutes for education of rescue personnel and for research activities. Through spin-off projects such as PANDEMERIC and Marhetak, threats such as epidemics and floods, for which the region was previously unprepared, are being given greater attention.
- The challenges lie in particular in the semi-formal structure which relies heavily on personal relationships, informal arrangements and established relationships. The existing trusted connections need to be continued by successors. However, today it is difficult to find young experts for the rescue service and civil protection. In addition, there are operational constraints due to legal restrictions. As agreements are mainly made at a local level, the national laws of three countries must be taken into account, which means, for example, restrictions on the cross-border use of drones.

Flood management in the Danube Basin

- International agreements for better water and river management have been a powerful tool for change in the Danube River Basin.
- The transboundary aspects of flood risk management between the neighbouring countries are covered by the bilateral agreements and are dealt with on a regular basis by the bilateral commissions.
- The territorial cooperation projects contributed to strengthening the cooperation on all elements of flood protection, prevention and mitigation for transboundary or bordering rivers.
- Progress was made in international exchange of meteorological and hydrological data, harmonisation of the flood alert and warning systems in transboundary basins with the neighbouring countries as well as preparation of joint procedures in relation to communication in case of emergency, intervention, monitoring and notification, border crossing procedure, etc.
- Countries accumulated experience in applying nature-based solutions in transboundary areas by improving the natural capacity to retain and release peak floods.
- Despite the achievements in the past decades there are several areas in bilateral disaster risk management where improvements can still be made. These include developing a flood-defence related data exchange system; improving coordination through further progressing with the development of joint plans and procedures; identifying pilot areas for the coordinated action; and building cross-border volunteer capacity.

Digital tools and communication systems for DRM

- Solution 1: Nordic cooperation in communication
 - Collaborative efforts among Norway, Finland, and Sweden in establishing cross-border emergency communication networks, facilitated by TETRA technology, and supported by the Haga Cooperation, have proven essential for addressing emergencies in the northern regions of Europe. Interconnected systems, including Nødnett, VIRVE, and Rakel, enable efficient collaboration and information sharing, fostering coordinated response to crises.
 - Ongoing migration from TETRA to 4G and 5G technologies, though challenging, reflects a commitment to advancing mission-critical communication capabilities, with careful planning needed to maintain cross-border functionality during the transition.
 - Success factors, such as committed partnerships, high visibility, adequate funding, and continuous end-user engagement, underscore the importance of governmental commitment and collaboration.
- Solution 2: INSECTRISK
 - The INSECTRISK project is a standout example of effective cross-border collaboration, utilising technology, robust partnerships, and a shared commitment to tackle environmental and health challenges. The project was initiated to meet the urgent need for coordinated action to addresses challenges related to insect proliferation, especially mosquitoes and ticks.
 - The project's success is attributed to its innovative approach, featuring the Joint Geographic Information System (BuGIS), an online WebGIS product. This technology played a crucial role in real-time monitoring, treatment planning, and data sharing among 72 municipalities.
 - Encountered challenges, such as political instability, the COVID-19 situation, and regional disparities, provide valuable lessons for future initiatives. The broad geographical scope and imbalanced user distribution emphasize the importance of strategic focus and even engagement.
- Solution 3: AdriaMORE
 - Bringing together partners from Croatia and Italy, the project successfully addressed critical objectives, reinforcing monitoring systems, integrating maritime environmental data, improving risk forecasting, and assessing the impact of coastal floods.
 - The project marked a pioneering step in civil protection applications by innovatively integrating a hydro-meteo-marine forecast system into the existing ICT framework.
 - The only challenge that the project faced were procurement and administrative issues that were resolved. AdriaMORE benefited from a smooth project implementation, capitalising on the major achievements and expertise gained through the ADRIARadNet and the CapRadNet projects.

Nordred framework agreement

- The Nordred Framework Agreement is a Nordic co-operation for civil protection between Norway, Denmark, Sweden, Finland and Iceland. Accidents, crises and events such as forest fires or storms can occur in the border regions, which underlines the need for Nordic cross-border rescue services. The aim of Nordred is to enable borderless rescue services, so that the closest unit can answer to an alert even though it occurs on the other side of the national border.
- The agreement obliges countries to adapt their national laws and regulations to remove obstacles to cooperation to the extent possible. Through the framework agreement, all Nordic countries undertake to support the other countries to the extent possible in the event of an accident or an immediate risk of an accident.
- On a national level, the Nordred agreement has varied over time depending on whether it is high or low on the member states agenda, and the financial situation with no allocated budget are two challenges the agreement still faces. However, on a local level, the agreements based on Nordred are still in use and active. One example of this is the Border Rescue Councils that aim to support co-operation across borders. There are three Border Rescue councils between Norway and Sweden where equipment and personnel can be jointly utilised, thereby increasing the ability to deal with serious disruptions. In addition, there are several municipal- or regional cross-border agreements between the countries that are also based on Nordred.
- The Nordred agreement allows local (regional/municipal) civil protection authorities to make agreements across territorial borders on preparedness for participation in a rescue operation in the neighbouring region. Today, Nordic co-operation is an integral part of everyday work in many border regions in the field of rescue services, Nordred serves as an overall regulatory framework that facilitates and frames cross-border co-operation.
- Parts of these regions in the Nordics are regions with limited resources and large distances, where building capacity through cooperation is a solution. The benefit of cross-border co-operation is that regions with few resources and large distances can become strong through co-operation. An overarching aim of the agreements is the joint and efficient use of personnel, equipment, and other resources, as a measure to be prepared to handle emergencies and crises. Despite some linguistic challenges, different organisational responsibilities and legal factors are still present.
- Important actions for cross-border cooperation are exchange of information, knowledge and experience and participation in joint exercises, both on a somewhat regular basis. By this, it is possible to raise problems in the border regions and find common solutions. It is perceived as important to be familiar with the regulations and laws on both sides of the border, to have maps that cross the border and a joint alert system.
- The Nordred framework agreement enables rescue operations in a cross-border context, thus focusing on cooperation on operational issues and increasing the capability to respond to events. Yet it also covers the capability of cooperation on planning, preventive and preparedness measures.

Nordic public health preparedness and emergency agreement (Nordhel)

- The Nordic public health preparedness agreement (Nordhel) has been complementary to the existing EU and other Nordic legal frameworks and has been used in cases where emergencies have not been covered by other legal instruments.
- Nordhel has been widely recognised as a successful cooperation framework both on a practical and political levels. The agreement entails collaboration between the civil protection and social services which is a very positive example.
- The work is mainly conducted within a joint Working Group called Svalbard Group which includes joint exercises, procedures, information, and skills exchange. It has been perceived as an effective governance mechanism. Governance is innovative as it also incorporates mechanisms for correcting deficiencies such as the conflicts with other agreements and national rules.
- The Strategy of the Svalbard Group is revised every five years hence it is a flexible mechanism for guiding Nordhel's implementation which is also capable of adapting to evolving context and circumstances.
- There are several additional initiatives which take place within the Nordhel agreement such as the Nordic Mass Burn Casualty Incident Response Plan and the Nordic Mechanism for Sharing Situation Awareness in Health and Social care hence Nordhel is also a good environment for new ideas and efforts.
- Overall, Nordhel has brought about a much stronger cross-border cooperation and preparedness level. Nevertheless, it has the potential to develop even further with additional spin-off projects and mechanisms.
- The agreement is an excellent example of a cooperation framework and is highly replicable in other European border territories.

Cross-border cooperation on seismic risk management between Italy, Austria and Slovenia

- The cross-border cooperation among Italy, Austria, and Slovenia in seismic risk management has become a successful reality that is constantly growing and improving and could be replicated in other countries.
- The three Countries have been able to jointly take advantage of different international funding sources offered by the EC to implement common measures and to ensure their continuity over time. They also had the foresight to improve their joint governance capacities in all DRMC phases by bringing together both the scientific community and public institutions.
- The continuous collaboration between actors involved in DRM at the border area achieved through different projects fostered joint development of know-hows and resources to deal with seismic risk and related impacts at the cross-border level. This initiative also enabled the consolidation of strong collaborative relationships among both the scientific communities and civil protection authorities.
- The cross-border projects jointly implemented are aligned with existing EU policy in DRM and address the European Union Disaster Resilience Goals.

- The projects described significantly improved the transboundary resilience of the North-Eastern Alps by allowing the achievement of concrete results in better joint assessment and cross border management of seismic risk.

Mont Cenis Dam: Disaster Risk Management between Italy and France

- Dams in cross-border mountain regions play a crucial economic and social role, supplying drinking water, facilitating irrigation, generating hydroelectric power, and producing artificial snow. These infrastructures require constant monitoring because of the risk of breakage.
- The RESBA project stresses that to create communities capable of withstanding crises, it is essential to provide citizens with information, gather their opinions and actively engage them in effective communication. This is why it is important to raise awareness of risks by improving the means of communication and information aimed at the population, while putting in place specific emergency information measures. In this context, the active participation of local communities is the key to effective prevention and management of emergency situations.
- Despite the different legal frameworks for dam management, the RESBA project provided an opportunity to bring the civil and political authorities closer together in the practical management of risk and the implementation of a bi-national emergency plan. In a common territory, with similar problems, cross-border territorial cooperation projects are an important way of bringing together the technical and scientific experience of the various partners.
- dams are subject to specific risks that require correct design, a careful assessment of vulnerability to hydrogeological (landslides and flooding) and the seismicity of the areas in which they are located and require constant monitoring.

Intersucho: Joint Drought Management between Czechia and Slovakia

- The INTERSUCHO service analyses past and monitors current drought conditions, and explores future trends in the Czech Republic, Slovakia, and Central Europe. The service involves compiling high-resolution drought indicators and gathering original information about drought impacts through a network of voluntary drought impact reporters. These drought reporters assess the effects of drought within their geographic areas and fields of expertise.
- The primary research is conducted at the Institute of Global Change Research of the Academy of Sciences of the Czech Republic (CzechGlobe), Mendel University in Brno, and Masaryk University. Collaboration extends to include the Czech Hydro-Meteorology Institute (CHMU), Slovak Hydro-Meteorology Institute (SHMU), Slovak Academy of Science (SAV), and agrometeorologists at the Doksany observatory.
- This intensive collaboration, along with the exchange of research innovations, has not only improved data quality but has also offered valuable education opportunities for early career researchers. The cross-border dimension of this project is the

common sharing of data, tools, methodology, innovation and approach of data collection from the local drought reporters.

- The primary outcome of this service is a fully functional drought monitoring system equipped with early warning capabilities for local stakeholders. This service integrates data from models and satellite sensors with reports on drought impacts from farmers and foresters.
- The methods and tools employed are replicable in other countries. Additionally, since some of the products are already offered at the European and global scale, and the approach of engaging local drought reporters from agriculture and forestry is user-friendly and easily implementable.

Disaster Risk Management in Central Baltic Maritime Border

- Recent studies have shown that the countries around the Baltic Sea will be facing increased risk of natural disasters in the coming decade, linked to the effects of climate change. The impacts of climate change on the region in the past several years have become increasingly visible and forecasted to be an increasingly major source of maritime risks.
- In response, countries are starting to re-evaluate their DRM strategies to account for the effects of climate change. These efforts are supported by regional stakeholders taking steps towards building DRM capacity. Notably these include the INTERREG Central Baltic Programme, the Council of the Baltic Sea States (CBSS) and the Baltic Marine Environment Protection Commission (HELCOM).
- Cross-sectoral collaboration continues to need strengthening to deepen the available knowledge base in terms of how, why risks emerge to support DRM experts in their activities. These international bodies have launched different actions aimed at creating common approaches to regional DRM.
- Importantly, many recent activities target networking as a capacity building tool. These networking actions must target the right people and ensure that societal value is created through their implementation. Capacity building actions for DRM must recognise the level of support needed for their target groups to engage in DRM activities. Projects designed to strengthen DRM capacity should not be viewed as “off-the-shelf” solutions; rather, careful consideration must be placed on the beneficiaries needs and capacity to engage in DRM. Only then can meaningful impacts be achieved.

8. Gap analysis of EU, national and local legal frameworks

This chapter provides the gap analysis and resulting findings of the study bringing together the complementary work carried out for the creation of the inventories, the valuable insights collected through consultation activities and the depth provided in the research undertaken for the case studies.

8.1. Gap analysis of European legal framework, of European disaster prevention, preparedness and response mechanisms, and of their adequacy for cross-border territories

This section addresses the following research questions trying to find areas for improvement and recommendations:

Key Research Question 1: 'Is the European legal framework sufficiently addressing the particularities of border areas? If not, why and what could be changed?', and

Key Research Question 4: 'Are the disaster prevention, preparedness and response mechanisms put in place at European level adequate for cross-border territories?'

8.1.1. European legal framework and border areas

Overall, the UCPM is an efficient and effective mechanism for cooperation and solidarity. Stakeholders suggested some aspects for attention concerning border areas. Several suggestions and recommendations have been compiled and grouped by topics. Whenever a recommendation originates from a representative of an institution or a Member State, these have been included in brackets.

Disclaimer

- Some of the perceptions below may not be factually correct but the authors find it noteworthy to include them in the analysis. In the event of inaccuracies, these statements serve to illustrate stakeholders' perception of the EU legal framework.

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8.1.2. Overall framework and strategic vision

Suggestions from EC representatives

Some EC representatives emphasised the need to clarify the strategic vision of the UCPM. The key objectives and focus areas for the near future should be determined in agreement with the Member and Participating States. This reflects the multitude of emerging risks necessitating a coordinated response across Europe.

While the UCPM has increasingly emphasised prevention and preparedness in recent years, there is still potential to further strengthening these aspects, including by further exploring the cross-border dimension within prevention and preparedness.

This could be enabled by a more holistic approach to the various phases of the Disaster Risk Management Cycle, avoiding excessive fragmentation and siloed approaches. The implementation of Disaster Risk Governance structures could facilitate a more integrated approach and, consequently, enhance disaster resilience at both the European and national levels.

Additionally, it was noted that certain methodologies and procedures, especially in the prevention and preparedness domain, could benefit from further development to ensure coherence among UCPM countries. In particular, it would be beneficial to enhance specific methodologies for Member States to implement more comparable and consistent National Risk Assessments, which would result in the drafting of consistent risk assessments in cross-border areas.

During the interviews, it was pointed out that the Union Civil Protection Knowledge Network (UCPKN) would also benefit from a clearer long-term strategic vision for future developments. Some countries' representatives believe that the effectiveness of UCPKN could be enhanced through a clearer definition of its mandate and the methods for implementing its goals. The authors of this report believe that UCPKN is a valuable platform for discussing improvements in cross-border disaster risk management, involving experts from various countries and sectors, including civil protection, research, academia, the private sector, and civil society organisations.

Additionally, the UCPKN could play a pivotal role in facilitating the consolidation of outcomes from various European projects focused on DRM. Many successful projects have been implemented within and beyond the UCPM framework. The UCPKN platform presents an excellent opportunity to share lessons learned, examples, and tools.

With regards to the response phase, an EC representative emphasised that multi-lateral/bilateral agreements, along with the UCPM, operate in a complementary manner. These agreements and the Mechanism are activated by Countries based on the current (evolving) situation and needs. It is essential for UCPM countries to understand this concept to ensure an effective and timely disaster response, while avoiding overreliance on the UCPM, particularly in the case of cross-border events.

Suggestions from national experts

National experts stressed that efforts to improve the coordination among countries made within the UCPM proved successful over the last years (Bulgaria). Nevertheless, in a pursuit of continuous improvement, there is a need to explore new avenues for dialogues and information exchange, especially among cross-border regions, as recommended by the Nordic Prime Ministers. This will assist in the development of consistent scenarios and the implementation of joint DRM capabilities to address future risks.

It was also suggested (France) that the establishment of regional disaster risk management centres could assist neighbouring countries in enhancing their cross-border collaboration and cooperation throughout the various phases of the disaster risk management cycle. Considering the increasing complexity of the disaster risk landscape, marked by robust interconnections across sectors and cross-border ramifications, such centres may facilitate trust-building among neighbouring countries confronting similar challenges in DRM. The same national expert suggested that the EC play a role in promoting the creation of shared alert systems along the EU borders. Furthermore, neighbouring countries should collaborate in the development of joint risk awareness campaigns.

8.1.3. Common risk assessments and DRM capability assessments

Suggestions from EC representatives

Article 6 of Decision 1313/2013 requires UCPM countries to develop risk assessment at the national (or sub-national level, where appropriate) and send to the EC the most relevant elements every 3 years (December 2023 being the last deadline). However, aside from providing general guidelines, there are no or very little explicit technical requirements for the development of such assessments. Consequently, national risk assessments exhibit heterogeneity and are challenging to compare. At the same time, it has to be noted that these DRM reports are only summary of key risks and priority measures at MS level. Risk assessment can and should be more elaborate in Member States.

More specific requirements from the EC could help achieve a more homogenous approach and consistent assessments. It is worth mentioning that the EC Joint Research Centre (JRC) has published a series of reports on “Recommendations for National Risk Assessment in DRM in EU” that have provided scientific advice to countries on this topic.

However, especially concerning the cross-border dimension, more comprehensive guidance (and even a concrete tool) on how to develop risk assessment in transnational territories would be highly beneficial for facilitating joint risk assessments. According to some EC representatives, there is currently a shortage of standardised risk assessments along borders, with only few exceptions, which hampers the development of shared DRM capabilities in transnational territories. Consequently, the EU should encourage the process of developing common risk assessments by improving data and information exchange and fostering collaboration with scientific institutions.

Additionally, the EC emphasised the importance of addressing low probability-high impact events (HILP) within risk assessment processes, especially in cross-border territories, where it is likely that all the neighbouring countries will need to take coordinated preparedness and response actions.

Suggestions from national experts

National experts expressed their appreciation for the inclusion of Art. 6 of Decision 1313/2013, noting that without this requirement from the EC many countries may not have developed a national risk assessment. The experts maintain that conducting regular risk assessments and analyses of disaster scenarios at national and, where appropriate, subnational level, is critical for identifying prevention and preparedness measures to enhance resilience. They also stressed the importance of addressing cross-border risks in a coordinated manner, considering cascading effects in order to enhance cross-border capabilities to assess and manage risks, as noted by France.

The experts recognise the necessity for additional enhancement of the EU’s collective ability to respond to disasters with transboundary effects. They believe that the UCPM can contribute to this effort by providing a framework for conducting common capabilities assessment in cross-border areas, which they perceive as potentially highly beneficial.

It has been concluded that regular conduct of disaster risk management capability assessments is essential for enhancing resilience at both the national and European level and for effectively adapting to the continuously evolving risk landscape.

8.1.4. Other recommendations

Build on historical cooperation

Also, in some areas, in flooding or responding to disasters in international waters, as an example, there is strict regulation already in place, national risk analysis and action plans can fill in possible gaps. An EC representative shared that the Maritime Incident Response Group (MIRG-EX) exercise demonstrated that local, historical cross-border maritime protection and response structures (FR, BE, NL, UK) are strong and efficient.

Consequently, it is suggested that the European Commission should leverage and reinforce these existing structures and relationships as a means for further enhancing the local and regional preparedness and response.

Optimising the use of the European Grouping of Territorial Cooperation (EGTC)

There is a perception that cross-border regions in Europe are not fully inclined to adopt the European Grouping of Territorial Cooperation mechanism extensively. The European Commission should consider exploring the reasons for the limited uptake of EGTC and devise incentives to encourage its application in DRM. For instance, it is essential to forge closer collaboration with the national authorities responsible for implementation. By collaborating with the EGTC Platform¹⁹ hosted by the Committee of the Regions, the Commission can actively promote their use throughout the EU²⁰.

In addition to the above recommendations which are targeted mainly at the European level, a number of UCPM-related recommendations to Member States stem from the Commission recommendations²¹ and the Communication 'European Union Disaster Resilience Goals'²², namely those presented below.

Recommendations for Member States stemming from the Union Disaster Resilience Goals

- MS are to take the Union disaster resilience goals and the risks related to disasters which cause or can cause **multi-country transboundary effects** into account when they further develop and refine disaster risk management planning at national or appropriate subnational level, including as regards cross-border cooperation.
- The Union's overview of disaster risks should build on national, sub-national and **cross-border risk assessments**.
- Member States should further improve the assessment of risk as appropriate at national and sub-national levels and for **cross-border risk**. Member States should include a review of emerging risks and an assessment of cross-border risks, the impacts of climate change and cascading effects. National, sub-national and **cross-border risk assessments** in the area of civil protection should build on and support risk assessments conducted in related policy areas.

¹⁹ <https://cor.europa.eu/en/our-work/Pages/eqtc.aspx>

²⁰ EC Communication EU Border Regions: Living labs of European integration.

²¹ Commission Recommendation of 8 February 2023 on Union disaster resilience goals 2023/C 56/01

²² COM/2023/61 final

- The strategies, frameworks or plans should be based on relevant scenarios, cross-border and cross-sectoral cooperation and should ensure adaptation, prevention and preparedness.
- MS should further develop risk management plans for **cross-border risks** on the basis of improved cooperation in **cross-border areas**.
- MS should increase the overall risk awareness in cross-border areas.
- MS should ensure public access to disaster risk information in border areas including through common platforms, etc.
- MS should cooperate, as appropriate, with local and regional authorities, partners, including the private sector and civil society organisations, also in a cross-border context.
- MS should improve their capacity to forecast, detect and monitor hazards and impacts, including through better coordination for transboundary and cross-border risks and better integration and interoperability of systems.
- Public warning in MS should be based on enhanced arrangements for warning in transboundary and cross-border disasters. To this end, ERCC and MS should ensure cross-sectoral and cross-border cooperation and foster partnerships with partners such as the private sector, civil society and volunteer organisations.
- MS should adapt their business continuity planning to cross-sectoral transboundary disasters. They should also enhance cross-border cooperation and interoperability of procedures, systems and tools to allow efficient and effective information exchange, facilitate operational decision-support and Host Nation Support.

8.1.5. European disaster prevention, preparedness and response mechanisms and their adequacy for cross-border territories. Possible actions.

With regards to complementing the different national perspectives on DRM and strengthening the EU-wide resilience, the European Commission could further work on developing regional risk assessments, methodologies and tools, risk management and response plans, and regional preparedness exercises on which to strengthen the Emergency Response Coordination Centre and contribute to the implementation of the Sendai framework for DRR.

Financial resources and support

The analysis of the inventories of bilateral agreements and cooperation tools as well as the expert consultation on EU and national level lead to the conclusion that funding all types of cross-border projects need to be increased. Full Union financial assistance should be provided for strengthening capacities which are required to respond to low probability risks with a high impact that might result in significant cross-border impacts and for which preparedness levels in the Union are not considered adequate based on capacity gap analyses undertaken by national civil protection authorities and the Commission.

At the same time, it has to be taken into consideration that national and local capacities to respond to and to absorb EU funding are limited at any given time. Therefore, trying to coordinate the timing of calls addressing the same target groups over the same period of time would help local authorities to prioritise and respond adequately to EU policy priorities, e.g. for

engaging in cross-border cooperation. Some experts raised concerns that EU funds (e.g. ERDF mainstream and INTERREG) might be too complicated for its purpose and sometimes administration steers away from them and therefore additional efforts for simplification need to be made. On the other hand, it is also true that there is a need for local authorities to be proactive in designing and implementing projects, including those with cross-border impacts.

Information deficits are the major obstacles for local authorities. This concerns both the comprehensive assessment of risks in a virtual location and easily accessible information on EU funds, e.g. for the specific focus of improving cross-border cooperation.

The overall analysis of available tools and the expert consultation suggest that additional funding would be needed for preparedness in terms of equipment, holding exercises, making risk management plans and creating more permanent cross-border units.

In parallel, as specified in the new ERDF Regulation, Member States and regions are strongly encouraged to make use of their own national and regional ERDF programmes to invest in cross-border initiatives and infrastructure projects. Making use of synergies with investments in neighbouring regions would be a major step to increase the effectiveness of cohesion policy in border regions²³. Financial support could also be dedicated to exploring the need for joint public services or to invest in developing robust cross-border statistics²⁴.

INTERREG

INTERREG is the **main financial instrument for cross-border cooperation** including in Disaster Risk Management. More than half of the projects identified under this study were funded by INTERREG.

Many of the **tools** that have been identified in this study have also been produced within INTERREG projects. At the same time, it is not clear to what extent these tools, processes, platforms and other working arrangements continue to operate in border areas upon completion of the INTERREG projects when relevant.

The case study on wildfires at the border between Spain and Portugal confirmed that the majority of cross-border regional collaboration primarily occurs through INTERREG-funded projects, mainly due to limited national and regional resources. EU funding has been instrumental in establishing and sustaining initiatives aimed at preventing, preparing for, and responding to forest fires that have allowed Spain and Portugal to leverage their resources and implement effective measures jointly. One of the most compelling illustrations of regional cooperation is exemplified by the INTERREG VI A Spain-Portugal Programme (POCTEP),²⁵ funded by the European Regional Development Fund (ERDF)²⁶ POCTEP stands as **the largest cross-border cooperation programme in the EU**, boasting a substantial allocation of EUR 427 million, of which over EUR 320 million (75%) originates from the ERDF²⁷.

Among the examples of this collaboration in working on the cross-border issue of wildfires within POCTEP 2014 - 2020 are ARIEM+, Biofrontera I and II BIN-SAL, GEFRECON, CILIFO, FIREPOCTEP as well as an INTERREG SUDOE programme's projects such as ForManRisk, FireRS.

²³ EC Communication EU Border Regions: Living labs of European integration, 2021

²⁴ Idem

²⁵ <https://www.poctep.eu/>.

²⁶ https://ec.europa.eu/regional_policy/funding/erdf_en.

²⁷ https://www.poctep.eu/wp-content/uploads/2023/05/04_Anexo2_ES.pdf

The European Commission and the INTERREG Programmes, as well as Interreg Europe and its Policy Learning Platform, should consider continuing to highlight and actively encourage collaboration successes and good practices from different borders. This could also be done through dedicated fora, exchange of good practices.

Project continuity and sustainability

ERDF and INTERREG fund a big number of cross-border cooperation projects but there is often an issue of continuity and project sustainability. This has been reiterated numerous times by Member States and EU representatives, but also recurring by project implementers.

Despite their undisputed usefulness, if mechanisms for sustained interaction across borders are not established, the efforts made tend to vanish or diminish significantly when the project/initiative finishes. The social capital built, including critical, interpersonal relationships may be easily lost and difficult to re-built (i.e. people change jobs, etc.).

Access to funding for municipalities exposed to high risk

There is currently no process to ensure that organisations/municipalities exposed to a risk that could benefit from cross-border cooperation are encouraged to respond to a relevant INTERREG call for proposal or apply to a relevant EU initiative. While the current risk assessment is not sufficiently granular as to pinpoint the needs of individual municipalities along a given border, these can be easily deduced from the risk assessment. Based on that knowledge, the Commission and the Member States could consider proposing a system to foresee incentives for such entities to apply for relevant initiatives (e.g. in the definition of the target beneficiaries in INTERREG or mainstream ERDF programmes, and in the definition of selection criteria of relevant initiatives).

Sharing of information and good practices

As there is always a possibility for further sharing of information and good practices, the following recommendations address different aspects of this process.

The European Commission together with the MS could develop a policy framework to collect, store and reuse data and information on DRM, including good practices and lessons learned during response and recovery processes. The framework/guidelines should help to promote the comparability of such information, where Member States face similar cross-border risks. Strengthening the communication aspect around these resources is key. There is also a possibility for Member States to assign liaison officers on DRM between countries, who can overcome language barriers.

The analysis of available tools at EU level and the expert consultation led to the conclusion that there should be a targeted presentation of the relevant information at EU level, for example in the form of a web-based map platform. On this platform or database, all information should be centrally accessible, starting from the risk assessment of the respective region to the possible measures through funding programmes (e.g., through the presentation of INTERREG programmes), to best practice examples. Such a platform could be provided, continuously maintained and supplemented by the Joint Research Centre.

Establishment of common units and crisis centres

The representatives of several countries underlined that the establishment of common units/joint teams between two neighbouring countries would take forward cross-border

cooperation. Benelux is one such example as there are well-functioning crisis centres in the three countries (governed by a MoU) and an associated network of experts.

Supplies and logistics contingency planning and pooling of resources

According to Nordic Prime Ministers, there is a need for strengthened cooperation within supplies and logistics contingency planning and crisis management. Moreover, there is a need for pooling of resources and structures, when feasible and bringing operational synergies.

Host nation support function

Several interviewees have pointed out that currently much focus is placed on sending help but the capacity for receiving help (allocating resources, management of help, etc.) remains questionable. The Commission may consider providing additional guidance on receiving help. According to a Montenegrin representative, it is necessary to conduct field exercises, with a special focus on harmonising the Host Nation Support system.

Joint exercises

In the course of the assignment, numerous cases of joint exercises in border areas have been identified in the Inventory of tools. Supposedly, there are even more joint exercises which take place. Nevertheless, it is difficult to judge if the joint exercises which have taken place at a given border/border segment or border region are/have been sufficient. There is also a difference in the quality and intensity of cooperation among different borders of a country. For example, in Finland the cooperation along the Swedish-Finnish border is much deeper than along the Finnish-Norwegian border.

Assessment of Post-disaster damage

According to an EU DG RTD representative, there is a need for a technical tool to better evaluate post-disaster damage. This technical tool should also contain considerations of border territories.

Illustrative examples

- **Estonia's collaborative efforts with Latvia and Finland:** In Estonia, responsibilities in cross-border collaboration are shared based on specific risks or disasters. Estonian organisations have established good collaboration with counterparts in Latvia and Finland, conducting joint trainings, exercises, and active participation in UCPM activities.
- **Sharing experience on mountain risk (France):** Successful experience-sharing on mountain risk through EU mechanisms was conducted in France, emphasising the importance of collaborative efforts in addressing specific geographical challenges.
- **EU's Role in seismic risk (France):** An increased EU role in addressing earthquake risk, particularly due to cross-border effects could be relevant to consider in France. Currently, solutions are mostly national, but a more coordinated EU approach could be beneficial, especially for small towns.

- **Cross-border cooperation via INTERREG (Spain):** Spain emphasises that the majority of cross-border cooperation, including preparedness and monitoring instruments, occurs through INTERREG. This framework facilitates simulation exercises and enhances collaboration between neighbouring regions.
- **Differences in mandates between Norway and Sweden:** In Norway and Sweden, differences exist in the mandates of state governors and county governors, respectively. While the Norwegian state governor is primarily focused on policy implementation, the Swedish county governor has a more operative role.
- **Switzerland's international support initiatives:** The need for international support in disaster management is acknowledged in Switzerland, which is organising international exercises within the framework of UCPM to enhance collaboration and preparedness.
- **Sustaining IPA projects in North Macedonia:** North Macedonia faces the challenge of sustaining IPA projects, as initiatives in the Balkans often fade away a few years after completion. This highlights the importance of long-term planning and investment in project sustainability.

8.2. Gap analysis of EU sectoral legislation and border regions of relevance for DRM

In the section below, the authors of the report address:

Key Research Question 2, namely 'Is the policy framework linked to the specific risks included in sectoral legislation satisfactory and are there risks which are not sufficiently covered?'

Relevant multi-risk and sectoral policy are analysed from the point of view of their implications for DRM in border areas. Moreover, an overview of key EU multi-risk and sectoral legislation with relevance for DRM is presented in Annex 7, and a table summarising various sectoral legislations and their relevance to cross-border cooperation on DRM is provided in Annex 8.

8.2.1. Multi-risk and sectoral legislation and border regions

Policy coherence and integration

Multiple instances during the consultation as well as the analysis of sectoral policies and tools have highlighted the need for improved coherence between various DRM-relevant policies and between DRM policies and other sectoral policies including in border areas. Moreover, it is important to emphasise and strengthen, where relevant, the links between sectoral policies and climate change adaptation efforts. Therefore, closer collaboration between sectoral authorities and climate and environmental authorities is essential to ensure that risk reduction measures align with the changing climate conditions in border areas. For instance, integrating climate change vulnerability assessments into national risk assessments is currently only partially implemented, as seen in the analysed reports. Spain serves as a positive example in this regard.

Synergies need to be established between the DRM legal framework and various other relevant domains, such as environment, information and communication technology (ICT), and eGovernment legal frameworks. Additionally, it is essential to ensure coherence with other

pertinent Union legislation related to prevention and DRM. This includes addressing cross-border prevention actions and responses to threats like serious cross-border health threats.

Floods

The implementation of the Floods Directive encounters various challenges, particularly concerning the assessment and management of extremely rare flooding events, public consultation, and basin-level management. While the Directive offers flexibility to member states for its implementation, a stronger focus on alignment is necessary, particularly in transnational catchments which are of relevance to this study, to ensure consistency in identifying APSFR (Areas at Potential Significant Flood Risk), implementing FH (flood hazard) and FR (flood risk) maps, and developing FRMPs (Flood Risk Management Plans). Currently, it appears that only a limited number of countries, like Finland and Sweden (FIN/SE), have adopted shared methodologies and specific standards for implementing the Floods Directive in the context of cross-border basins. Several interviewees have suggested that the European Commission could play a stronger role in promoting harmonised approaches across borders.

Critical infrastructure

The evolving threats and the changing nature of critical infrastructure prompt discussions about the future of critical infrastructure protection policy in the EU. The risk management of critical infrastructure in border regions, as outlined in the directive and related scientific opinions, operates at multiple levels, including supranational, political, legislative, regulatory, and municipal. Therefore, addressing all these dimensions is essential for successful risk management. While cooperation on response to critical infrastructure disruptions is strong, there is room for improvement in preparedness, especially in sectors like food, transport, and energy, where strengthening DRM around supply chains and logistics is desirable.

Health

The COVID-19 pandemic has highlighted the importance of coordinated action at the EU level to address cross-border threats like epidemics. There is a need for mapping of the potential forms of capacities and cooperation to best utilise the capacities to prepare for, respond to and manage medical emergencies, thus contributing also to a stronger European preparedness.

Geophysical risks

With regards to seismic risks links between building policies and DRM should be made including in border areas. Work on renovating buildings to improve energy performance should simultaneously strengthen their seismic resilience.

Technological risks

Local authorities (e.g. cities) should be further involved in exercises on risks in border territories, particularly technological risk. In addition, industry on both sides of the border should be better involved in these exercises.

8.3. Gap analysis of legal and governance framework on DRM at a national and regional/local level impacting border territories

In this section the following research questions are addressed:

Key Research Question 3 of the analysis namely: ‘What are the gaps in the legal framework on Disaster Risk Management on a national and regional/local level impacting border territories? What could be improved especially with regards to border territories?’ and

Key Research Question 5: ‘What are the gaps in the governance framework on Disaster Risk Management on a national and regional/local level impacting border territories? What could be improved especially with regards to border territories?’

8.3.1. DRM legal framework at national and regional/local level impacting border territories

Horizontal aspects

The lack of knowledge about the legislation in neighbouring countries can be a hindrance to effective and efficient cross-border cooperation. Therefore, it is essential to map and gain a better understanding of the legislation and governance arrangements on the other side of the border to facilitate improved cross-border cooperation. This is a process that could be additionally facilitated by the European Commission.

It often appears that central governments pay insufficient attention to the dynamic and unique situations inherent in border regions, as well as the international coordination and cooperation necessary within them. Strengthening the central governments' focus on border regions and improving their understanding of the specific challenges related to Disaster Risk Management (DRM) is a key factor for success in ensuring effective DRM in border territories. This could be done through different initiatives, putting the border regions in focus but ensuring national government presence and commitment.

The Nordred case study highlights the importance of bilateral or multilateral agreements as valuable tools for enhancing cross-border cooperation. These agreements can compel countries to adjust their national laws and regulations, eliminating obstacles to cooperation. Furthermore, framework bilateral agreements have the potential to catalyse the signing of additional agreements at the national, regional, and municipal levels, similar to the Nordred case. As highlighted previously, risk-specific agreements backed up by financing and suitable governance arrangements accelerate cooperation.

Complementarity to EU level

It has been illustrated within the Nordhel case study that bilateral and multilateral agreements could overlap with the EU legal framework. To avoid this situation Member States should ensure that agreements are complementary to as opposed to duplicating the relevant European framework. This issue is especially important in regions with very strong history of cooperation, e.g. Nordic countries, Czechia and Slovakia, etc.

Streamline responsibilities and multi-level governance

In some MS the role of Civil Protection authorities at national level as an integrator of all measures when it comes to preparedness is very low. It has been pointed out by a representative of the Emergency Response Coordination Centre (ERCC) that strengthening this role is very important. Moreover, Member States should make sure to create links between different financial instruments as, very frequently, there are line ministries taking care of certain risks and Civil Protection overseeing the residual risks. This has direct repercussions on efficiency and effectiveness of interventions in border areas and the capabilities to act jointly with the counterparts on the other side of the border.

In the same vein, in the legal frameworks of several Member States, various hazards are assigned to different ministries and government services. For instance, addressing the social consequences of extreme weather events and provision of support to vulnerable populations, such as the elderly, disabled, or low-income individuals and families may involve the responsibilities of the Ministry of Social Affairs. Other tasks and responsibilities are assigned to different entities and agencies to ensure a coordinated and effective approach to disaster preparedness, response, recovery, and mitigation. Hence, the importance of streamlining responsibilities in national legal frameworks to enhance clarity regarding the division of tasks.

In several countries, it has become evident that the roles and responsibilities of local governments in the context of cross-border disaster risk management (DRM) could be better defined and strengthened. There is room for improvement in this regard. It is important to consider that awareness, preparedness, and resources among local governments vary significantly when dealing with crisis situations, including those that extend across borders. Therefore, there is a need for ongoing training to enhance their cooperation and collaboration capacities.

Moreover, there is a need to strike the right balance between providing bottom-up incentives for cross-border cooperation in DRM but also strengthening the role of the national level for better coordination. Practically, this means that central level should be aware and involved, to the extent possible, in cross-border efforts and projects.

It has to be noted that in certain countries in Europe (e.g. Spain) regions do not have competence to sign cross-border agreements with bordering regions and this bureaucratic obstacle is a clear policy gap as it does not facilitate cross-border cooperation. This does not block cooperation but does not allow the tailored legal framing of collaboration efforts.

Even in the case of existing agreements, it has been reported that the frequency of meetings between institutions on both sides of the border has been limited at certain borders and informal communication channels are used. It is crucial to formalise local level meetings and promote bottom-up communication. To enhance collaboration, a structured approach is recommended with scheduled meetings occurring every six months on a rotational basis between the countries.

The analysis has also shown that in big countries with strong regions, the responsibilities of the regional level with regards to cross-border interventions are not always clear.

Good practices and recommendations from national experts on specific borders/hazards

During the consultation process, national experts highlighted a number of good practices already in place, as well as areas for improvements in relation to specific borders and hazards.

A brief summary of the key findings follows.

- Spain:
 - Agreements on forest fires and dam-related emergencies are considered adequate for cross-border risks but need to account for changing risks due to climate change.
 - More systemic multilateral cooperation processes are necessary, particularly for forest fires.
 - The existing agreement between Spain and Portugal allowing entry up to 25km into each other's territory is deemed insufficient in the long term.
- Denmark:
 - Öresund is highly vulnerable concerning critical infrastructure risks.
 - Greater investment and cooperation in the region are recommended.
 - Past work within the southern rescue service has been satisfactory, but Danish and Swedish systems lack integration, affecting response during emergencies.
- Belgium:
 - Legal obstacles hinder the crossing of ambulances across borders and require resolution.
 - Cooperation within the Benelux is stronger than at the EU level, with real-time information exchange and transboundary actions.
 - The EU could learn from Benelux examples, such as establishing crisis centers, to enhance its own cross-border cooperation.
- Lithuania:
 - Lithuania has adopted a new National Disaster Management Law, redistributing responsibilities to include NGOs, particularly at the municipal level.
 - This law could serve as a model for improving local and municipal preparedness in other countries.
- Norway:
 - Civil preparedness, especially in border regions, is inadequately emphasised and needs significant strengthening as part of total defense strategies.
- ERCC's:
 - There's a need for a stronger link between marine pollution and civil protection.
 - Response to marine pollution should mirror inland response, as pollution affects both land and sea areas.

Information flows

It is essential to adapt the communication framework and facilitate discussions throughout the organisational hierarchy. For instance, the head of the firefighting services on one side of the border could communicate with the corresponding head on the other side of the border. Alternatively, a mandatory communication channel could be established with the neighbouring province for critical issues, fostering discussions at a more local level.

Illustrative examples

- **Nordhel Agreement and Health Legislation Mapping:** Under the Nordhel Agreement, the Nordic Council of Ministers launched a project to map health legislation and rules. This initiative aimed to address stumbling blocks hindering enhanced health sector cooperation.
- **Estonia's Civil Crisis Act:** Estonia is preparing a new Civil Crisis Act to replace the existing Emergency Act. This legislation covers civil protection, early warning mechanisms, and evacuation. Prompted by events like the Covid-19 pandemic and the Russian-Ukrainian conflict, Estonia aims to elevate its crisis preparedness. The new act centralises government responsibility for disaster risk management, while also decentralising specific hazard responsibilities to implementation levels. It has to be noted that in Estonia there is no specific approach to border areas. The new system is more flexible and addresses risks better. As an example, response to flooding can be different in agricultural and urban areas, or, in case of heavy snow storm different bodies respond – the Transport administration is responsible for roads, the Rescue Board is responsible for civil population, *Elektilevi* (energy network operator) is responsible for securing electricity network service.
- **French perspective on regional coordination:** France recognises the importance of regional coordination in disaster management. A shift towards greater reliance on regional levels, rather than solely focusing on local departments, is advocated. Regional coordination aligns better with risk basins and facilitates cross-border collaboration. It has been shared by a French representative that the national French approach does not rely sufficiently on the regional level (focus on local "département" regional cross-departmental role of the prefect exclusively coordination).
- **Differences in governance between Ireland and Northern Ireland:** In Ireland and Northern Ireland, governance structures for disaster risk management (DRM) vary significantly. While Ireland follows a centralised approach, Northern Ireland has nine separate agencies, leading to structural differences. Streamlining governance is essential for cohesive cross-border cooperation.
- **Malta-Italy cooperation:** Malta and Italy rely on informal relationships and exchanges in civil protection, as they lack specific agreements beyond a 1994 cooperation agreement. However, EU-funded projects demonstrate successful coordination, particularly in monitoring tsunamis and extreme events.
- **Cooperation between North Macedonia and Bulgaria:** Despite challenging terrain, North Macedonia and Bulgaria demonstrated effective cooperation during significant floods in 2021. This cooperation included resource sharing and planning for a common storage place for firefighting equipment, highlighting the benefits of bilateral collaboration.
- **Emergency assistance cooperation in Portugal:** Portugal's emergency assistance cooperation with Spain involves informal agreements, allowing cross-border interventions by firefighters and police within specified distances. Activating emergency level 3, facilitates coordinated mutual assistance from neighbouring countries.

- **Swiss Risk assessment:** Switzerland conducts national-level risk assessments, but cantons have autonomy in following them. Cantons and municipalities carry out their own risk assessment on what they want to focus on, but it is not done by every canton. For instance, in the Grisson, they conducted the risk assessment with each municipality.
- **Denmark's legal principle in crisis preparedness:** Denmark's legal principle requires requesting assistance from the nearest appropriate units, even if they are in other countries, ensuring efficient crisis response.
- **Challenges in laws and regulations between the Netherlands and Germany:** The Netherlands and Germany face challenges in aligning laws and regulations, hindering streamlined processes at the regional level. Overcoming these challenges is crucial for effective cross-border cooperation.
- **Spain and Portugal cross-border cooperation in DRM,** firefighters can interfere without authorisation 25km cross-border, police can interfere without authorisation 10km cross-border, there are agreement for cross-border medical emergency and cross-border hospitals.
- **Training in DRM in Bulgaria and Greece:** Under the 'Floodguard' project, workshops have been conducted specifically for personnel from Civil Protection Services, Municipalities, Regions, and relevant stakeholders involved in addressing flood incidents in Greece and Bulgaria. During one of these workshops, three scenarios were simulated for three rivers, incorporating a timeline. The 'Floodguard' project is noteworthy as a good practice. In general, it is important for countries to participate in practical exercises at simulation and disaster training centres to collaboratively enhance preparedness for potential risks.
- **Northern cross-border cooperation:** On a local level, the agreements based on Nordred are still in use and active. One example of this is the Border Rescue Councils that aim to support co-operation across border regions. There are three Border Rescue councils between Norway and Sweden where equipment and personnel can be jointly utilised, thereby increasing the ability to deal with serious disruptions. In addition, there are several municipal- or regional cross-border agreements between the countries that are also based on Nordred.

8.3.2. DRM governance framework on a national and regional/local level impacting border territories. Possible actions.

Availability and density of institutions, policy tools

The analysis of the types of Institutions, processes and tools shows that even though there is a high overall number of entries, keeping in mind that these are spread over almost 60 borders, the number is not high enough. Overall, we can observe insufficient number of management plans, expert groups, atlases, and joint protocols. The number of awareness campaigns is also low.

The analysis of individual risks addressed by the entries in the 'Institutions, processes and tools' inventory indicates that certain risks are much less covered than other risks. While flooding, wildfires and to some extent geophysical risks are well-addressed, for hazards such as droughts, terrorism, migration, cyber threats, chemical accidents and animal and plant

diseases there are very few tailored instruments at the disposal of border municipalities, civil protection agencies, etc. Hence, funding should be channelled to their production.

As it is close to impossible to develop instruments which are tailor-made for each border and each risk, the best way forward would be to compile and classify these in an online tool at the disposal of relevant border actors.

Enforcement of current bilateral agreements

The existence of bilateral agreement(s) between two countries at a national level or between regions and/or municipalities at a local level does not automatically mean that the collaboration between these countries is at a particularly high level. Multiple interviewees have emphasised that many provisions under the existing bilateral agreements do not work in practice and the Covid-19 was a point in case. Therefore, creating the necessary governance structure of an agreement, earmarking the necessary funding and enforcing the agreement in practice should be a priority for the Member States.

Shift to a focus on prevention and preparedness

The analysis of the inventory of agreements draws the attention to the fact that they are mostly made on the side of the response. The Participating states with the support of the European Commission should shift the efforts to creating bilateral legal frameworks with a focus on prevention and preparedness.

Joint approaches to transboundary risk assessment

Several challenges appear when dealing with the transboundary dimension, since the different countries' national risk assessments are not harmonised or comparable in terms of methodologies and data used. For this reason, a process of harmonisation is crucial for developing effective prevention and planning strategies and reducing the impact of disasters in cross-border regions. To address this issue, projects could be developed to focus on implementing a harmonised process to use common approaches, data and models for assessing the level of different risks.

Joint initiatives as a way to connect disconnected institutions

Whenever there is a high probability or a high impact risk in border territories and the institutions on both sides of the border in charge of monitoring are disconnected and functioning in silos, there is a good argument for launching a joint initiative and strengthening the cross-border cooperation. This recommendation is operationalised in the individual border tables where concrete recommendations are given for strengthening cooperation.

In the aftermath of an event in a cross-border territory, the data collected nationally are often used to be analysed in different ways by the civil protection authorities. This discrepancy in the analysis on both sides of the border is a major gap. For this reason, a project could be launched focused on the harmonisation of post-event information to be used for civil protection purposes. The aim is to produce a deliverable (e.g. an atlas) that provides harmonised information adopting a common approach and terminology²⁸.

²⁸ Seismic case study Cross-border cooperation on seismic risk management between Italy, Austria and Slovenia

Connecting regional platforms to Disaster Risk Management Knowledge Centre - Risk Data Hub

Following the example of the BORIS project and the platform developed by the project to collect and visualise results, such similar platforms could be linked to the DRMKC - Disaster Risk Management Knowledge Centre - Risk Data Hub of the European Commission with the objective to disseminate and promote data access to a wider public.

Liaison and communication from national to local level

There is a need for more active national communication so that local communities better understand and take advantage of EU funds for flooding.

Using the potential of scientific communities

As scientific communities are often at the forefront of risk assessment and knowledge holding regular meetings between the scientific community to address recent problems and to share research results is very beneficial.

Empowering local communities

Pandemic is one example of civil protection mechanisms going through stress test. Lots of gaps have been identified but these could be fixed by empowering local municipalities. In bigger countries with strong regional governance levels many of the DRM responsibilities are still within the regional administrations and should be transferred to the extent possible to the local level to enable more effective cooperation.

Awareness raising on national and local level

There is a need to make special efforts on raising awareness, especially among decision-makers considering DRR, with special reference to border territories. In this context, there is a need for an increasingly bottom-up and cross-border approach whereby public consultation and awareness raising have a stronger place.

One of the gaps that can cause a potential problem in the future is the wrong interpretation of the climate-connected data used by the end users (citizens, ministry and other departments). There are deficiencies in education in climate data interpretation and risk awareness and this lack needs to be addressed both on an EU and national levels.

Alignment on data management practices

During the consultation and the analysis it has become clear that early warning systems and general data management practices on both side of the border are not always aligned. For example, this is the case of extreme weather warnings between Met Office (UK) and Met Eire (Ireland). There could be more alignment on data management practices overall, an approach which is valid for other borders as well. Moreover, there is a need for deeper exchange of information on risk assessments and establishment of a framework for that.

According to a JRC report, there is a need to establish frameworks for data collection at the most local level possible, as well as for retrieval and sharing of data among governance levels after an event. The frameworks should consider the databases that already exist on DRM,

mainly sector-specific, alongside others that are related to the specific context, as necessary to understand the baseline situation before the event²⁹.

Wildfire

Despite exemplary case of cross-border collaboration in managing wildfire risk between Spain and Portugal, several challenges persist. These possibilities for improvement are also valid to other borders with high risk for wildfires.

One pressing challenge is the room for improvement in overall forest management practices in both countries^{30,31}. Effective wildfire prevention and mitigation strategies rely on a thorough understanding of the local ecosystems and environment, necessitating the development and implementation of joint, science-based approaches to land and forest management that would encompass both public and private actors³².

Whenever there is a contrast in governance strategies of both countries this adds to the complexity. For example, Portugal's centralised approach with more emphasis on 'emergency response' contrasted with Spain's regional focus with a stronger emphasis on prevention showcase the disparity in tactics. Bridging this gap is crucial, requiring the creation of joint firefighting protocols that draw upon the strengths of both approaches.

Strengthen existing governance structures

Intergovernmental commissions play a crucial role in fostering cooperation and addressing common challenges among member states. However, their effectiveness remains to be evaluated. It is imperative to support participating member states in evaluating these commissions to ensure functional and functioning governance structures. Turning Covid-related cross-border cooperation into transformative change

The COVID crisis exposed a deficiency in crucial information regarding the competencies of relevant authorities necessary for preparing an effective response. This highlighted the importance to establish cooperation centres around the borders that are well informed of the realities of both countries, enabling efficient and coordinated responses. Moreover, the COVID crisis revealed increased activity in the Euroregion, which increased the appeal for better cooperation from border regions to central authorities in both Poland and Germany which was very important and symbolic. The European Commission is well-positioned to support the translation of this increased activity into transformative changes.

Integrating lessons learned into contingency planning

Authorities should update contingency plans and other initiatives based on the lessons learned from joint simulation exercises. They should address impacts beyond those that are direct and tangible and should work with operators of industries and infrastructures, business representatives and nature conservation groups on both sides of the borders to learn together and reinforce prevention, mitigation and adaptation measures³³.

²⁹ JRC, 2020, Science for Disaster Risk Management, Disaster Risk Management Knowledge Centre

³⁰ <https://doi.org/10.1016/j.foreco.2022.120526>

³¹ <https://www.jstor.org/stable/43739860>

³² Case study on wildfires at the Spain/Portugal border

³³ EC, 2020, Science for Disaster Risk Management, Acting Today, Protecting Tomorrow

Implementing trilateral rather than bilateral projects

Whenever the natural form of cooperation in certain border areas (where three countries meet) is trilateral it is much more impactful to implement trilateral rather than bilateral projects which are possible through the given funding instruments. This has been reiterated and evidenced within the case studies on EMRIC and Cross-border cooperation on seismic risk management between Italy, Austria and Slovenia. These good practices originated from projects involving all three countries around a common hazard in a border area.

From single projects to a joint platform

The EMRIC case, presented in the report and in a separate case study, is an inspiring example for different regions across Europe of how a single project can grow into a permanent and impactful partnership. EMRIC started as a two-year INTERREG III project and was extended as EMRIC+ until 2013. In this cooperation network, which focused on the exchange of information, thematic focus groups and the steering group, which advise the EGTC Euregio Meuse-Rhine on strategic issues, were established in 2013. The EMRIC office was founded as coordinating centre to support the network. The work results of the focus groups flow into the respective planning processes of the network partners for cross-border cooperation. Since then, the cooperation has been deepened more and more and brought offshoot projects like PANDEMERIC and Marhetak. The goal of any EU funded project is to produce lasting results, which in the context of this analysis could entail growing into sustainable governance arrangements. Accordingly, the upfront thinking on project sustainability should be one of the main criteria to rely upon for selecting beneficiaries to funding.

Macro-regional strategies as a way to enhance regional cooperation

As demonstrated by the case study on flooding in the Danube Region, macro-regional strategies can create a synergetic effect with other legal and institutional frameworks to strengthen even further cross-border cooperation in DRM. For example, Priority Area 5 of the EU Strategy for the Danube Region (EUSDR) is aligned with the work of the ICPDR. Moreover, there are synergetic relations between different priority areas such as PA5 Environmental risk, PA4 Water Quality and PA 6 Biodiversity especially with regards to the promotion of nature-based approach to flooding.

There are several areas in bilateral disaster risk management where improvements can still be made: developing a flood-defence related data exchange system; improving coordination through development of joint plans and procedures for flood management and civil protection (evacuation plans and procedures, emergency rescue plans, etc.) considering the benefits of the civil protection systems for the shared flood basins or stretches of common interest to better use the available resources; identifying pilot areas for the coordinated action and organising flood and civil protection cross-border exercises regularly; building cross-border volunteer capacity by exchange of knowledge and experience and joint trainings for common disaster management.

Hence, efforts to look for potential synergies between DRM cross-border cooperation on one hand and the macro-regional initiatives on the other hand should be continued.

Cross-border DRM in remote regions

In Scandinavia, as a part of the Nordred agreement, three Border Recue Councils have been established. Parts of the regions that they cover are regions with limited resources and large distances. The interviewed representatives with experience of the Border Rescue Councils' work expressed that the benefit of cross-border cooperation is that regions with few resources

and large distances can become stronger through cooperation. It could be concluded that similar types of cooperation are even more beneficial in remote border regions than in other regions.

Illustrative examples

- **Italian alert system for tsunamis (SiAM):** Italy's SiAM system provides crucial alerts for tsunamis generated by earthquakes in the Mediterranean Sea, enhancing early warning and response capabilities.
- **Challenges in Hungary-Austria border cooperation:** Bilateral border region meetings between Hungary and Austria have been lacking, primarily due to significant governance differences. Austria's federal state structure and Hungary's dissolution of developmental regions have posed challenges in cooperation.
- **Governance changes in Hungary:** In Hungary, the Local Government Office has taken over competencies for water, crises, and climate management, reducing developmental competencies at the local level. Limited citizen initiatives further impact governance, creating complexities in cooperation with neighbouring regions.
- **Cooperation framework between Portugal and Spain:** Portugal and Spain have established a cooperation framework for forest fires, with mechanisms in place for other risks. However, defining roles, responsibilities, and improving coordination are ongoing challenges.
- **Switzerland-Italy disaster treaty:** Switzerland and Italy have a treaty allowing mutual assistance to municipalities within a 30 km range in case of cross-border disasters. However, outside of this range of 30 km, a solution must be found at national level.
- **Cross-Border cooperation between Austria and Switzerland:** Before it flows into lake Constance, some preventing measures have been implemented by Austria and Switzerland: the two countries have modified the basin of the river which now has more space. Kreuzlingen (CH) and Konstanz (GE) have a strict collaboration in this area.
- **Cross-border cooperation between Germany, Austria, and Switzerland:** Switzerland collaborates with Germany and Austria, facilitated by federal state structures.
- **Polish-German COVID-19 hotline:** An ad-hoc information hotline in Frankfurt supported German and Polish citizens during the COVID-19 pandemic, showcasing cross-border crisis response.
- **Neighbourhood strategy challenges in Brandenburg and Lubusz Voivodeship:** Brandenburg's neighbourhood strategy with Lubusz Voivodeship faced challenges on the Polish side, highlighting differences in approaches and central authority dependency.
- **Greater Region Pandemic Task Force:** The Greater Region (LU-BE-FR-DE) created a Pandemic Task Force to coordinate a response to the pandemic on multiple levels (e.g. monitoring the availability of intensive care beds). The neighbouring towns of Görlitz (DE) and Zgorzelec (PL) ran joint emergency exercises (e.g. on action to take when faced with a mass outbreak of measles) and used this experience

to set up a cross-border information exchange system during the COVID-19 pandemic³⁴.

- **Bánát Triplex Confinium European Grouping of Territorial Cooperation (BTC EGTC):** BTC EGTC facilitated cooperation among Hungarian, Romanian, and Serbian local authorities, providing urgent supplies and fostering collaboration in disaster response. For instance, the EGTC got together to deliver urgently needed face masks and hand sanitisers from Hungary to the 37 Romanian authorities involved in the EGTC.
- **Cross-border communication in Greece and Bulgaria:** Informal communications between Greek regions and the Greek Embassy in Bulgaria enable early alerts about flood hazards, improving preparation and response. Official data are initially provided from the Embassy to the Ministry of Foreign Affairs of Greece and then forwarded to Civil Protection and regions, a time-consuming process. However, if the Autonomous Directorate of Civil Protection in the Region of Eastern Macedonia and Thrace obtained the necessary data earlier from the Embassy of Greece, an assessment of potential floods in Greece can occur 2-3 days before EFAS warnings, allowing for better preparation.
- **UCPM Project BORIS: seismic risk assessment and prevention:** The UCPM project BORIS developed harmonised approaches for seismic and hydro-meteorological risk assessment in Italy, Austria, and Slovenia, enhancing prevention and preparedness.
- **Polish-German Crisis Management Units:** Post-COVID, Poland and Germany established crisis management units for regular information exchange, strengthening cross-border collaboration between the Western Pomeranian, Lower Silesian, Lubusz marshal offices and the relevant lands authorities.
- **Nordred cross-border cooperation:** Sweden and Norway allow the use of nearest resources regardless of nationality in case of accidents, promoting swift and effective response.

8.4. Gap analysis of the interoperability of systems

In this section the following research question is addressed:

Key Research Question 6 of the analysis namely: ‘Is the interoperability of systems adequately addressed? Should this be more closely “framed” at European level?’

Ensuring an effective cooperation among actors involved in DRM through efficient data exchange and collaborative operations is essential to disaster risk emergency management.

Interoperability can be considered to be “the ability of two or more systems or components, to exchange information and to make mutual use of the information that has been exchanged”³⁵. Barriers to interoperability include “high number of actors involved, such as civil protection,

³⁴ EU Border Regions: Living labs of European integration, COM(2021) 393 final

³⁵ <https://www.enisa.europa.eu/publications/interoperable-eu-risk-management-framework>

firefighters, healthcare services, municipalities, and non-profit organisations among others”³⁶. Interoperability is addressed in Art. 155 of the Lisbon Treaty ‘permitting the Community to implement any measure necessary to ensure the interoperability of networks. Following this, the European Commission developed a framework of five directives which are expected to enable the interoperability across borders’³⁷.

The European Initiative to Enhancing Data Interoperability (Data-ESTAG) for DRR was established by UNISDR and the European Commission’s Joint Research Centre in 2018. Data-ESTAG aims at: stimulating DRR data searchers to increase their effectiveness in collecting, assessing and using data which can support the implementation and monitoring of Sendai Framework principles; providing guidance to DRR data searchers in the operations of data finding, mapping, reporting, assessing, exchanging, verifying, etc. with the aim to create a common baseline approach supporting DRR data searchers in getting in contact with (and maximising the benefit taken from) existing core European and international data-related resources able to support the implementation and monitoring of Sendai Framework principles, including platforms such as Data Risk Hub and *Desinventar* Sendai. It would be necessary to enhance the valorisation of the good practices and lessons learnt by DRR data searchers, with the aim to increase data exchange and interoperability at global level, and to foster the transfer of such knowledge to policy makers.

8.4.1. Interoperability of systems

Importance of cooperation efforts for establishing cross-border emergency communication networks

The Nordred case study³⁸ demonstrated that collaborative efforts among countries in establishing cross-border emergency communication networks, facilitated by a given technology, and supported by a respective agreement, can be essential for addressing emergencies in a given region. Interconnected systems can enable efficient collaboration and information sharing, fostering coordinated response to crises.

Success factors, such as committed partnerships, high visibility, adequate funding, and continuous end-user engagement, underscore the importance of governmental commitment and collaboration.

Identification of common data, data reliability

As identification of data to be used commonly on both sides of the border is crucial, the countries need to decide on the common set of data:

- Geo-referenced data: satellite and earth-observation images, demographic distribution, existing hazards and possible impacts, critical infrastructures, cultural heritage, terrain models.
- Data on rescue intervention procedures, methodological approaches, means, resources, technologies, and tools.

³⁶ M. Migliorini et al, The role of data interoperability in disaster risk reduction: barriers, challenges and regional initiatives.

³⁷ British Institute of International and Comparative law, 2010, Analysis of Law in the European Union pertaining to Cross-Border Disaster Relief.

³⁸ Nordred Cooperative Framework Case Study, 2024.

- Data from damage assessments, including socio-economic impacts and local/national economic drivers, from governments, municipalities and citizens, health services and insurance companies.
- Building data: BIM models, materials, technologies, and security measures³⁹.

Issues around data collection and data quality assessment need to be solved between the two neighbouring countries or on EU level: data location; data reliability and completeness; data usability; data application, etc.

The massive amounts of data being collected both passively and opportunistically through technological tools and devices requires practitioners to rethink key questions that arise from the design, implementation, monitoring, and evaluation of projects, including the role of ethics, privacy and security, technology access, governance and sociocultural contexts in data collection and analysis (ISSD, 2018)⁴⁰.

Synchronisation of alert systems

In different borders in Europe, the next step in cross-border cooperation will be the establishment of common units between two neighbouring countries. This will require the adoption of regulatory framework on EU level focusing on the criteria of interoperability. For example, if there is a cross-border disaster the question of synchronisation of the alert systems of the neighbouring countries is essential and the mechanism can support the process improving the interoperability by for example development of interoperability criteria at EU level. As an example, it has been shared that there is a need for the synchronisation of the alert systems (sirens signal in border areas) on the Spain/Portugal border.

Interoperability of mapping services

According to an EC DG RTD interviewee, interoperability of mapping services for disaster management is a critical issue. Despite it being technologically available, normally geo-risks portals are not coordinated across borders, significantly impacting disaster management (a very simple example refers to the ability to reach the closest hospital in case of an accident, which may well be across the border).

Involvement of the private sector

The efforts on data collection and exchange should continue even if a private company becomes the operator of critical infrastructure like dams, for example.

Capitalisation from past projects and benefitting from existing initiatives

The results of the Data-ESTAG Initiative should be explored and disseminated among relevant stakeholders to increase their knowledge and understanding of the issue of interoperability.

Member States should benefit fully from the European Digital Innovation Hubs (EDIH) as well as a reinforced interoperability policy, funded by the Digital Europe Programme⁴¹ to stimulate

³⁹ Idem.

⁴⁰ ISSD (2018). Disaster-related Data for Sustainable Development - Sendai Framework Data Readiness Review 2017. Big Data for Resilience Storybook.

⁴¹ <https://digital-strategy.ec.europa.eu/en/activities/digital-programme>.

increased cooperation between neighbouring countries and provide support for digital innovation of public services and companies in cross-border regions⁴².

The Commission should establish frameworks for data collection at the most local level possible on both sides of the border, as well as for retrieval and sharing of data among governance levels after an event⁴³.

Illustrative examples

- **Helcom Agreement in the Baltic Area:** The Helcom agreement demonstrates tight international cross-border collaboration in the Baltic area. The system's interoperability works well, with frequent meetings and information exchanges.
- **Interoperability in Montenegro:** While interoperability within Montenegro is adequately addressed, bilateral interoperability remains a challenge.
- **Ardas Forecast Programme (Greece-Bulgaria):** The Ardas Forecast programme aimed to predict weather and rainfall, coordinating the operation of dams to prevent flooding in the Ardas River drainage basin. It worked in conjunction with a system for coordinating the operation of three dams on the Bulgarian side to prevent flooding on Greek territory. However, the data received from Bulgaria was in an unmanageable PDF format, leading to interoperability problems, crucial for early warning systems.
- **INSECTRISK Project (Nordic Countries):** The INSECTRISK project exemplifies effective cross-border collaboration, utilising technology and robust partnerships. The project's success is attributed to its innovative approach, featuring the Joint Geographic Information System (BuGIS), an online WebGIS product.
- **AdriaMORE Project:** AdriaMORE integrated a hydro-meteo-marine forecast system into the existing ICT framework, pioneering civil protection applications.
- **Trans-National Seismological Networks in the South-Eastern Alps:** This project aimed to strengthen data sharing and establish procedures for real-time data exchange after earthquakes. The integrated networks and their connection with a software (Antelope) that enables real-time data acquisition, sharing and processing, proved successful in the 2004 earthquake in Bovec-Kobarid, Slovenia.
- **Wildfires at the Spain-Portugal Border:** Challenges arise in wildfire management due to the lack of uniform approaches in maps, data, and calculations between Spain and Portugal.
- **Euregio Meuse-Rhein:** Most of the difficulties in Euregio Meuse-Rhein were in the field of communication. In the initial phase of EMRIC, the challenge for the German forces was that their communication system was not compatible with the Belgian and Dutch systems. There were also some areas on the Belgian side where it was impossible to connect to the operations centre on the German side. The reason for this problem was that the Belgian and the Dutch rescue services have been using digital broadcasting since the early 2000s - while the German forces were still using the old analogue technology.

⁴² EC Communication EU Border Regions: Living labs of European integration

⁴³ EC, 2020, Science for Disaster Risk Management, Acting Today, Protecting Tomorrow

- **Paragon System in Euregio Meuse-Rhein:** In Euregio Meuse-Rhein drone operations are regulated differently in the three countries and border crossing is not allowed, which makes cross-border operations difficult. To overcome this, Paragon serves as a 'bridge' for the transmission of images, allowing them to be uploaded and shared within the EU.

8.5. Gap analysis of additional themes

8.5.1. Risk communication with population, civic engagement in resilience building, volunteering

The voluntary support of citizens in Disaster Risk Management is a very important component of overall preparedness and a pre-condition for resilience. Moreover, in cross-border cooperation personal engagement is very important⁴⁴.

As pointed out by a representative of the Council of the Baltic Sea States (CBSS), before the pandemic the focus was on cross-agency cooperation in DRM and setting up command and control centre and constant dialogue between the agencies; standardisation (specific procedures and guides); inter-operability; how to deal with the low frequency, high impact; anticipating vulnerabilities; information management – how to provide an efficient, flexible flow of information cross-border. After the Covid-19 pandemic crisis, focus has shifted to crisis and risk communication with general population (connected to disinformation). In the Nordics, Civil Protection agencies are investing a lot in learning about this⁴⁵.

In this context, it is worth highlighting the Austrian 'CIVolunteer' project aiming to create a digital platform for goal-oriented and competence-based networking and bundling of volunteer work across non-profit organisations to strengthen volunteers in DRM of critical infrastructure. The project comprises of a Citizen Empowerment pillar 'aiming to activate commitment by implementing low-threshold goal setting/progress mechanisms' and 'Citizen encouragement' pillar aims for long-term commitment⁴⁶.

While neither of these two efforts are focusing exclusively on border regions, the lessons learned from them are very important across Europe and including in border areas, namely a necessary focus on communication to the population and strengthening the work with volunteers in a DRM and cross-border context.

In terms of recommendations, Member States should consider increasing the reliance on strong NGO network for DRM including in border areas. The European Commission should stimulate and support the emergence and development of non-governmental organisations with a strong DRM profile.

The lessons learned in citizen empowerment and citizen engagement should be transferred in border territories to strengthen the overall territorial capability to act jointly in all phases of DRM especially keeping in mind that local citizens and Civil Society Organisations have a very good knowledge of the border territory and its features.

⁴⁴ Interview with a representative of b-solutions.

⁴⁵ Interview with a representative of the Council of the Baltic Sea States (CBSS).

⁴⁶ https://civil-protection-knowledge-network.europa.eu/system/files/2023-10/UCPKN_Newsletter_Issue%2010_Oct%202023.pdf.

As the inspiring role of champions in DRM is very important, following the example of Council of the Baltic Sea States, countries should foster these. Building long-term partnerships is the key to enhancing multidisciplinary collaboration that promotes synergies between scientists, policymakers, practitioners, and citizens and this has been demonstrated by some of the most successful projects studied within this assignment. Embedding these synergies in stable networks builds trust and makes it possible to exchange information and best practices, education and training, and awareness raising in risk management, governance and communication⁴⁷.

Illustrative examples

- **Lithuania's national disaster management law rewrite:** Lithuania's rewriting of the national disaster management law has redefined actors and bestowed significant responsibilities upon NGOs, reflecting a proactive approach to disaster management.
- **b-solutions' support for cross-border cooperation:** The b-solutions initiative supports and accompanies champions of cross-border cooperation in DRM, facilitating collaboration and addressing challenges across borders.
- **Volunteering for civil protection in the Nordics:** Volunteering for civil protection is robust in the Nordic countries, particularly in Finland. This includes active participation from children and youth, highlighting the community's dedication to disaster preparedness.
- **CBSS's Innovative DRM expert exchange programme:** The Council of the Baltic Sea States (CBSS) is developing an innovative DRM expert exchange programme, fostering knowledge sharing and collaboration among Baltic Sea nations.
- **Integration of volunteers in Disaster Risk Management:** Efforts to integrate volunteers into DRM activities have been pursued by the National Directorate General for Disaster Management (NDGDM). Municipal volunteer rescue organisations, with over 6,000 members across more than 400 settlements, have been established. These organisations, trained to intervene independently, contribute significantly during heavy rain and storms, particularly in technical rescue activities.

8.5.2. Inclusivity in disaster risk management 'leaving no one behind', vulnerable groups, special target groups

As described previously, the **Council conclusions on "Civil protection work in view of climate change"**⁴⁸ call for the adaptation of civil protection to extreme weather events resulting from climate change in Member States. The conclusions call for the adaptation of civil protection systems to the consequences of climate change, in terms of prevention, preparedness, response and recovery through specific information, education, training, and exercises that may involve the national and sub-national levels and **even a cross-border dimension**, paying particular attention **to people with specific vulnerabilities**.

⁴⁷ EC, 2020, Science for Disaster Risk Management

⁴⁸ Council conclusions on civil protection work in view of climate change 2022/C 322/02

Persons with disabilities (PwDs) are particularly vulnerable in case of emergencies. In this context, it is particularly relevant to highlight the example of the project 'SEE ME - Safe and Equal in Emergencies', financed by UCPM and implemented by Croatia, Slovenia and Montenegro. An analysis of the specific requirements and deficiencies in the treatment of PwDs in emergencies has been compiled in guidelines for assistance⁴⁹.

Gaps and recommendations

Each group of people with disabilities has different limitations, reacting differently in disasters or in situations that are not commonplace, which makes it impossible to develop a single model for how first responders should approach these vulnerable groups (SEE-ME project).

Activities in this area should be focused on raising awareness and familiarising people with disabilities with disaster prevention and correct behaviour in the event of disasters but also of rescuers on how to take care of persons with different disabilities (SEE-ME project).

8.5.3. Innovation using new technologies, digital tools

One of the case studies within the assignment aimed to show how digital applications and tools can make cross-border cooperation and communication more effective in enhancing the capability to manage risks. The study illustrates three inspiring examples of collaboration, i.e. in the development of warning systems and improving response efficiency to various hazards in Norway, Finland, and Sweden; in the management of insect-related health risks between Romania and Bulgaria; and regarding the integrated hydro-meteorological risk management framework established between Italy and Croatia.

The Haga Cooperation, involving five Nordic countries, has been instrumental in initiating and fostering cross-border radio communication cooperation. The extensive border between Norway, Finland and Sweden highlights the need for uninterrupted communication to ensure timely interventions during emergencies. The TETRA technology offers valuable features for emergency services, including group communication and interoperability with other systems.

The AdriaMORE project, funded by the EU through the INTERREG Italy-Croatia CBC Programme, unites four partners from Croatia and Italy. Its primary focus is the enhancement of the integrated hydro-meteorological risk management platform along the Adriatic coast, building on the accomplishments of previous initiatives such as ADRIARadNet and CapRadNet. These initiatives aimed at establishing a cross-border infrastructure for observing and forecasting systems dedicated to civil protection. AdriaMORE's key objectives encompass strengthening the existing monitoring system, integrating maritime environmental data with hydrometeorological information, improving hydro-meteo-marine risk forecasting, and evaluating the impact of coastal floods on various parameters. Notably, the project addresses the need for historical flood data, leveraging hydrological modelling from prior projects to assess hydro-meteorological risks. A significant innovation is the integration of a hydro-meteo-marine forecast system into the existing ICT framework, marking a pioneering effort for civil protection applications.

The innovative aspect of the AdriaMORE project is that it managed to build a hydro-meteo-marine forecast system integrated into the existing ICT system. This system fulfils the need for establishing a comprehensive hydrometeorological-maritime monitoring and forecasting system for the Adriatic Sea coastlines in the presence of flooding and extreme weather hazards. This represents a pioneering study for civil protection applications.

⁴⁹ <https://www.gov.si/en/registries/projects/european-project-safe-and-equal-in-emergencies-see-me/>

DAREnet (Danube River Region Resilience Exchange Network) supported flood management practitioners across the EU Danube River region to deepen and broaden their Research, Development, and Innovation (RDI) related collaboration. The project was financed by the EU Horizon2020 programme. DAREnet built a multi-disciplinary community of practitioners, operating in a network of civil protection organisations, and supported by a broad range of stakeholders from policy, industry, and research to foster synergies, innovation, and its uptake. DAREnet presented a regularly updated RDI Roadmap that highlighted promising innovation opportunities to cope with the main challenges in the region and improve flood resilience in the future. The project drew upon synergies with the modules and facilities of the UCPM and the regional strategies for flood prevention and risk management of the ICPDR and EUSDR.

Gaps and recommendations

From the case study, we can conclude that cross-border communication and cooperation between two or more countries, particularly in the context of public safety and emergency services, are essential to address emergency situations and ensure effective responses in border regions. For an efficient use of the communication networks, joint exercises and trainings are often organised. This ensures that their public safety personnel are familiar with cross-border communication protocols and can effectively collaborate during crises.

When there is an overall cooperation framework (e.g. [Haga cooperation](#)) it would be much easier to launch a cross-border radio communication cooperation between countries. Adequate funding is an important factor of success as well as continuous end-user engagement.

The interconnected emergency communication networks contribute significantly to EU Disaster Resilience Goals, enhancing the effectiveness and interoperability of warning systems and facilitating more efficient responses to various hazards.

The lessons learned from the interlinked networks emphasise the importance of regular training, operational cooperation, and policy-level meetings. Despite the absence of monitoring systems, the initiative has demonstrated tangible impacts, contributing to lives saved and enhanced civil mechanism capabilities.

Illustrative examples

- **Spain's National Emergency Monitoring and Coordination Centre (CENEM):** CENEM demonstrates how satellite technology can be effectively harnessed for early warning and prediction of forest fires. By using satellite imagery to identify fire hotspots, CENEM provides early warnings and predicts potential fire spread. This system also facilitates international collaboration by sharing valuable data, particularly with its Portuguese counterpart.
- **Iberian Study on patents and forest fire control:** The joint study "Patents and forest fire control" conducted by the Portuguese Institute of Industrial Property (INPI) and the Spanish Patent and Trademark Office (OEPM) showcases technological collaboration between Spain and Portugal. This study highlights the most promising patented technologies in firefighting and rural fire control, emphasising the crucial role of industrial property in encouraging innovation and fostering collaboration between the two countries.

8.5.4. Nature-based solutions, working with natural processes (floods, wildfire, droughts, climate-proof building) including building partnerships with stakeholders

Nature-based solutions (NBS) and Green Infrastructure (GI) are alternative approaches to DRM. NBS rely on natural processes and ecosystem services and can be implemented alone or in combination with engineering solutions⁵⁰. NBS and GI are a part of the EU Biodiversity Strategy. GI role for DRM is prominent mainly in protection against flood, storm surge, landslide, and wind protection (EEA, 2016a). In its reports, the EEA emphasised the strong link between GI, DRM and Climate Change adaptation also in combination with disaster reduction infrastructure. The **EU Climate Change Adaptation Strategy** reiterates that nature-based solutions should be prioritised for climate resilience to water impacts.

While flooding cannot be prevented, restoring rivers to a more natural state, and undertaking sustainable measures across the basin can greatly reduce their frequency and the damage they cause (ICPDR, 2015). The Danube Flood Risk Management Plan Update 2021 gives special attention to measures employing areas which have the potential to retain flood water, such as natural floodplains as well as the other areas enabling controlled flooding. The key lessons from the 2010 floods have shown that the risk of flood damage could be dramatically reduced by creating dry polders, revitalising floodplains, and providing regular maintenance of river channels to ensure unhindered flow during extreme flooding events. These solutions are also relevant for cross-border areas and transnational cooperation has provided a contribution of new ideas that partners are applying in their territories. (case study on Flood Management in the Danube Basin)

The **EU Biodiversity Strategy** reiterates that it will be important to set up ecological corridors to prevent genetic isolation, allow for species migration, and maintain and enhance healthy ecosystems. In this context, investments in green and blue infrastructure and cooperation across borders among Member States should be promoted and supported, including through the European Territorial Cooperation⁵¹.

Gaps and recommendations

The topic of nature-based solutions does not have a strong border implication per se but should be horizontally integrated in any prevention measures that take place in border areas.

Nature-based solutions could be used more widely for addressing flood risks. To increase resilience, countries accumulated experience in applying nature-based solutions in transboundary areas by improving the natural capacity to retain and release peak floods.

Vegetation of fire-resistant trees can help control wildfires and could also be implemented in border territories.

Illustrative examples

- **Fire-resistant vegetation at the Greece-North Macedonia border:** Despite the rugged mountain terrain along the Greece-North Macedonia border, the area predominantly features fire-resistant trees. This vegetation plays a crucial role in controlling wildfires, as it reduces the spread of fires and helps mitigate their impact.

⁵⁰ World Bank, 2021, Investment in Disaster Risk Management in Europe Makes Economic Sense

⁵¹

The natural resilience of these trees serves as an effective defence against wildfires, contributing to the region's fire management efforts.

- **INTERREG Danube project: Danube Floodplain for flood risk reduction:** The INTERREG Danube project, Danube Floodplain, exemplifies a nature-based approach to flood management. The project focuses on reducing flood risk in urban areas by reconnecting the river to its floodplains. By restoring natural floodplains and improving transnational water management, the project aims to prevent floods while simultaneously benefiting biodiversity conservation.

8.5.5. Cooperation with the private sector, cross-border infrastructure, critical infrastructure management

According to an EC DG RTD representative, critical infrastructure is generally complex to manage, not least because it is often a private-public partnerships, which implies more severe legal constraints as compared to fully public infrastructure.

In terms of technological risks, local authorities (e.g. cities) and industry should be further involved in exercises on risks, particularly technological risk.

8.5.6. Comprehensive approaches for cooperation over a longer period

Long-lasting comprehensive approaches for cooperation happen mainly in regions with long history of cooperation such as Benelux, the Nordic countries but also the Baltic countries and Czechia and Slovakia. For example, it could be observed that the number of bilateral agreements is higher in these instances and there are governance structures which precede the ones on an EU level, and which continue to be operational and complementary ensuring a higher degree of integration.

Gaps and recommendations

In border areas where there is no language barrier or where the countries on both sides of the border have had stronger historical connections (e.g. Czechia and Slovakia; Benelux; Ireland and Northern Ireland; Slovenia, Croatia and Serbia, etc.), the countries on both sides of the borders should capitalise on these historical links.

According to the Irish representative, as in Ireland and Northern Ireland (UK), there are concerns that resourcing may drop off or divergence may increase post Brexit, efforts should be made to stick to the historic cooperation that exists beyond EU structures.

Illustrative examples

- **Visegrad 4:** There is a strong connection in the area of climate data sharing and early warning and no language barrier with CZ, but there is a problem with the funding of the cross-border projects.
- **Nordics:** Both the Danish and Swedish legislation are quite similar, so it works about the same to receive and get help. It is easier to work on the local level than state level. If state resources are requested, then it would have to be brought up on the national level and could be more complicated. But as long as the risk can be handled among local actors (i.e. Hovedstadens Beredskab and Rådningstjänst Syd), few obstacles in terms of legislation exists. There is a lot of cooperation between the municipalities on the two sides of the Oresund strait, for example linked to resources, who pays for assistance, responsibilities etc. The relations between Danish municipalities and Malmö (and Rådningstjänst Syd) are as with any other Danish municipality. They can request assistance from Hovedstadens Beredskab and be treated the same way as Danish municipalities and vice versa. (Denmark)
- **Baltics:** There are frequent meetings and discussions between Estonia, Latvia and Lithuania – the Baltic collaboration is really tight. (Estonia)
- **Ireland/Northern Ireland (UK):** Long term relationships built over a long period of time, and they work really well. Lots of Agreements on shared services between border groups, shared work on climate change risks and planning, particularly in North Western Ireland (Derry & Donegal). For example, during the heavy rains in 2017, they have been able to provide a blended response around the border by establishing a Command and control centre, by managing the immediate response and the engagement of other areas and by crossing the border for dealing with damage to road in (Ireland).
- **Ireland/Northern Ireland (UK):** There is a deep sense of 'pragmatic cooperation in the border region', covering all emergency services. The basis for cooperation between UK, NI executive and Republic of Ireland exists in primary legislation in both UK and Ireland and is underpinned by the good Friday Agreement.

ANNEX 1. BIBLIOGRAPHY

- Association of European Border Regions (AEBR), 2021. "Border Regions for the EU Green Deal: Obstacles and Solutions to Cross-border cooperation in the EU". Available at: <https://op.europa.eu/en/publication-detail/-/publication/1d74eec5-5bc5-11ec-91ac-01aa75ed71a1/language-en>
- b-solutions, 2020. "Solving Border Obstacles: A Compendium of 43 Cases". Available at: https://www.b-solutionsproject.com/files/ugd/8f68c1_4ce87ef8407445839b3b19c392c5a2a2.pdf
- British Institute of International and Comparative law, 2010. "Analysis of Law in the European Union pertaining to Cross-Border Disaster Relief". Available at: https://disasterlaw.ifrc.org/sites/default/files/media/disaster_law/2020-09/193300-Analysis-of-law-in-EU-EN.pdf
- ESPON, 2019. "Cross-border Service, Summary Report". Available at: <https://www.espon.eu/sites/default/files/attachments/ESPON%20CPS%2016%20Syntesis%20Report.pdf>
- ESPON, 2021. "Cross-border Public Services 2.0". Available at: <https://www.espon.eu/cps-2>
- European Agricultural Fund for Rural Development, 2014. "Is EU support for preventing and restoring damage to forests caused by fire and natural disasters well managed?". Available at: <https://op.europa.eu/en/publication-detail/-/publication/aacca99d-0a8b-4743-ba54-03959a135d87>
- European Commission, 2009. "Communication, European Union Strategy for the Baltic Sea Region COM(2009) 248 final". Available at: https://ec.europa.eu/regional_policy/sources/docoffic/official/communic/baltic/com_baltic_en.pdf
- European Commission, 2010. "Communication, EU Strategy for the Danube Region COM(2010) 715 final". Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC0715&from=EN>
- European Commission, 2017. "Quantification of the effects of legal and administrative border obstacles in land border regions". Available at: https://ec.europa.eu/futurium/en/system/files/ged/quantif_effect_borders_obstacles_1.pdf
- European Commission, 2021. "Communication, Forging a climate-resilient Europe – the new EU Strategy on Adaptation to Climate Change, COM/2021/82 final". Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:82:FIN>.
- European Commission, 2021. "Communication, New EU Forest Strategy for 2030". Available at: https://ec.europa.eu/environment/strategy/forest-strategy_en
- European Commission, 2022. "Eighth Report on Economic, Social and Territorial Cohesion". Available at: https://ec.europa.eu/regional_policy/information-sources/cohesion-report_en
- European Commission, "EU Floods Directive 2007/60/EC". Available at: https://ec.europa.eu/environment/water/flood_risk/implem.htm

- European Commission, 2021. “EU Border Regions: Living labs of European integration”. Available at: https://ec.europa.eu/regional_policy/information-sources/publications/reports/2021/eu-border-regions-living-labs-of-european-integration_en
- European Commission, 2020. “Overview of natural and man-made disaster risks the European Union may face”. Available at: <https://op.europa.eu/en/publication-detail/-/publication/89fcf0fc-edb9-11eb-a71c-01aa75ed71a1>
- European Commission. “European Civil Protection and Humanitarian Aid Operations – EU Civil Protection Mechanism”. Available at: https://ec.europa.eu/echo/what/civil-protection/mechanism_en
- European Environment Agency, 2017. “Climate change adaptation and disaster risk reduction in Europe”. Available at: <https://www.eea.europa.eu/publications/climate-change-adaptation-and-disaster>
- Hochrainer-Stigler, S. et al, European Parliament, REGI Committee, 2022. “EU Tools to Respond to Natural Disasters”. Available at: [https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU\(2022\)699637](https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU(2022)699637)
- European Union, “Decision (EU) 2019/420 9 amending Decision No 1313/2013/EU on a Union Civil Protection Mechanism”. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019D0420&from=EN>
- GreenEdge Consulting, 2022. “Building Blocks and Gaps in Crisis Management and Resilience in EU internal Cross-border Regions”
- International Federation of Red Cross and Red Crescent Societies, 2017. “International Disaster Relief (IDRL) Guidelines”. Available at: https://disasterlaw.ifrc.org/sites/default/files/media/disaster_law/2020-09/1205600-IDRL-Guidelines-EN-LR.pdf
- Joint Research Centre (EC), 2021. “Recommendations for National Risk Assessment for Disaster Risk Management in EU”. Available at: <https://op.europa.eu/en/publication-detail/-/publication/7cc8b9ec-7651-11eb-9ac9-01aa75ed71a1>
- The Disaster Risk Management Knowledge Centre, 2020. “Science for disaster risk management 2020: acting today, protecting tomorrow”. Available at: <https://reliefweb.int/report/world/science-disaster-risk-management-2020-acting-today-protecting-tomorrow>
- The Disaster Risk Management Knowledge Centre, 2017. “Science for disaster risk management 2017: Knowing better and losing less”. Available at: <https://op.europa.eu/en/publication-detail/-/publication/4bc0e055-3712-11e7-a08e-01aa75ed71a1/language-en>
- The European Union Agency for Cybersecurity, 2022. “Threat Landscape 2023”. Available at: <https://www.enisa.europa.eu/topics/cyber-threats/threats-and-trends>
- UCP Knowledge Network, 2023. “Building Blocks and Gaps in Crisis Management and Resilience in EU internal Cross-border Regions”. Available at: <https://civil-protection-knowledge-network.europa.eu/news/cross-border-resilience-and-crisis-management>
- United Nations Office for Disaster Risk Reduction, 2020. “Sendai Framework Monitoring in Europe and Central Asia: A Regional Snapshot”. Available at: <https://www.undrr.org/publication/sendai-framework-monitoring-europe-and-central-asia-regional-snapshot>

- World Bank, 2021. “Financial Risk and Opportunities to Build Resilience in Europe”. Available at: https://civil-protection-humanitarian-aid.ec.europa.eu/system/files/2021-06/wb_ec_2021_disaster_economics_financial_protection_c2.pdf
- World Bank, 2021. “Investments in Disaster Risk Management (Background and Summary Reports)”. Available at: https://civil-protection-humanitarian-aid.ec.europa.eu/system/files/2021-06/wb_ec_2021_disaster_economics_investments_background_c1.pdf
- World Bank, 2021. “Understanding the Needs of Civil Protection Agencies and Opportunities for Scaling up Disaster Risk Management Investments”. Available at: https://civil-protection-humanitarian-aid.ec.europa.eu/system/files/2021-06/wb_ec_2021_disaster_economics_cp_summary_c3.pdf

ANNEX 2. INTERVIEW GUIDELINES

The questions depended on the type of stakeholder interviewed. Below is a generic guide which has been adapted to each interviewee.

Questions on sources of information

- Are you aware of any sources of information and/or datasets related to border areas in the country? a/ platforms; b/ datasets; c/ reports, etc. d/ projects in the border areas.
- Are you aware of particular tools, processes and other governance aspects in border areas?
- Are you aware of concrete funding for the Disaster Risk Management in border areas?
- Are you aware of good practices in disaster risk management in border areas in Europe or in one of the borders or border segments in your country that could be transferred to other border areas in Europe?

Question on risk validation (of course, it is better if this happens through email exchange)

- Based on the following methodology we have provided the following assessment of risks, risk exposure and impacts in border territories. Do you agree with these?

Question on funding

- Have you accessed particular funding for improving civil protection and DRM in border areas in your country and what are the lessons learned? (will inform recommendations to EU level)

Questions on gaps and recommendations (the most precious ones)

Legal framework

- Is the European legal framework (e.g. UCPM, sectoral directives, etc.) sufficiently addressing the particularities of border areas? If not, why and what could be changed? (will inform recommendations to EU level)
- Is the policy framework linked to the specific risks included in sectoral legislation satisfactory and are there risks which are not sufficiently covered??
- What are the gaps in the legal framework on Disaster Risk Management on a national and regional/local level impacting border territories? What could be improved especially with regards to border territories?

Governance

- Are the disaster prevention, preparedness and response mechanisms put in place at European level adequate for cross-border territories? [EU level]
- What are the gaps in the governance framework on Disaster Risk Management on a national and regional/local level impacting border territories? What could be improved especially with regards to border territories?
- Is the interoperability of systems adequately addressed? Should this be more closely “framed” at European level? [EU level]
- What concrete actions could be taken up on national, regional and local level to improve common action in Disaster Risk Management, solidarity, resilience in border areas?

ANNEX 3 GLOBAL, NON-EU LEVEL POLICIES AND THEIR IMPLICATIONS FOR DRM IN CROSS-BORDER TERRITORIES

| Name of policy | Information of relevance to cross-border cooperation on DRM |
|---|--|
| Sendai Framework for Disaster Risk Reduction | The Sendai Framework provides a framework for Parties to set up their legal and institutional frameworks at local, national and regional levels to address the prevention of, preparedness for, and response to industrial accidents. It focuses on disaster risk reduction arising from hazardous activities which can cause a transboundary effect in case of accident. The Convention can be regarded as a mechanism for regional and subregional cooperation, as it addresses local and transboundary disaster risk reduction in case the consequences of an accident travel across borders and supports capacity development. |
| UNECE Convention on the Transboundary Effects of Industrial Accidents | Obliges parties to identify all potentially hazardous operations with trans-boundary destructive potential. Regarding preparedness, parties to convene and make their contingency plans compatible or even draw up joint plans. The convention encourages bi-and multi-later agreements under this convention. |
| International Health Regulations | (Art.21) Parties sharing common borders should consider: (a) entering into bilateral or multilateral agreements or arrangements concerning prevention or control of international transmission of disease at ground crossings in accordance with Article 57; and (b) joint designation of adjacent ground crossings for the capacities in Annex 1. The development of "bi-national" contingency plans with minimum content for the inclusion in plans of action where two countries share a border, for public health emergencies of international concern (PHEIC). |
| Council of Europe Convention on the Prevention of Terrorism (2005) | Art.4 on international cooperation on prevention does not specifically refer to border territories but is very relevant to them and is directly applicable. |
| Movement of Hazardous Waste | While the Basel Convention addresses the issue of cross-border movement of waste it does not specifically address potential accidents (and risk thereof) at the border itself. |

ANNEX 4. EU COORDINATION SYSTEMS, PLATFORMS, INITIATIVES, DATA HUBS AND KNOWLEDGE PORTALS

EU coordination systems, platforms, initiatives, data hubs and knowledge portals

| Name | Description | Relevance to cross-border territories |
|---|--|--|
| European Response Coordination Centre (ERCC) | <p>ERCC is the heart of the Union Civil Protection Mechanism. It carries out monitoring tasks at the EU and global level and coordinates the delivery of assistance (in terms of teams, experts, modules, items.) to disaster-stricken countries when the UCPM is activated. ERCC is managed by the EC at DG ECHO premises in Brussels 24/7.</p> <p>Besides ensuring coordination of assistance, the centre also has some budgetary competences: It can co-finance operational costs (e.g. transport costs) and thereby lower the financial burden on assisting states. The centre provides monitoring and real-time reaction. It is activated upon national or UN requests and operates both inside and outside the EU.</p> | <p>The ERCC is not specifically designed for cross-border risk management, however, as a coordination hub it has the capacity to manage several incidents at once. Thus, it operates in the event of two or more MS requesting for international assistance through the UCPM for a shared border region.</p> |
| Common Emergency Communication and Information System (CECIS) | <p>CECIS facilitates communication between the ERCC with National Authorities, making response to disasters faster and more effective. This interconnection facilitates exchange of information between authorities responsible for Civil Protection and Marine Pollution to improve the capabilities of these organisations to deal with emergencies,</p> <p>Its main task is to host a database on potentially available assets for assistance, to handle requests for assistance based on these data, to exchange information and to document all action and message traffic.</p> <p>The end-users of CECIS are the ERCC and National Contact points.</p> | |
| EU Civil Protection Knowledge Network | <p>Launched in December 2021, aiming to strengthen the UCPM in preventing, preparing for and responding to disasters. It brings together civil protection and disaster management actors to collaborate and learn from each other with the objective of strengthening the EU's overall ability and capacity to deal with disasters. The Knowledge Network includes the training, exercises, exchanges, and lesson-learned programmes of the UCPM.</p> <p>There are good practices and funding opportunities available.</p> | |
| Early Warning and Response System (EWRS) | <p>The EWRS is a tool for communicable diseases in the EU which ensures an effective response by the EU to events and emergencies related to communicable diseases. It is a web-based system linking the EC, the public health authorities in MS responsible for controlling communicable diseases and the European Centre for Disease Prevention and Control (ECDC). EEA countries are also linked to the system.</p> <p>EWRS is a tool with restricted access for monitoring public health threats in the EU. Access and posting are confidential and only accessed by ECDC, the Member States and the Directorate General Health and Food Safety (SANTE).</p> | |

Strengthening the resilience of EU border regions: Mapping risks & crisis management tools and identifying gaps

| Name | Description | Relevance to cross-border territories |
|--|--|---------------------------------------|
| DRMKC - Disaster Risk Management Knowledge Centre | DRMKC within the JRC provides a networked approach to the science-policy interface in DRM across the Commission, EU Member States and the DRM community within and beyond the EU. Focuses on enhancing the knowledge-based support to DRM. Builds on 3 pillars: knowledge, partnership, innovation. Several relevant tools available especially the Risk Data Hub. | |
| DRMKC – INFORM | INFORM (Index for Risk Management) is a global tool designed to measure the risk of humanitarian crises and disasters. It can support decisions about prevention, preparedness, and response. It provides a risk profile for 191 countries, assigning a rating between 0 and 10 for overall risk and its components. INFORM uses 50 indicators to assess hazards, exposure, vulnerability, and available resources. It is open source, freely available, and regularly updated, allowing organisations to prioritise countries, compare risk profiles, and adapt it for regional (within the countries) or national risk assessments. The aim is to enhance preparedness, reduce risks, increase resilience, and contribute to sustainable development by fostering coordination and effectiveness among organisations. | |
| DRMKC Risk Data Hub (RDH) | A web platform, for collecting, managing, and sharing disaster risk as well as damage and loss data. The RDH aims at supporting the implementation of the EU Strategy on Climate Change Adaptation and the understanding of the EU risk landscape as part of the Sendai Framework for Disaster Risk Reduction and at facilitating reporting by Member States, to help meet the objectives of Decision No 1313/2013/EU of the Union Civil Protection Mechanism. The development of the platform is based on the results of “Needs and Gap analysis” performed as part of the preparation of the EC Staff Working Document – “Overview of Natural and Man-made Disaster Risks the European Union may face” (latest two versions 2017, 2020). The RDH adopts the comprehensive framework of policies and guidelines, data sharing initiatives and spatial data infrastructures with the purpose of setting the bases for knowledge for DRM at local, regional, national, supra-regional and Europe-wide level. The platform hosts, curates and disseminates data, tools and methodologies for Disaster Risk Management (DRM). Among its key functionalities, it offers an open-source methodology for risk assessment as well as an authoritative loss and damage database that can provide an analysis of the losses due to disasters at European level. | |
| Copernicus Emergency Management Service (CEMS) | <p>CEMS is an EU programme aimed at developing European information services based on satellite Earth Observation and in situ (non-space) data. Copernicus is a user driven programme and the information services provided will be freely and openly accessible to its Users, mostly public authorities.</p> <p>CEMS provides information for emergency response in relation to different types of disasters, including meteorological hazards, geophysical hazards, deliberate and accidental man-made disasters and other humanitarian disasters, as well as prevention, preparedness, response, and recovery activities. CEMS consists of the Mapping Service and of the Early Warning System (floods).</p> | |
| European Forest Fire Information System (EFFIS) (part of Copernicus) | EFFIS supports the services in charge of the protection of forests against fires in the EU and neighbouring countries and provides the EC services and the European Parliament with updated and reliable information on wildland fires in Europe. Since 1998, EFFIS is supported by a network of experts from the countries in what is called the Expert Group on Forest Fires, which is registered under the Secretariat General of the European Commission. Currently, this group consists of experts from 43 countries in European, Middle East and North African countries. In 2015, EFFIS became one of the components of the Emergency Management Services in the EU Copernicus programme. | |
| European Flood Awareness System | EFAS is the first operational, pan-European flood forecasting and monitoring system. EFAS provides a wide range of complementary early flood forecasting information based on models, satellites, and in-situ data. National and regional authorities with flood risk management duties can make use of the information provided to arrange preparatory measures before an event strikes. In addition, EFAS provides a unique overview | |

Strengthening the resilience of EU border regions: Mapping risks & crisis management tools and identifying gaps

| Name | Description | Relevance to cross-border territories |
|--|--|--|
| (EFAS) (part of Copernicus) | across Europe and neighbouring countries on currently observed and forecasted flood events for the Emergency Response Coordination Centre (ERCC) of DG ECHO. | |
| European Drought Observatory (EDO) (part of Copernicus) | EDO contains drought-relevant information such as maps of indicators derived from different data sources (e.g., precipitation measurements, satellite measurements, modelled soil moisture content). Different tools, like Compare Layers, allow for displaying and analysing the information and drought reports give an overview of the situation in case of imminent droughts. | |
| rescEU | The EC upgraded the UCPM and created rescEU to further protect citizens from disasters and manage emerging risks. rescEU was established as a reserve of European capacities, fully funded by the EU. It includes a fleet of firefighting planes and helicopters, medical evacuation planes, and a stockpile of medical items and field hospitals that can respond to health emergencies. The rescEU reserve also includes shelters, transport and logistics assets and energy supply items. Reserves are also being developed to respond to chemical, biological, radiological, and nuclear (CBRN) risks. These include decontamination and detection, as well as reserves of CBRN medical countermeasures. | |
| Global human settlement layer (GHSL) | Open and free data and tools for assessing the human presence and built up infrastructure on the planet. | |
| Cities Climate Hazards CDP Open Data Portal | CDP-ICLEI Track is the world's leading climate reporting platform and progress accountability mechanism for cities. It tracks 1,100 cities' climate action in 2021. These cities are reporting over 8,000 urban sustainability actions (such as energy efficiency and increased green spaces). CDP-ICLEI Track also measures their progress on the UN-backed climate campaigns, Race to Zero and Race to Resilience, which bring cities, businesses and investors together to create a zero-carbon and resilient future. Through CDP-ICLEI Track, cities are also able to report to several initiatives such as numerous ICLEI initiatives, C40, WWF and Global Covenant of Mayors at the same time. | |
| European River Catchments (ERC) | The purpose of the European river catchments (ERC) data hub is to provide a homogeneous European catchments dataset at scale 1:1 million that can be used together with the digital topographic data of EuroGlobalMap. | Geodatabase of European river catchments; potentially relevant for cross border risks connected to river flows e.g. chemical pollution https://www.eea.europa.eu/data-and-maps/data/european-river-catchments-1 Map of European river catchments https://www.eea.europa.eu/data-and-maps/figures/european-river-catchments-geographic-view-1 |
| European Commission's Knowledge Centre on Migration and Demography | The EC KCMD Data Portal supports an evidence-informed EU policymaking in areas related to demography, migration, and mobility. It provides a single entry point to data and knowledge on migration and demography relevant to EU policies. The portal allows for the use of the data catalogue and of the interactive tools for analysis and visualisation. | |

Strengthening the resilience of EU border regions: Mapping risks & crisis management tools and identifying gaps

| Name | Description | Relevance to cross-border territories |
|---|---|---|
| (KCMD) Data Portal | | |
| European Severe Weather Database (ESWD) | The objective of the ESWD is to collect and provide detailed and quality-controlled information on severe convective storm events over Europe. In collaboration with our partners including networks of voluntary observers, meteorological services and general public, many tens of thousands of reports have been collected. It is operated by the European Severe Storms Laboratory (ESSL). | |
| Desinventar Disaster Information Management System | - The Disaster Information Management System is a sustainable arrangement within an institution for the systematic collection, documentation and analysis of data about losses caused by disasters associated with natural hazards. It is a tool that helps to analyse the disaster trends and their impacts in a systematic manner. With increased understanding of the disaster trends and their impacts, better prevention, mitigation and preparedness measures can be planned to reduce the impact of disasters on the communities. The Disaster Information Management System (Desinventar methodology) includes a software product with two main components: Administration and Data Entry module as a relational and structural database, and Analysis module that allows access to the database. | |
| Database of INTERREG projects KEEP | In the database of keep.eu, specific documents from INTERREG projects, documents, INTERREG Programmes, and INTERREG partnerships can be searched for using filtering keywords, e.g. Disaster. Map images and data can be downloaded | Many of the INTERREG projects are cross-border by default and address the issue of DRM. |
| ThinkHazard! | ThinkHazard! provides a general view of the hazards, for a given location, that should be considered in project design and implementation to promote disaster and climate resilience. The tool highlights the likelihood of different natural hazards affecting project areas (very low, low, medium and high), provides guidance on how to reduce the impact of these hazards, and where to find more information. The hazard levels provided are based on published hazard data, provided by a range of private, academic, and public organisations. | |
| JRC Drought Risk Atlas | The European Drought Risk Atlas provides a detailed and disaggregated view of drought risks in EU regions, offering insights into the impacts on societies and ecosystems. It combines expert knowledge and machine learning to assess drought risks, considering current conditions and projected climate scenarios. | |
| Cross-Border Crisis Response Integrated Initiative (CBCRII) | The CBCRII is European Parliament pilot project with the aim of delivering for key results: <ol style="list-style-type: none"> 1. a report on the consequences of the COVID-19 crisis in border regions 2. the development of an IT infrastructure to host and update information on cross-border public services in cross-border regions 3. the development of an action plan to systematise solidarity and crisis management in EU cross-border regions 4. boost in the potential of border regions through co-development, cross-border spatial planning and multi-level governance. | |

Strengthening the resilience of EU border regions: Mapping risks & crisis management tools and identifying gaps

| Name | Description | Relevance to cross-border territories |
|-------------|---|---------------------------------------|
| b-solutions | b-solutions and its extension b-solutions 2.0: Solving Cross-Border Obstacles are initiatives to tackle legal and administrative border obstacles along EU internal borders. They are promoted by DG REGIO as one of the actions proposed in the referred Communication Boosting growth and cohesion in EU border regions. The initiative is managed by the Association of European Border Regions (AEBR). With b-solutions, AEBR and DG REGIO strive to be closer to local administrations in border areas: the initiative represents a great occasion to collect information with a bottom-up approach in which practitioners of cross-border cooperation can tell what obstacles they encounter when trying to realise projects with the neighbouring countries. | |

ANNEX 5. OVERVIEW OF KEY EU LEGAL FRAMEWORK IN DRM

Treaty of the European Union

Article 174 of the Treaty of Lisbon states that “in order to promote its overall harmonious development the Union, should pay particular attention to rural areas, areas affected by industrial transition, and regions which suffer from severe and permanent natural or demographic handicaps such as the northernmost regions with very low population density and island, **cross-border** and mountain regions”.

Union Civil Protection Mechanism (UCPM)

Civil protection is a competence of EU Member States, while the European Commission has a coordinating and support role.

A Community mechanism to facilitate cooperation in civil protection assistance interventions was established in 2001 through a Council Decision (2001/792/EC, Euratom – no longer in force). The Decision was recast in 2007 and in 2013, it was thoroughly reformed and replaced as a Decision of the European parliament and the Council on a Union Civil Protection Mechanism. Decision 1313/2013 was amended twice, in 2019 and 2021, and it serves as the current legislative framework of the UCPM.

The UCPM promotes collaboration on civil protection to improve prevention, preparedness and response to disasters caused by natural and human-induced hazards. Strengthening cooperation between Member states and Participating States for an effective, coordinated assistance to affected countries is one of the UCPM's main goals. Within the UCPM, Member States and Participating states are obliged to provide the Commission with summaries of the relevant aspects of their Risk Assessments at the national (or sub-national) level and the assessment of their risk management capability, focusing on key risks. UCPM Countries are also required to provide information on the priority prevention and preparedness measures needed to address key risks with cross-border impacts, and, where appropriate, high impact with low probability risks (HILP).

Reforms of the Union Civil Protection Mechanism

In 2017, the Commission put forward a proposal to revise the UCPM legislation in order to: (i) boost the EU's collective ability to respond to disasters, (ii) improve prevention, and (iii) simplify administrative procedures for a more agile response. The revised UCPM legislation entered into force in spring 2019 and strengthened the incentives for Member States and Participating States to offer their own response capacities to the European Civil Protection Pool (ECP). In addition, the legislation brought in a **new reserve of European response capacities called “resceEU”**. This reserve is designed to be an additional safety net, to be mobilised in worst-case disaster scenarios, when emergency assistance from the ECP cannot be mobilised or is not sufficient. The 2019 revision introduced the **Union Civil Protection Knowledge Network** to help build a shared culture of disaster risk management in Europe through training, joint exercises, and knowledge sharing⁵².

The 2021 reform included **new provisions on risk management and information sharing** between UCPM Countries and the Commission as a basis for building a better collective understanding, prevention of and preparedness for risks that may potentially lead to disasters in Europe. There is an increased focus on sharing of information concerning cross-border risks and risks with low likelihood but a potentially high impact.

The most recent amendment of the UCPM Decision introduced two key enhancements to the EU's risk management capabilities for addressing cross-border effects: **Union disaster**

⁵² GreenEdge Consulting, 2022, Building Blocks and Gaps in Crisis Management and Resilience in EU internal Cross-border Regions

resilience goals and cross-sector disaster scenarios. Cross-border and cross-sector disaster scenarios, currently under development, encompass both natural and man-made drivers including climate change, and provide input for comprehensive disaster prevention, preparedness, and response planning and management.

The following provisions relevant to border areas have been introduced with the 2021 revision of the UCPM legislation⁵³.

Table 2 Cross-border aspects of UCPM

| Article | Information of relevance to cross-border cooperation on DRM |
|----------------|---|
| Article 3.1(f) | to step up cooperation and coordination activities at cross-border level and between Member States prone to the same types of disasters. |
| Article 5.1(c) | establish and regularly update a cross-sectoral overview and map of natural and man-made disaster risks , including risks of disasters which cause or are capable of causing multi-country transboundary effects, the Union may face, by taking a coherent approach across different policy areas that may address or affect disaster prevention and taking due account of the likely impacts of climate change; |
| Article 5.1(i) | highlight the importance of risk prevention , support the Member States in awareness-raising, public information and education , and support the Member States' efforts in the provision of public information on alert systems, by providing guidance on such systems, including on a cross-border level; |
| Article 6.1(c) | further develop and refine disaster risk management planning at national or the appropriate subnational level, including as regards cross-border collaboration , taking into account the Union disaster resilience goals, and the risks related to disasters which cause or are capable of causing multi-country transboundary effects; |

UCPM-related tools

To enhance preparedness and response to disasters at EU level, the Mechanism sets up a 24/7 operational **Emergency Response Coordination Centre (ERCC)** that coordinates the EU's disaster-response efforts. The ERCC is managed by the European Commission in Brussels and acts as a communication and coordination hub between MS, PS and civil protection and humanitarian experts.

Disaster assistance can take the form of relief items, expertise, civil protection teams, specialised equipment. UCPM countries contribute either through material resources or reserve pools of human assistance. Besides ensuring coordination and coherence, the centre also has some budgetary competences: it can co-finance operational costs (e.g. transport costs) and thereby lower the financial burden on assisting states. The centre provides monitoring and real-time reaction. It is activated upon national or UN requests and operates both inside and outside the EU.

The ERCC is **not specifically designed for cross-border risk management**, however, as a coordination hub it coordinates the assistance provided by UCPM countries through the Mechanism to the affected country requesting for assistance, with the aim of avoiding duplication/ensuring coherence and designing a tailored response.

As pointed out by an ERCC representative, despite the availability of bilateral agreements, countries often directly ask for international assistance to the UCPM. For example, in the case of Spain and Portugal, cooperation is smooth, but in the case of more serious events both countries turn to the EC.

The ERCC functions are supported by a web-based alert and notification application known as **CECIS** (Common Emergency Communication and Information System). The **CECIS** is a tool allowing for immediate emergency communication among the UCPM countries. making

⁵³ Regulation (EU) 2021/836 of the European Parliament and of the Council of 20 May 2021

response to disasters faster and more effective. It facilitates the exchange of information and experience between authorities responsible for Civil Protection and Marine Pollution to improve the capabilities of these organisations.

Other UCPM tools/initiatives include, among others:

- The UCPM training programme and exercises, to improve countries' disaster response capacity and coordination of civil protection assistance;
- Civil protection modules: units of personnel and equipment ready to mobilise;
- The European Civil Protection Pool: a voluntary pool of pre-committed EU countries' disaster response capacities, ready to mobilise for civil protection operations inside or outside the EU. This includes high-quality modules of relief teams, experts and equipment, and receives higher rates of EU co-financing. The ECPP is available for immediate deployment in response to natural and man-made disasters as part of a collective European intervention. In times of increasing disaster risks, the ECPP allows for a more predictable, faster and coherent EU response to disasters.
- rescEU: it was established after one of the revisions of the UCPM and its aim is to protect citizens from disasters and to manage emerging risks. rescEU was introduced as a reserve of European capacities, fully funded by the EU. It includes a fleet of firefighting planes and helicopters, medical evacuation planes, and a stockpile of medical items and field hospitals that can respond to health emergencies. The rescEU reserve also includes shelters, transport and logistics assets and energy supply items. Reserves are also being developed to respond to chemical, biological, radiological, and nuclear (CBRN) risks. These include decontamination and detection, as well as reserves of CBRN medical countermeasures.⁵⁴

The UCPM provides financial support for activities addressing the different aspects of the disaster management cycle, namely a more coherent and better integrated response in case of emergencies, improved preparedness to deal with disasters and innovative actions to reduce the risk of disaster. Besides grants for single and multi-country projects, training, exercises and exchange of experts, funding allocated to the UCPM is used for the strengthening of the UCPM response capability, including early warning and situational awareness, investments in rescEU, further building the voluntary pooling of Member States civil protection assets, so as to generate enhanced cost-effectiveness through coordinated availability of civil protection assets.

Commission recommendations on Union disaster resilience goals (DRGs)⁵⁵

The Union disaster resilience goals, non-binding targets for boosting capacity to manage cross-border disasters, were defined in five areas in the 2023 Communication⁵ and Commission Recommendation⁵⁶. These include anticipating risks through improved assessment and threat anticipation; enhancing preparedness through risk awareness and readiness; improving early warning systems for timely alerts; strengthening response capacity within the UCPM to assist when a country's capacity is overwhelmed; and maintaining a robust civil protection system that ensures operational readiness, updates continuity plans, promotes coordination, and facilitates information sharing.

The Union disaster resilience goals were developed as a response to unprecedented disasters in recent years to boost disaster resilience in the areas of civil protection. This includes ways to better prepare European countries for natural hazards, including

⁵⁴ https://civil-protection-humanitarian-aid.ec.europa.eu/what/civil-protection/resceu_en

⁵⁵ Commission Recommendation of 8 February 2023 on Union disaster resilience goals 2023/C 56/01

⁵⁶ https://civil-protection-humanitarian-aid.ec.europa.eu/document/download/7b124199-d4d7-43fe-b852-8cee69674d19_en

earthquakes, floods, and wildfires to name a few. It was developed in the context of a revised UCPM (May 2021) and its time horizon is set at 2027-2030 aligned with the UN-led Sendai Framework for Disaster Risk Reduction.

There are five Union disaster resilience goals:

- Anticipate – To improve risk assessment, anticipation, and disaster risk management planning.
- Prepare - To increase risk awareness and preparedness of the population.
- Alert - To enhance early warning. Respond – To enhance the UCPM response capacity.
- Secure - To ensure a robust civil protection system.

The DRGs improve prevention and preparedness for future disasters, using all UCPM tools; contribute to the broader EU resilience agenda; guide the policy dialogue with partner countries.

To kick-start the implementation of the DRGs, each of the five DRGs is accompanied by a flagship initiative (FI). Flagship initiatives will help translate the broader resilience goals and objectives into concrete steps and mobilise relevant stakeholders to cooperate on issues of common interest.

- FI 1: Develop Europe-wide disaster scenarios to support planning and preparedness for disasters that transcend geographical and sectoral borders.
- FI 2: Launch a preparEU pan-European awareness raising programme for disaster resilience targeting wider population.
- FI 3: Link global early warning to local action in Europe.
- FI 4: Scale up the rescEU strategic reserve of response capacities by doubling the aerial firefighting fleet.
- FI 5: Stress-test the emergency operation centres across Europe to ensure they themselves remain resilient in complex emergency situations.

Proposal for a 'Regulation on Facilitating Cross-Border Solutions'

It is important to note that in December, 2023, the Commission adopted an amended proposal for a 'Regulation on Facilitating Cross-Border Solutions'⁵⁷. One of the proposals is that 'Member States set up Cross-Border Coordination Points (CBCP), a new service which will assess any request submitted by border stakeholders on potential obstacles, and act as a liaison between them and the national authorities'. Member States can also apply the Cross-Border Facilitation Tool, a voluntary standard procedure designed to resolve administrative and legal obstacles in cross-border regions.

In a positive way, this initiative answers to a number of concerns voiced within the expert consultation within this assignment with regards to technical and administrative obstacles in border areas to DRM-related cooperation.

⁵⁷ https://ec.europa.eu/regional_policy/sources/policy/cooperation/european-territorial/proposal-facilitating-cross-border-solutions_en.pdf

European Cross-border Mechanism

The **European Cross-border Mechanism**⁵⁸ is an instrument which aims to **simplify cross-border projects** by making it possible, on a voluntary basis and agreed by the competent authorities in charge, for the rules of one MS to apply in the neighbouring Member State. This would apply to a specific project or action limited in time, located within a border region and initiated by local and/or regional public authorities. The European Cross-border Mechanism:

- Establishes Cross-Border Coordination Points at national or regional levels;
- Allows Member States flexibility to opt for the proposed Mechanism or other effective mechanisms;
- Defines initiators and specifies the elements required in the initiative document;
- Involves Cross-Border Coordination Points in both initiating and responding Member States.

Civil Protection Financial Instrument (CPI)

The Commission proposes to renew the **Civil Protection Financial Instrument (CPI)** to provide financial support for activities addressing the different aspects of the disaster management cycle, namely a more coherent and better integrated response in case of emergencies, improved preparedness to deal with disasters and innovative actions to reduce the risk of disaster. The CPI will also be used for the creation of the European Emergency Response Capacity, building on voluntary pooling of Member States civil protection assets, so as to generate enhanced cost-effectiveness through coordinated availability of civil protection assets.

Other relevant EU communications, regulations and council conclusions

In recent years, there are a number of communications and recommendations which aim to strengthen DRM in general and whose advises could be further implemented in border areas.

***Communication 'Boosting Growth and Cohesion in European Border Regions'*⁵⁹**

Border regions are places where the European integration process should be felt most positively - studying, training, working, caring, and doing business across borders are all daily activities that should be possible regardless of the existence of an administrative national border.

The Communication suggests undertaking ten concrete actions, some of which are relevant to DRM:

- Deepening cooperation and exchanges;
- Improving the legislative process;
- Enabling cross-border public administration;
- Providing reliable and understandable information and assistance;
- Supporting cross-border employment;

⁵⁸ Proposal for a Regulation on a mechanism to resolve legal and administrative obstacles in a cross-border context (COM/2018/373 final)

⁵⁹ Communication Boosting growth and cohesion in EU border regions, COM(2017) 534 final. https://ec.europa.eu/regional_policy/en/information/publications/communications/2017/boosting-growth-and-cohesion-in-eu-border-regions.

- Facilitating cross-border accessibility;
- Considering the legal and financial framework for cross-border cooperation;
- Building evidence of cross-border interaction to inform decision-making.

The implementation of actions under the Communication "Boosting Growth and Cohesion in EU Border Regions" will be facilitated by the creation of a "**Border Focal Point**" within the Commission and consisting of Commission experts in cross border issues, which will offer advice to national and regional authorities to tackle legal and administrative border obstacles⁶⁰.

Regulation on European Groupings of Territorial Cooperation⁶¹

In 2006, the European Commission established the European Grouping of Territorial Cooperation (EGTC) 62, primarily emphasising nature protection and the revitalisation of cultural assets. The Regulation (EU) No 1302/2013 of the European Parliament and of the Council⁶³ amended Regulation (EC) No 1082/2006 on a European grouping of territorial cooperation (EGTC) as regards the clarification, simplification and improvement of the establishment and functioning of such groupings.

The EGTC is cross-border by design. Disaster Risk Management can hence be a part of the cooperation activities within the mandate of the EGTC.

Council conclusions on "Enhancing preparedness, response capability and resilience to future crises"⁶⁴

The conclusions were adopted in 2021 and set out a series of measures designed to improve resilience, preparedness, and response. They stress that the response to crises needs to evolve, drawing on lessons from the migration crisis and the COVID-19 pandemic crisis. It highlights that **cross-sectoral and cross-border crisis response coordination and political steering will gain further importance**. These tools, platforms, and initiatives collectively contribute to the EU's ability to address and manage crises in a cross-border context, emphasising cooperation, coordination, and strategic planning.

Disaster Risk Management Knowledge Centre (DRMKC)

DRMKC provides a networked approach to the science-policy interface in DRM across the Commission, EU Member States and the DRM community within and beyond the EU. It focuses on enhancing the knowledge-based support to DRM and builds on 3 pillars: knowledge, partnership, innovation.

From the different modalities of the Disaster Risk Management Knowledge Centre (DRMKC) the following are of particular interest including to border territories: INFORM; Risk Data Hub; Scientific Output; Gaps Explorer; Project Explorer.

As pointed out by a representative of the JRC, the concept of the GIS-based platform Risk Data Hub was the result of a needs and gaps assessment performed in 2016. It presents data gaps and knowledge gaps based on analysis and overview of risks. It provides comparable and robust disaster damage and loss data⁶⁵.

⁶⁰ https://ec.europa.eu/regional_policy/en/information/publications/communications/2017/boosting-growth-and-cohesion-in-eu-border-regions

⁶¹ Regulation No 1082/2006 on a European grouping of territorial cooperation (EGTC).

⁶² Regulation No 1082/2006 on a European grouping of territorial cooperation (EGTC).

⁶³ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32013R1302>

⁶⁴ Council conclusions on "Enhancing preparedness, response capability and resilience to future crises" (2021)

⁶⁵ Interview with a JRC representative

DRMKC - INFORM (Index for Risk Management) is a global tool designed to measure the risk of humanitarian crises and disasters. It can support decisions about prevention, preparedness and response. It is open source, freely available, and regularly updated, allowing organisations to prioritise countries, compare risk profiles, and adapt it for sub-regional or national risk assessments. The aim is to enhance preparedness, reduce risks, increase resilience, and contribute to sustainable development by fostering coordination and effectiveness among organisations.

A JRC representative pointed out that DRMKC has committed to producing a series of reports to analyse, update the state of the art and identify research and innovation gaps in the field of DRM⁶⁶.

JRC is also developing a new **vulnerability indicator framework** including socio-economic dimensions and a composite index. It stems from the need 'to understand disaster risk and its core components for a better anticipation of disaster impacts'⁶⁷. Vulnerability is comprised of four dimensions: social dimension explains condition and processes of individuals and the entire population; economic situation of individuals, the population and the government; political dimension deals with quality of government and their actions; environmental and ecosystem aspects of vulnerability have been embedded in the ecological/ecosystem dimension.

Even though none of the DRMKC modalities and tools are specifically targeting border areas, these can be progressively integrated in all of them. For example, the Gaps Explorer can also provide targeted recommendations to DRM in border areas as well; INFORM could pay specific attention to border areas.

Copernicus Emergency Management Service (CEMS)

CEMS is an EU programme aimed at developing European information services based on satellite Earth Observation and in situ data. Copernicus is a user-driven programme and the information services provided will be freely and openly accessible to its Users, mostly public authorities.

CEMS provides information for emergency response in relation to different types of disasters, including meteorological hazards, geophysical hazards, deliberate and accidental man-made disasters and other humanitarian disasters, as well as prevention, preparedness, response and recovery activities. CEMS consists of the Mapping Service and of the Early Warning System (floods).

As highlighted in an interview with a JRC representative, CEMS provides products and datasets for the entire DRM cycle: prevention, response, recovery - using take satellite data and model information - to support a thematic area. All products are complementary information and are not specific for border regions. The first block covers on-demand mapping, e.g. risk and recovery mapping and could be activated by UCPM focal points. The second block covers early warning and monitoring and CEMS does constant monitoring of several hazards: floods, forest fires and droughts through EFAS, EFFIS and EGDO. The third block covers exposure mapping which is not a real-time product but a fundamental dataset use for the other two products⁶⁸.

INTERREG 2021-2027

One of the INTERREG-specific objective on Better Cooperation Governance aims at enhancing 'the potential for INTERREG cross-border cooperation programmes to actively remedy border obstacles.

⁶⁶ Interview with JRC

⁶⁷ JRC, 2023, Towards a European wide vulnerability framework

⁶⁸ Interview with JRC

In addition, as pointed out in the Communication EU Border Regions: Living labs of European integration, EC has shared with future programme authorities border orientation papers, drawn up to guide Member States, regions and partner countries through the programming process, mainly based on knowledge gained by implementing the 2017 action plan⁶⁹.

EU Solidarity Fund

The EU Solidarity Fund was set up in 2002⁷⁰ to respond to major natural disasters and express European solidarity to disaster-stricken regions within Europe. It has been used for more than 100 disasters including floods, forest fires, earthquakes, storms, and drought and public health emergencies. More than 8 billion EUR has been spent so far.

b-solutions

b-solutions and its extension b-solutions 2.0: Solving Cross-Border Obstacles are initiatives to tackle legal and administrative border obstacles along EU internal borders by providing legal expert support to local administrations encountering border obstacles. They are one of the actions proposed in the Communication Boosting growth and cohesion in EU border regions. The initiative is managed by the Association of European Border Regions (AEBR). With b-solutions, AEBR and DG REGIO strive to be closer to local administrations in border areas: the initiative represents a great occasion to collect information with a bottom-up approach in which practitioners of cross-border cooperation can tell what obstacles they encounter when trying to realise projects with the neighbouring countries.

As pointed out by an AEBR representative, b-solutions have a compendium of cases on solving obstacles on cross-border cooperation and there are several of them relevant to DRM: Improvement of conditions for cross-border aerial forest fire control and Cross-border emergencies team between Spain and Portugal.

Extreme weather

European Severe Weather Database

European Severe Weather Database aims at collecting and providing detailed and quality-controlled information on severe convective storm events over Europe. In collaboration with our partners including networks of voluntary observers, meteorological services and general public, many tens of thousands of reports have been collected. It is operated by the European Severe Storms Laboratory (ESSL). While not specifically targeting border areas, it is an useful prevention tool including in border areas with a potential to trigger enhanced cooperation.

Flooding

European Flood Awareness System

European Flood Awareness System (EFAS), a part of Copernicus, is the first operational, pan-European flood forecasting and monitoring system. It provides a wide range of complementary early flood forecasting information based on models, satellites, and in-situ data. National and regional authorities with flood risk management duties can make use of the information provided to arrange preparatory measures before an event strikes. In addition, EFAS provides a unique overview across Europe and neighbouring countries on currently observed and forecasted flood events for the ERCC.

⁶⁹ EC Communication 'EU Border Regions: Living labs of European integration'.

⁷⁰ <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:02002R2012-20200401&qid=1601971117690>

EFAS also provides support before major flood events strike, particularly in the large trans-national river basins and throughout Europe in general. **It highlights the need for transboundary coordination for river basins.**

For floods there is a datasets which is a flood hazard map for the whole Europe. The datasets included in this collection depict flood prone areas in Europe and the World for river flood events of different magnitude⁷¹.

With regards to flood governance in different river basins a lots of work has been done on the side of International Commission on Protection of the Danube River (ICPDR) and similarly - on Rhein, Elbe, Oder⁷². As these rivers are often national borders, the tools and instruments developed are of high relevance to DRM and floods. This is well-illustrated in the case study dedicated to flood management in the Danube Basin.

European catchments and Rivers network system

European catchments and rivers network system (Ecrins) provides a homogeneous European catchments dataset at scale 1:1 million that can be used together with the digital topographic data of EuroGlobalMap. This geodatabase of European river catchments is potentially relevant for cross border risks connected to river flows e.g. chemical pollution. Moreover, EDO is about to release the third version of a database on all historical data which is a gridded information and can also be aggregated.

Drought

European Drought Observatory

European Drought Observatory (EDO) is a part of Copernicus and contains drought-relevant information such as maps of indicators derived from different data sources (e.g., precipitation measurements, satellite measurements, modelled soil moisture content). Different tools, like Compare Layers, allow for displaying and analysing the information and drought reports give an overview of the situation in case of imminent droughts.

As pointed out in an interview with an EDO representative, with regards to the precipitation deficit there are different products available: a combined indicator assigning classes to inform direct uses: watch, warning, alert.

JRC Drought Risk Atlas

The European Drought Risk Atlas provides a detailed and disaggregated view of drought risks in EU regions, offering insights into the impacts on societies and ecosystems. It combines expert knowledge and machine learning to assess drought risks, considering current conditions and projected climate scenarios.

These tools are also relevant to cross-border areas. EU-level tools are complemented by tools developed bilaterally. Intersucho, elaborated within a dedicated case study under this study, is a case in point for the Czech Republic and Slovakia.

Wildfires

European Forest Fire Information System

European Forest Fire Information System (EFFIS) is a part of Copernicus and supports the services in charge of the protection of forests against fires in the EU and neighbouring countries and provides the EC services and the European Parliament with updated and reliable information on wildland fires in Europe. Since 1998, EFFIS is supported by a

⁷¹ <https://data.jrc.ec.europa.eu/collection/id-0054>.

⁷² Interview with JRC EFAS representative

network of experts from the countries in what is called the Expert Group on Forest Fires, which is registered under the Secretariat General of the EC. Currently, this group consists on experts from 43 countries in European, Middle East and North African countries. In 2015, EFFIS became one of the components of the Emergency Management Services in the EU Copernicus programme.

As pointed out in an interview with EFFIS, there is very little risk assessment information on national level, let alone in border areas and, moreover, methodologies differ. At the same time, there is a Pan-European Wild Fire Risk Assessment endorsed by the countries⁷³. There are contrasting forest fire risk assessments in different Member States as they have different methodologies. In Italy and Spain every region has a different methodology and there is not a national one. Poland has a very simple but robust methodology and in France only Southern France has a methodology as Northern France does not have a problem with forest fires⁷⁴. Moreover, France has developed the Prometheus Database⁷⁵ which is a database on forest fires in the Mediterranean region in France. There is a similar situation in Germany whereby only landers with problems have a methodology while the others do not.

Geophysical risk

Financed by the Horizon 2020 programme of the European Commission, the Real-time earthquake risk reduction for a reSilient Europe (RISE) project is a three-year programme with the objective to enhance the scientific understanding of earthquakes and Europe's capabilities in future earthquake prevention. RISE came up with several good practices which are of relevance to border areas: European rapid earthquake loss assessment.

Epidemics/pandemic

European Centre for Disease Prevention and Control

The Decision 1082/2013/EU on serious cross-border threats to health establishes an **Early Warning and Response System** and defines the engagement of the **European Centre for Disease Prevention and Control (ECDC)** and the European Food Safety Authority (EFSA). The EWRS is a tool for communicable diseases in the EU which ensures an effective response by the EU to events and emergencies related to communicable diseases.

The ECDC developed a tool that enables different infectious disease threats to be assessed and ranked based on their impact on people's health in EU/EEA countries. The tool is intended to support public health agencies and policy makers in making evidence-based decisions on preventing and controlling infectious diseases.

As pointed out by a ECDC representative, ECDC does not have statutory powers over MS and can offer advice and non-binding recommendations after doing rapid risk assessments and seeing potential threat. It has no power of enforcement either. ECDC has an annual reporting tool for MS where there are questions on points of entry and thanks to it, ECDC assesses countries for level of preparedness.

The ECDC EpiPulse system⁷⁶ for monitoring infectious diseases aims at sharing of information on technical level for certain diseases and it includes countries beyond EEA.

⁷³ https://effis-gwis-cms.s3.eu-west-1.amazonaws.com/effis/reports-and-publications/annual-fire-reports/Annual_Report_2021_final_topdf1.pdf

⁷⁴ Interview with JRC EFFIS representative

⁷⁵ <https://bdiff.agriculture.gouv.fr/>

⁷⁶ <https://www.ecdc.europa.eu/en/publications-data/epipulse-european-surveillance-portal-infectious-diseases>

Cross-Border Crisis Response Integrated Initiative

The Cross-Border Crisis Response Integrated Initiative (CBCRII) is an European Parliament pilot project with the aim of delivering four key results: a/ a report on the consequences of the COVID-19 crisis in border regions; b/ the development of an IT infrastructure to host and update information on cross-border public services in cross-border regions; c/ the development of an action plan to systematise solidarity and crisis management in EU cross-border regions; d/ boost in the potential of border regions through co-development, cross-border spatial planning and multi-level governance.

Nuclear and radiological accidents

An article in Civil Protection Knowledge Framework underlines that ‘Europe is well protected by collaborative legislation and tools to monitor and share data, and to enact coordinated responses between MS in the event of a nuclear accident’⁷⁷. Several emergency arrangements exist in the event of a nuclear accident including in border areas, for example the European Community Urgent Radiological Information Exchange (ECURIE)⁷⁸ and the European Radiological Data Exchange Platform (EURDEP)⁷⁹.

Industrial accidents

As described earlier, the Seveso III Directive and the UNECE: Convention on the Transboundary Effects of Industrial Accidents regulate the prevention, preparedness, and response to industrial/chemical accidents. In terms of support tools there is the Minerva Portal of the Major Accident Hazards Bureau which is a collection of technical Information and tools supporting EU Policy on control of major chemical Hazard⁸⁰.

Disruption of critical infrastructure

As pointed out by an EC DG HOME representative, within the Critical Entities Resilience Directive and the NIS2 Directive mentioned earlier, there are some mechanisms in place relevant to border areas: advisory missions; joint projects for risk assessment; trainings; and exercises to test resilience. Funding in critical infrastructure can be sourced from the Internal Security Fund⁸¹ and Horizon Europe (HEU) (Cluster Civil security and Destination Resilient Infrastructure) with its research-oriented programme. Using INTERREG funds is also an option for the future, also Recovery and Resilience Fund (RRF).

eSPIRS⁸² (Seveso Plants Information Retrieval System) is voluntary database to which the EU Member States could identify their Seveso establishments to the European Commission.

The **Accident Damage Analysis Module (ADAM)⁸³** is a software specifically intended to assist the EU Competent Authorities, who are responsible for the implementation of the Seveso Directive in their countries, as well as governmental and research organisations of the EU Member States, Accession and Candidate Countries of the EU, and European Neighbourhood Policy Countries involved in chemical accident prevention and

⁷⁷ <https://civil-protection-knowledge-network.europa.eu/eu-overview-risks/human-induced-risks/nuclear-and-radiological-accidents>

⁷⁸ <https://www.ensreg.eu/nuclear-safety/prevention-accidents/Emergency-arrangements-at-EU-level>

⁷⁹ <https://remon.jrc.ec.europa.eu/About/Rad-Data-Exchange>

⁸⁰ <https://minerva.jrc.ec.europa.eu/en/minerva>

⁸¹ https://home-affairs.ec.europa.eu/funding/internal-security-funds/internal-security-fund-2021-2027_en

⁸² <https://espirts.jrc.ec.europa.eu/en/espirts/content>

⁸³ <https://adam.jrc.ec.europa.eu/en/adam/content>

preparedness. As pointed out in an interview with DG ENV D4, ENV C4 Industrial Emissions & Safety, it also enables authorities to assess the consequences of major accidents.

Major Accident Reporting System (eMARS) aims at 'facilitating exchange of lessons learned from accidents and near misses involving dangerous substances in order to improve chemical accident prevention and mitigation of potential consequences.

Cyber threats

The EU Agency for Cyber Security (ENISA) oversees cybersecurity in the EU. It has launched various self-assessment tools and launched a bid for the development and maintenance services for the EU cybersecurity index tool.

European Commission's Knowledge Centre on Migration and Demography Data Portal

The European Commission's Knowledge Centre on Migration and Demography (ECKCMD) Data Portal supports an evidence-informed EU policymaking in areas related to demography, migration and mobility. It provides a single entry point to data and knowledge on migration and demography relevant to EU policies. The portal allows for the use of the data catalogue and of the interactive tools for analysis and visualisation.

ANNEX 6. EU DIRECTIVES WITH RELEVANCE TO DRM IN CROSS-BORDER TERRITORIES

Table 3 EU Directives with relevance to DRM in cross-border territories

| Name of policy | Information of relevance to cross-border cooperation on DRM |
|--|--|
| European Critical Infrastructure Protection Directive | <p>Certain number of critical infrastructures in the Community, the disruption or destruction of which would have significant cross-border impacts. This may include transboundary cross-sector effects resulting from interdependencies between interconnected infrastructures. Such ECIs should be identified and designated by means of a common procedure. A Community approach to critical infrastructure protection should be developed and implemented considering sector specificities and existing sector based measures including those already existing at Community, national or regional level, and where relevant cross-border mutual aid agreements between owners/operators of critical infrastructures already in place.</p> |
| Revised Nuclear Safety Directive | <p>The Directive provides information on the responsibilities of the member states also in terms of cooperation. As the Directive encourages:</p> <ul style="list-style-type: none"> - MS to notify and provide information to the Commission and to other MS in case of a radiological emergency on their territory. - Art. 8 on Transparency (3): "MS shall ensure that the competent regulatory authority engages in cooperation activities on the nuclear safety of nuclear installations with competent regulatory authorities of other MS in the vicinity of a nuclear installation, inter alia, via the exchange and/or sharing of information." |
| Water Framework Directive | <p>Where a river basin district extends beyond the territory of the Community, the MS concerned shall endeavour to establish appropriate coordination with the relevant non-Member States, with the aim of achieving the objectives of this Directive throughout the river basin district.</p> |
| Floods Directive | <p>Based on available or readily derivable information, such as records and studies on long term developments, in particular impacts of climate change on the occurrence of floods, a preliminary flood risk assessment shall be undertaken. It shall include, among others, maps of the river basin district at the appropriate scale including the borders of the river basins, sub-basins and, where existing, coastal areas, showing topography and land use.</p> |
| EU Directive on combating terrorism | <p>The cross-border nature of terrorism requires a strong coordinated response and cooperation within and between the Member States, as well as with and among the competent Union agencies and bodies to counter terrorism, including Eurojust and Europol. To that end, efficient use of the available tools and resources for cooperation should be made, such as joint investigation teams and coordination meetings facilitated by Eurojust. The global character of terrorism necessitates an international answer, requiring the Union and its Member States to strengthen cooperation with relevant third countries. A strong coordinated response and cooperation is also necessary with a view to securing and obtaining electronic evidence.</p> |
| Security of Network and Information Systems (the NIS2 Directive) | <p>Network and information systems have developed into a central feature of cross-border exchanges.</p> <p>Requirements imposed by one MS that are different from, or even in conflict with, those imposed by another MS, may substantially affect such cross-border activities.</p> <p>The possibility of the inadequate design or implementation of cybersecurity requirements in one MS is likely to have repercussions at the level of cybersecurity of other MS, given the intensity of cross-border exchanges. Divergences entail a fragmentation of the internal market and can have a prejudicial effect on its functioning, affecting the cross-border provision of services and the level of cyber resilience due to the application of a variety of measures.</p> <p>Given the wide-ranging scope and, in most cases, the cross-border nature of incidents, MS and the relevant Union institutions, bodies, offices and agencies should cooperate at technical, operational, and political level to properly coordinate the response across the Union.</p> <p>Cyberattacks are of a cross-border nature, and a significant incident can disrupt and damage critical information infrastructures on which the smooth functioning of the internal</p> |

| Name of policy | Information of relevance to cross-border cooperation on DRM |
|---|--|
| | <p>market depends. Where essential or important entities become aware of a significant incident, they should be required to submit an early warning without undue delay and in any event within 24 hours and they should indicate if it is likely to have a cross-border impact.</p> <p>To ensure effective supervision and enforcement, in particular in a situation with a cross-border dimension, a MS that has received a request for mutual assistance should, within the limits of that request, take appropriate supervisory and enforcement measures in relation to the entity that is the subject of that request, and that provides services or has a network and information system on the territory of that Member State.</p> <p>Disruption of the service provided by the entity could induce a significant systemic risk, for sectors where such disruption could have a cross-border impact;</p> |
| Critical Entities Resilience Directive (CER) | <p>Indeed, an operator situated in one Member State may provide services in several other Member States or across the entire EU through tightly intertwined networks. It follows that a disruption affecting this operator could have far-reaching effects into other sectors and over national borders.</p> <p>By way of a directive, it is possible to ensure that Member States apply a uniform approach in identifying critical entities, while at the same time accounting for specificities at national level, including varying levels of risk exposure and interdependencies between sectors and over borders.</p> |
| EU Seveso-III-Directive | <p>eSPIRS - voluntary database to which the EU Member States could identify their Seveso establishments to the European Commission.</p> <p>ADAM - This software is specifically intended to assist the EU Competent Authorities, who are responsible for the implementation of the Seveso Directive in their countries, as well as governmental and research organisations of the EU Member States, Accession and Candidate Countries of the EU, and European Neighbourhood Policy Countries involved in chemical accident prevention and preparedness.</p> <p>The main link is to the UNECE Convention on Transboundary Accidents</p> |
| Decision 1082/2013/EU on serious cross-border threats to health | <p>The Decision aims to better regulate, and support coordinated preparedness and response planning to public health emergencies with a cross-border dimension between MS. To that end it establishes:</p> <ul style="list-style-type: none"> - The possibility of joint procurement of medical measures - The network of epidemiological surveillance to be operated by the ECDC (it brings into permanent communication the commission, national competent bodies and the ECDC on sharing data, information and shared standards for communicable diseases and related special health issues) - An early warning and response system (EWRS) (a rapid alert system for notifying at Union level alerts in relation to serious cross-border threats to health; the commission is responsible for ensuring its proper functioning and avoiding overlap/ integrating it with existing alert system) - the MS obligation to alert the Union in cross-border health threats with the EWRS - the responsible body for carrying out risk assessments in different circumstances - the obligation to coordinate and inform about responses to cross-border public health threats between MS - the MS obligation to designate a competent body for cross-border public health threats - the Health Security Committee (HSC) (composed of high-level MS representatives for preparedness and response coordination and risk and crisis communication; to be convened where necessary) |

ANNEX 7. OVERVIEW OF KEY EU MULTI-RISK AND SECTORAL LEGISLATION WITH RELEVANCE FOR DRM

Multi-risk

The **EU Climate Change Adaptation Strategy**⁸⁴ is relevant to several risks covered in the study, including extreme weather, droughts, flooding, health risk. It emphasises the importance of addressing climate change-related security, health, ecological and water threats through cross-border cooperation. This can be accomplished through the macro-regional and maritime strategies and by using INTERREG funding. The Commission encourages the reduction of water consumption through the implementation of drought management plans, soil water retention measures, and the safe reuse of water. Monitoring and reporting progress in border areas is challenging.

The **EU Forest Strategy**⁸⁵ outlines a vision and specific actions to enhance the quantity and quality of EU forests and strengthen their protection, restoration and resilience. Its primary aims are to enable Europe’s forests to adjust to the altered conditions, **weather extremes** and uncertainty brought about by climate change.

The Strategy foresees dedicated efforts to advance research on the principles and techniques of assisted forest species migration, and to enhance its collaborative production and transfer across national borders.

The **EU Biodiversity Strategy** is a comprehensive, long-term plan designed to safeguard nature and reverse the degradation of ecosystems. The strategy aims to ensure that biodiversity in Europe is on the path of recovery by 2030 through specific actions and commitments. The strategy looks at the societies' resilience to future threats such as **climate change impacts, forest fires, food insecurity, disease outbreaks, wildlife and illegal wildlife trade**.

To establish a genuinely cohesive and resilient Trans-European Nature Network, it is essential to encourage and facilitate cooperation among Member States across borders, including through the European Territorial Cooperation.

The **European regional strategies** also mention the importance of cooperation between countries.

Table 4 EU regional strategies and their relevance to DRM in cross-border territories

| Policy name | Information of relevance to cross-border cooperation on DRM |
|---|--|
| EU Strategy for the Danube region (EUSDR) | Mentions that “work together is needed to minimise risks and disasters such as floods, droughts and industrial accidents which have significant transnational negative impacts”. In the past few years EUSDR PA5 contributed to the elaboration of the ICPDR Climate Change Adaptation Strategy Update 2018, supported project elaboration and implementation in the field of drought management and climate change related spatial planning, disseminate scientific results to anticipate regional and local impacts of climate change through research. |
| EU Strategy for the Baltic Sea Region | Mentions the need to “improve cooperation, co-ordination and the coherence of maritime safety and surveillance agencies and disaster response”. |
| EU Strategy for the Alpine Region | Acknowledges that the Alpine Region is vulnerable to environmental disasters and to climate change. |

⁸⁴ Communication on Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change (COM(2021) 82 final)

⁸⁵ Communication COM(2021) 572 final on New EU Forest Strategy for 2030

| Policy name | Information of relevance to cross-border cooperation on DRM |
|-------------------------------------|--|
| | <p>Will focus on carrying out risk assessment and implementing a disaster risk management policy at regional level.</p> <p>Will focus on comprehensive vulnerability assessment of the sectors and systems likely to be affected by climate change and developing a regional strategy on adapting to climate change.</p> |
| EU Strategy for the Adriatic Region | <p>It is cross-border by design. Capacities at national, regional, or local level must be reinforced to ensure that structures are fit for working with cross-border counterparts, as well as for cross-policy coordination.</p> <p>Migration pressure and cross-border organised crime call for coordinated border security policies.</p> <p>Mentions mitigating and adapting to climate change effects as well as managing disaster risks were also recognised as horizontal principles for all four pillars”.</p> |

Council conclusions on “Civil protection work in view of climate change”⁸⁶

The conclusions, adopted in 2022, call for the adaptation of civil protection to extreme weather events resulting from climate change in Member States. They also emphasise the need to adapt civil protection systems to the consequences of climate change, focusing on prevention, preparedness, response, and recovery. Member States and the Commission are encouraged to invest in research and innovation, including through the **EU Civil Protection Knowledge Network**, to better detect and anticipate extreme climate risks and enhance civil protection capabilities. Member States are further encouraged to develop adequate prevention and preparedness actions, ensuring the availability of sufficient national capacities to address climate change-related risks, such as forest fires and flooding.

Due to climate change, Member States (MS) and Union institutions must be prepared to address large- scale, multi-sectoral, cross-border disasters with cascading effects. These disasters may occur simultaneously and with increased frequency, having profound impacts on human life, activities and biodiversity.

Support the preparedness and resilience of the population exposed to climate change-related risks through specific information, education, training and exercises that may involve the national and sub-national levels and **even a cross-border dimension**, paying particular attention to people with specific vulnerabilities.

Extreme weather (also relevant to its consequences: droughts, floods, forest fires)

Extreme weather and climate related events are prominently addressed in the **EU Climate Change Adaptation Strategy, the EU Forest Strategy and the EU Biodiversity Strategy**. More frequent extreme weather and climate related events, including droughts, floods, and forest fires, are observed in some European regions, including in border areas. The Inventory of risks identifies specific border regions that are particularly susceptible to extreme events.

The **French Presidency conclusions on Civil Protection and Climate change** (March 2022)⁸⁷ call for ‘the adaptation of civil protection to extreme weather events resulting from climate change in terms of prevention, preparedness, response and recovery’. The conclusions emphasise the cross-border aspect of the preparedness as well as the need to

⁸⁶ Council conclusions on civil protection work in view of climate change 2022/C 322/02.

⁸⁷ <https://www.consilium.europa.eu/media/54659/st06528-en22.pdf>

strengthen the overall governance within the EU for disaster risk prevention, preparedness and response.

The **European Parliament resolution from September 2022 on the consequences of drought, fire, and other extreme weather phenomena**⁸⁸ calls for a comprehensive EU-wide climate risk assessment and for a number of measures for the overall strengthening of the civil protection and emergency response.

Status of water bodies

Since 2000, the **Water Framework Directive** has served as the primary legislation for water protection in Europe. It applies to inland, transitional, and coastal surface waters as well as groundwaters. It ensures an integrated approach to water management, respecting the integrity of whole ecosystems. The Water Framework Directive (WFD) requires MS to monitor and address some quantitative aspects of water management, notably flows of surface water bodies as part of the good ecological status and the quantitative status of groundwater.

The Directive advocates for river basin-based management, emphasising the need for cooperation and collaborative goal setting across administrative and political boundaries among Member States. Initiatives taken by Member States for the Maas, Schelde or Rhine river basins have served as positive examples of this approach. The WFD mandates that when a river basin district spans beyond the European Community's borders, Member States (MS) involved must actively seek to establish effective coordination with relevant non-Member States.

Flooding

The **EU Floods Directive (FD)**⁸⁹ plays a crucial role in enhancing protection against flooding and serves as a prominent risk management instrument within the EU. Supported by cohesion policy funding, cross-border and transnational cooperation and the **European Floods Awareness System**, the Directive has significantly increased protection against flooding and contributed to reducing the recurrence of disastrous floods. It is a significant EU risk management instrument against this hazard.

The Directive consists of three main implementation steps that Member States (MS) must carry out and update every 6 years. These steps include the development of Preliminary Flood Risk Assessments (PFRA), the implementation of flood hazard (FH) and flood risk (FR) maps in the Areas at Potential Significant Flood Risk (APSFR) identified within the PFRA, and the creation of Flood Risk Management Plans (FRMPs). The FRMPs should encompass flood risk reduction measures that cover the entire District River Basin Management (DRMC). The FD also addresses the cross-border dimension by requiring neighbouring countries to collaborate and align assessments, maps, and plans for transboundary river basins.

As noted by a JRC expert from the European Flood Awareness System (EFAS), the Floods Directive places significant emphasis on cross-border collaboration, which can be very challenging from a practical standpoint. Achieving harmonisation of data and standardising various elements, including data, models, and maps, is essential but challenging. This process is necessary to ensure that all these components seamlessly fit together along border regions⁹⁰.

⁸⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52022IP0330>

⁸⁹ Directive 2007/60/EC on the assessment and management of flood risks

⁹⁰ Interview with JRC European Flood Awareness System (EFAS) expert

Wildfires

The **EU Forest Strategy** and **EU Biodiversity Strategy** address forest fires from the point of view of making forest more resilient and in that way preventing forest fires.

As the forest management angle of fire prevention is in the sole competence of Member States, DG ENV only provide Guidance on Land-based Wildfire Prevention⁹¹. Land use, land use change and forestry (LULUCF) is directly relevant to wildfires: emissions if caused by anthropogenic factor are a part of this. Each MS has its own way of monitoring LULUCF emissions⁹².

In addition, the European Commission established the **European Forest Fire Information System (EFFIS)** described later in the text in the section on mechanisms. As described earlier, the issue of forest management and the associated issue of forest fires are also addressed indirectly in the EU Forest Strategy, the EU Adaptation Strategy and the EU Biodiversity Strategy.

After the 2022 wildfire season, which confirmed an upward trend in intense extreme wildfires, the EC launched the Wildfire Prevention Action plan (November 2022), aiming at strengthening wildfire prevention across the EU, improve the management of forests and landscapes, reduce the ignition of fires, and limit their impacts. An explicit reference to the cross-border dimension is included in *theme III – Increased financing of wildfire prevention actions*, where a specific action is focused on *encouraging use of the UCPM prevention and preparedness funding instruments for national, **cross-border** or pan-European projects to support wildfire prevention and improve the uptake of good practices.*

Geophysical (seismic) risk

Unlike for floods, there is no European Directive for seismic risk. The EC supports the development of European building standards, the Eurocodes. Eurocode 8 (EN 1998) guides the design of buildings, bridges, silos, tanks, pipelines, foundations, towers, masts and chimneys in seismic areas. Special structures, such as nuclear power plants, offshore structures and large dams are out of the scope of EN 1998. These do not have a specific cross-border dimension.

However, according to a JRC report on the State of harmonised use of the Eurocodes (EC, 2019), seismic zone maps show discontinuities in the seismic levels at countries' borders due to different national practices, making it difficult to harmonise the use of Eurocodes in neighbouring regions of different Member States.

Epidemics/pandemics

The **Decision 1082/2013/EU on serious cross-border threats to health** regulates measures on epidemiological surveillance, monitoring, early warning of, and combating of serious cross-border threats to health, including **preparedness and response planning** related to those activities. It aims to support cooperation and coordination between EU MS. It demands a high level of human health protection across Union policies and a complementary role of the Union in supporting national health endeavours.

The decision aims to better regulate, and support coordinated preparedness and response planning to public health emergencies with a cross-border dimension between MS. To that end it establishes:

- The possibility of joint procurement of medical measures;
- The network of epidemiological surveillance to be operated by the ECDC (it brings into permanent communication the commission, national competent bodies and the

⁹¹ <https://op.europa.eu/en/publication-detail/-/publication/4e6cc1f1-8b8a-11eb-b85c-01aa75ed71a1>

⁹² Interview with DG ENV D1, Forest Protection and Bioeconomy

ECDC on sharing data, information and shared standards for communicable diseases and related special health issues);

- An Early Warning and Response System (EWRS) (a rapid alert system for notifying at Union level alerts in relation to serious cross-border threats to health; the commission is responsible for ensuring its proper functioning and avoiding overlap/integrating it with existing alert system);
- The MS obligation to alert the Union in cross-border health threats with the EWRS;
- The responsible body for carrying out risk assessments in different circumstances;
- The obligation to coordinate and inform about responses to cross-border public health threats between MS;
- The MS obligation to designate a competent body for cross-border public health threats;
- The Health Security Committee (HSC) (composed of high-level MS representatives for preparedness and response coordination and risk and crisis communication; to be convened where necessary).

EU Member States follow the guidelines of the World Health Organisation regarding actions to take before or during pandemics. Moreover, the EC adopted Regulation 851/2004/EC establishing a **European Centre for Disease Prevention and Control (ECDPC)**. The Centre is intended to “enhance the capacity of the Community and the Member States to protect human health through the prevention and control of human disease”. The International Health Regulations (IHR) should also be mentioned. The IHR entered into force in 2007 and is binding on all Member States of the WHO, including all the EU Member States.

The basis for the ECDPC is a previous Decision of the Parliament and Council in 1998 regarding the creation of a network for surveillance and control of communicable diseases. In line with the decision, the Member States are obliged to consult with each other and the Commission in order to co-ordinate their efforts for the prevention and control of communicable diseases’. More recently, the Commission has issued communications regarding strengthened co-ordination on preparedness for health emergencies at EU level⁹³ and on preparedness and response planning specifically in relation to pandemic influenza.⁹⁴

Animal and plant diseases

The **Animal Health Law**⁹⁵ streamlined a number of laws into a single law and introduced ‘simpler and clearer rules enable authorities and those having to follow the rules to focus on key priorities: preventing and eradicating disease’. It also provides for ‘better early detection & control of animal diseases, including emerging diseases linked to climate change’ and ‘offers more flexibility to adjust rules to local circumstances’. Art. 27 stipulates that ‘the design, means, diagnostic methods, frequency, intensity, targeted animal population, and sampling patterns of the surveillance shall be appropriate and proportionate to the objectives of the surveillance, taking into account the Member States and third countries or territories which either border on, or from which animals and products enter into, that Member State’.

⁹³ Communication from the Commission to the Council, the Parliament, the European Economic and Social Committee and the Committee of the Regions on strengthening coordination on generic preparedness planning for public health emergencies at EU level, COM(2005) 605 final

⁹⁴

⁹⁵ Regulation (EU) 2016/429

Nuclear and radiological accidents.

The **Council Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations** represents the EU's framework for nuclear safety of nuclear installations. It provides guidance for measures on nuclear safety (both plants and waste installations) for transposition into national laws. However, the key competence lies with the MS.

The **Revised Nuclear Safety Directive**⁹⁶ came after the nuclear accident in Japan in 2011 where there was renewed attention on the need for measures to minimise risk and ensure robust nuclear safety.

The Directive provides information on the responsibilities of the member states also in terms of cooperation. As the Directive encourages MS to notify and provide information to the Commission and to other MS in case of a radiological emergency on their territory.

Art. 8 on Transparency (3): "MS shall ensure that the competent regulatory authority engages in cooperation activities on the nuclear safety of nuclear installations with competent regulatory authorities of other MS in the vicinity of a nuclear installation, inter alia, via the exchange and/or sharing of information."

The Council has adopted legislation to promote the early exchange of information in the event of a radiological emergency.¹⁵⁴ The decision is intended to apply to situations where a Member State chooses to take broad measures in response to accidents involving or likely to involve a significant release of radioactive material or the detection of abnormal levels of radioactivity.⁹⁷

The Council has also adopted measures relating to public health protection measures in the event of a radiological emergency.⁹⁸ The purpose of the Directive is "to define, at Community level, common objectives with regard to measures and procedures for informing the general public".

Industrial accidents

The **Seveso-III-Directive**⁹⁹ focuses on the prevention of major accidents where dangerous substances are involved. The Directive applies to industrial establishments in the EU where dangerous substances are used or stored in large quantities, e.g. chemical and petrochemical industry, fuel wholesale and storage sectors. It aims to control major accident hazards involving these dangerous substances, especially chemicals. The Directive contributes to the technological disaster risk reduction effort.

Since 1998, the EU has been a party to the **UNECE Convention on the Transboundary Effects of Industrial Accidents**¹⁰⁰. The convention constitutes the main pillar of the UN Economic Commission for Europe's efforts at preventing industrial accidents and their transboundary effects. It regulates the **preparedness for and response to** industrial accidents capable of causing transboundary effects, including the effects of such accidents caused by natural disasters. Additionally, it regulates international cooperation concerning mutual assistance, research and development, exchange of information and exchange of

⁹⁶ Council Directive 2014/87/Euratom of 8 July 2014 amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations.

⁹⁷ Council Decision 87/600/Euratom on Community arrangements for the early exchange of information in the event of a radiological emergency.

⁹⁸ Directive 89/618/Euratom on informing the general public about health protection measures to be applied and steps to be taken in the event of a radiological emergency.

⁹⁹ Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC.

¹⁰⁰ <https://unece.org/environment-policy/industrial-accidents>.

technology in the area of prevention of, preparedness for and response to industrial accidents.

The Convention obliges, parties to convene and make their contingency plans compatible or even draw up joint plans. The convention encourages bi-and multi-later agreements under it.

As emphasised by a UNECE Secretariat representative, parties have to use the industrial accident notification system to request mutual assistance and to carry out joint inspections and joint exercises. Moreover, UNECE has an assistance and cooperation programme and is in the process of developing a guidance on Natural Hazards Triggering Technological Accidents (Natech) with JRC and OECD. UNECE has developed Good practices in implementing the Industrial Accidents Convention¹⁰¹ and Action Guidelines: Implementation Guide for Man-made and Technological Hazards¹⁰². The Secretariat has also conducted work on the management Tailings Management Facilities (TMF) including in border areas¹⁰³.

Disruption of critical infrastructure

Critical Entities Resilience Directive (CER)¹⁰⁴ establishes the obligations of Member States to take specific measures aimed at ensuring the resilience of critical infrastructures and essential services these provide. CER creates an overarching framework that addresses the resilience of critical entities in respect of all hazards, whether natural or man-made, accidental or intentional. It covers three priority areas: preparedness, response and international cooperation and invites member states to update their risk assessments regularly and conduct stress tests of entities operating critical infrastructure. It calls on member states to develop, in cooperation with the European Commission, the coordinated response to disruptions of critical infrastructure with significant cross-border relevance. As highlighted by an EC DG HOME representative, CER has a strong cross-border relevance as many critical entities (transport, energy, etc.) are in border areas. The Directive mandates the creation of a national strategy on resilience, **requiring Member States to conduct risk assessments that consider potential cross-border risks**. Art.11 is on cooperation between MS and obliges MS to work together for the benefit of critical infrastructure¹⁰⁵.

In 2023, a delegated Regulation was adopted on supplementing Directive (EU) 2022/2557 of the European Parliament and of the Council by establishing a list of essential services.

Within the **Trans-European Transport Network (TEN-T) policy**¹⁰⁶, Art. 35 on Resilience of infrastructure to climate change and environmental disasters stipulates the during infrastructure planning, Member States shall give due consideration to improving resilience to climate change and to environmental disasters. Art. 34 stipulates that due consideration should be given to the risk assessments and adaptation measures adequately improving resilience to climate change and environmental disasters. According to Art. 37, MS and other **project promoters should ensure that assessments of projects of common interest are carried out efficiently, avoiding unnecessary delays**.

¹⁰¹ <https://unece.org/publications/industrial-accidents>.

¹⁰² <https://unece.org/info/Environment-Policy/Industrial-accidents/pub/21655>.

¹⁰³ Interview with UNECE representative.

¹⁰⁴ Directive (EU) 2022/2557 on the resilience of critical entities and repealing Council Directive 2008/114/EC.

¹⁰⁵ Interview with an EC DG HOME representative.

¹⁰⁶ Regulation (EU) No 1315/on Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU.

The **Council Recommendation on a Union-wide coordinated approach to strengthen the resilience of critical infrastructure**¹⁰⁷ cover sectors such as energy, digital infrastructure, transport and space, etc. They call for an all-hazards approach in risk assessments; enhanced trainings; making use of EU and national funding opportunities; etc. **MS are urged to coordinate their response to disruption of critical infrastructure.** The document specifies that this could possibly be done through ‘a future Blueprint on a coordinated response to disruptions of critical infrastructure with significant cross-border relevance; the existing Integrated Political Crisis Response (IPCR) arrangements for the coordination of the political response when it comes to critical infrastructure with cross-border relevance; etc.

Terrorism

EU Directive on combating terrorism stipulates that Member States shall take the necessary measures to ensure that certain intentional acts, defined as offences under national law, which, given their nature or context, may seriously damage a country or an international organisation, are defined as terrorist offences.

The cross-border nature of terrorism requires a strong coordinated response and cooperation within and between the Member States, as well as with and among the competent Union agencies and bodies to counter terrorism, including Eurojust and Europol. To that end, efficient use of the available tools and resources for cooperation should be made, such as joint investigation teams and coordination meetings facilitated by Eurojust. The global character of terrorism necessitates an international answer, requiring the Union and its Member States to strengthen cooperation with relevant third countries. A strong coordinated response and cooperation is also necessary with a view to securing and obtaining electronic evidence.

Council of Europe Convention on the Prevention of Terrorism (2005) aims to increase the effectiveness of existing international texts on the fight against terrorism and strengthen the member states' efforts to prevent terrorism in two specific ways: 1) by establishing as criminal offences certain acts that may lead to the commission of terrorist offences, namely: public provocation, recruitment and training; and 2) by reinforcing co-operation on prevention both internally (national prevention policies), and internationally (modification of existing extradition and mutual assistance arrangements and additional means). Art.4 on international cooperation on prevention does not specifically refer to border territories but is very relevant to them and is directly applicable.

Cyber threats

The **NIS2 Directive**¹⁰⁸ is the EU-wide legislation on cybersecurity. It provides legal measures to boost the overall level of cybersecurity in the EU. The directive improves the current approach to cyber-security by: creating the necessary cyber crisis management structure (CyCLONe) increasing the level of harmonisation regarding security requirements and reporting obligations encouraging MSs to introduce new areas of interest such as supply chain, vulnerability management, core internet and cyber hygiene their national cybersecurity strategies bringing novel ideas such as the peer reviews for enhancing collaboration and knowledge sharing amongst the MS.

Requirements imposed by one MS that are different from, or even in conflict with, those imposed by another MS, may substantially affect such cross-border activities. Network and information systems have developed into a central feature of cross-border exchanges.

¹⁰⁷ Council Recommendation of 8 December 2022 on a Union-wide coordinated approach to strengthen the resilience of critical infrastructure 2023/C 20/01 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023H0120%2801%29>.

¹⁰⁸ Security of Network and Information Systems (the NIS2 Directive) (2022/2555).

Given the wide-ranging scope and, in most cases, the cross-border nature of incidents, MS and the relevant Union institutions, bodies, offices and agencies should cooperate at technical, operational, and political level to properly coordinate the response across the Union.

To ensure effective supervision and enforcement, in particular in a situation with a cross-border dimension, a Member State that has received a request for mutual assistance should, within the limits of that request, take appropriate supervisory and enforcement measures in relation to the entity that is the subject of that request, and that provides services or has a network and information system on the territory of that Member State.

Marine pollution

The European Union has been involved in dealing with marine pollution since 1978 through the Council Resolution setting up an action programme on the “control and reduction of pollution caused by hydrocarbons released at sea. **The Decision 2850/2000/EC setting up a Community framework for co-operation in the field of accidental or deliberate marine pollution** was applicable until 2006. Currently, the UCPM regulates marine pollution too. The goals of the EU with regards to marine pollution include improving consistency of Community policy regarding preparedness, enhancing preparedness actions of the European Maritime Safety Agency, increasing the exchange of good practice at Community level, enhancing response through greater consistency at the European level in providing operational support to the Member States. The European Union is also a party to several regional conventions such as the Barcelona Convention for the Mediterranean.¹⁰⁹

¹⁰⁹ Analysis of Law in the European Union pertaining to Cross-Border Disaster Relief

ANNEX 8. RECOMMENDATIONS FOR THE POST-2027 EU INTERREG COOPERATION PROGRAMME FOR DISASTER AND RISK MANAGEMENT

The set of recommendations below is based on the analysis conducted on the large volume of relevant data collected for the development of the study on *Strengthening the resilience of EU border regions: Mapping risks & crisis management tools and identifying gaps*. In particular, the recommendations are grounded on triangulated evidence identified in the desk research and literature review, in the inventories of DRM-relevant agreements, institutions, processes, tools, EU-level platforms and tools for DRM, in the risk inventory, in the case studies, as well as in the consultations with experts and stakeholders.

The Council on cohesion policy post 2027 has already stressed that cohesion policy must remain a key pillar of the EU and is a policy for all regions; paying particular attention to rural areas, areas affected by industrial transition, and regions which suffer from severe and permanent natural or demographic handicaps. It also emphasised the need for the cohesion policy regulatory framework to be able to adapt to new developments and unexpected events, while recalling the long-term transformational nature and structural objectives of cohesion policy¹¹⁰.

Similarly, the Council on INTERREG underlined the importance and opportunities of cross-border, transnational, interregional and outermost regions' cooperation for the Member States and their regions, stressing that that mutual cooperation contributes to the regions' development and the EU's integration.

The purpose of the recommendations is to contribute to make the EU INTERREG Cooperation Programme for the post 2027 more agile, effective and focused on Disaster and Risk Management, and thus contribute even more significantly to building resilience, enhancing preparedness, and reducing vulnerabilities across European border regions facing various natural and man-made hazards.

The recommendations are presented below, not in order of priority. They are followed by a brief synthesis of the key INTERREG projects examined during the study, for reference. A selection of compelling examples of projects from different regions and contexts that have been implemented under INTERREG programmes for disaster and risk management closes this section.

Set of recommendations for the post-2027 EU INTERREG Cooperation Programme for Disaster and Risk Management

Recommendation no.1: Enhanced Funding and Resources Allocation.

- Increase funding allocation for disaster and risk management projects to address emerging challenges and vulnerabilities effectively, such as extreme weather events, i.e. floods, storms, heatwaves, and drought, epidemics/pandemics and animal/plant diseases (also often related to climate change), and mass migration.
- Allocate resources for capacity building, training, and knowledge exchange activities to strengthen the capabilities of local authorities, emergency responders, and communities.

Recommendation no.2: Continuity and Embedded Sustainability Mechanisms.

- Develop mechanisms to encourage and ensure continuity and sustainability of cross-border cooperation initiatives beyond the lifespan of individual projects. This includes fostering long-term partnerships, institutionalising collaboration frameworks, facilitating mainstreaming and capitalisation, as well as uptake and

¹¹⁰ Council of the EU 17/11/2023 Conclusions on the future of cohesion policy; ST 15523/23.

replication and maintaining social capital and knowledge built during project implementation.

Recommendation no.3: Diversification of Funding Sources.

- Explore opportunities to diversify funding sources for cross-border cooperation projects in disaster risk management. This can include leveraging additional funding from national, regional, and international sources to complement INTERREG funding and contribute to ensure long-term sustainability.
- As a complementary measure it could be envisaged to facilitate access to financing for the development of tools or platforms or promoting blended funding from multiple public sources / programmes / initiatives (EU, national, regional).

Recommendation no.4: Promotion of Cross-Border Collaboration.

- Encourage and facilitate cross-border cooperation among neighbouring regions and countries to develop joint strategies, action plans, and projects for disaster preparedness, response, and recovery. This includes providing incentives for cities and regions located in areas exposed to high risks hazards, but not having yet achieved a sufficient level of resilience to engage in projects and partnerships.
- Foster collaboration through joint exercises, simulations, and workshops to enhance coordination and interoperability among different stakeholders.

Recommendation no.5: Integration of Climate Adaptation Measures.

- Integrate climate adaptation measures into disaster and risk management cooperation projects to address the increasing frequency and intensity of extreme weather events, such as floods, storms, heatwaves, and droughts.
- Support the development of climate-resilient infrastructure, early warning systems, and nature-based solutions to mitigate the impacts of climate-related disasters.

Recommendation no.6: Promotion of Innovation and Technology.

- Promote the wider adoption of innovative technologies, including remote sensing, geospatial analysis, artificial intelligence, and drones, for early warning, risk assessment, and disaster response.
- Facilitate the exchange of best practices and lessons learned on the use of technology in disaster management through pilot projects, knowledge-sharing platforms, including peer-to-peer exchanges.

Recommendation no.7: Community Engagement and Empowerment.

- Foster community engagement and participation in disaster risk reduction efforts by raising awareness, building local capacities, and involving communities in joint design, and / or joint implementation, joint capitalisation processes that are place-based and rely on integrated territorial development as the key delivery method.
- Support grassroots initiatives and community-based organisations working on disaster resilience, including volunteer groups, citizen science projects, and local resilience networks.

Recommendation no.8: Promotion of Nature-Based Solutions.

- Promote the implementation of nature-based solutions for disaster risk reduction, such as green infrastructure, floodplain restoration, coastal wetlands preservation, and ecosystem-based adaptation measures.
- Encourage cross-border cooperation on transboundary natural resources management and ecosystem restoration to enhance resilience to natural hazards.

Recommendation no.9: Mainstreaming Disaster Risk Reduction.

- Mainstream disaster risk reduction principles and practices into regional development policies, land-use planning, infrastructure development, and environmental management.
- Ensure coherence and alignment between the INTERREG programme and other EU policies and initiatives related to disaster risk reduction, climate change adaptation, and sustainable development.

Recommendation no.10: Flexibility and Adaptability.

- Maintain flexibility and adaptability in the design and implementation of INTERREG programmes to respond to evolving risks, changing priorities, and emerging needs in the field of disaster and risk management, allowing to easily shift funds to different priorities if the need arises, without the additional administrative burden for Managing Authorities to adopt new rules and processes.
- Encourage innovation and experimentation in project development and implementation to test new approaches, methodologies, and technologies for enhancing resilience to disasters and reducing risks.

Examples of projects from different regions and contexts that have been implemented under INTERREG programmes for disaster and risk management

These projects exemplify the diverse range of initiatives supported by INTERREG programmes to address disaster and risk management challenges in cross-border regions across Europe. They demonstrate the importance of collaboration, innovation, and nature-based approaches in building resilience and enhancing preparedness for various hazards and threats.

Project Name: INSECTRISK

Territorial Area: Bulgaria-Romania Cross-Border Programme

Objective: Enhancing governance related to the risk of animal/plant diseases

Description: The INSECTRISK project aimed to develop integrated mechanisms for mosquito population control and joint risk management between Bulgaria and Romania. It focused on addressing the risks associated with insect-borne diseases and implementing collaborative strategies for prevention and control.

Project Name: MARINEGEOHAZARD

Territorial Area: Bulgaria-Romania Black Sea Coast

Objective: Development of a joint early warning monitoring system for geological hazards

Description: MARINEGEOHAZARD project facilitated the development of a comprehensive early warning monitoring system to address hazardous geological processes along the Bulgarian-Romanian Black Sea coast. It aimed to improve preparedness and response capabilities for coastal erosion, landslides, and other marine-related hazards.

Project Name: Danube Floodplain

Territorial Area: Danube River Basin (Multiple Countries)

Objective: Reducing flood risk in urban areas through nature-based solutions

Description: The Danube Floodplain project focused on reconnecting the river to its floodplains to reduce flood risk in urban areas along the Danube River. By restoring natural ecosystems and enhancing water management practices, the project aimed to mitigate the impact of flooding and improve resilience to climate change.

Project Name: **EMRIC (Emergency Management Response and Information Centre)**

Territorial Area: Cross-Border Regions in Europe

Objective: Strengthening emergency management capabilities and cooperation

Description: The EMRIC project aimed to establish a permanent and impactful partnership for emergency management response across various cross-border regions in Europe. It focused on enhancing coordination, communication, and joint response mechanisms to effectively address disasters and emergencies.

Project Name: **RESBA (Resilience of Strategic Alpine Dams)**

Territorial Area: Mont Cenis (Moncenisio) Dam Area, Italy-France Border

Objective: Emergency planning and risk management for strategic alpine dams

Description: The RESBA project conducted specific activities related to emergency planning for the Mont Cenis Dam within the Italy-France border region. It focused on developing strategies, protocols, and response plans to ensure the resilience of strategic alpine dams in the event of emergencies or disasters.

Additional examples of the positive contribution of INTERREG to build resilience through cross-border cooperation on DRM in different areas.

More than half of the projects identified under the study were funded by INTERREG.

In **Bulgaria-Serbia**, examples of projects under INTERREG IPA/CBC programme have helped to develop joint training programmes and local joint intervention plans with regards to forest fire events.

In **Slovakia – Austria** successful data sharing initiatives connected with the flooding risk and the positive impact of INTERREG initiatives.

There are various agreements as well as the INTERREG programme **Saxony-Czech Republic** 2021-2027, which supports projects in the border region for climate change adaptation, risk prevention and risk management, among other topics. A follow-up programme could be broader in terms of potential hazards and promote local projects that focus on droughts, the resilience of critical infrastructure and the containment of epidemics.

In **Greece - North Macedonia** INTERREG programmes have significantly facilitated collaboration regarding floods and wildfires.

In **Portugal – Spain**, strong collaboration in civil protection matters via INTERREG POCTEP programme, albeit subject to time and budget-bound projects, has been pivotal in building the practices and frameworks in prevention, preparedness and response to forest fires along the Spain/Portugal border.

Based on a nature-based approach to flooding, the INTERREG **Danube** project *Danube Floodplain* provides solution for reducing the risk of floods in urban areas by reconnecting the river to its floodplains. The project focuses on improving transnational water management and flood risk prevention while maximising benefits for biodiversity conservation.

In **Germany – Czech Republic** there seems to be opportunities to further strengthen the management of drought and disruption of critical infrastructure in the cross-border area.

In **Greece – North Macedonia** Several projects under INTERREG 2014-2020 have been implemented to improve the efficient detection and management of forest fires, conduct risk assessments, and provide solutions for prevention. Several INTERREG projects were implemented to sharpen policies for addressing flooding.

In **Lithuania - Poland** specific actions are slowly being taken where in the recent 2021-2027 INTERREG programming period wildfires, extreme weather, draughts, flooding are recognised and will hopefully signal more cooperative initiatives along the border. Within the framework of INTERREG, opportunities were provided to enhance the capabilities of fire brigades in responding to challenges posed by the COVID-19 pandemic or any other outbreak of infectious disease by fostering long-term partnerships and cooperation between firefighting and rescue services.

In **Poland-Slovakia**, initiatives like the Visegrad 4 group, Euroregions, the European Grouping of Territorial Cooperation, and INTERREG are identified as comprehensive frameworks that effectively address a spectrum of issues within the cross-border context.

The **Romania - Serbia** border has certain bilateral and cooperation agreements in the field of protection against natural and man-made disasters. Positive developments at the local level include the establishment of common intervention collaborative agreement for emergency situations, as well as methodologies for risks with cross-border impact have been established, as part of the INTERREG-IPA CBC Romania-Serbia Programme.

Italy, Austria, and Slovenia have a long history of cooperation in the field of seismic risk. Besides several agreements that ensure cooperation in the cross-border area – such as the ALPINE Convention and the EUSALP strategy, as well as bilateral agreements and memorandum of understanding between the countries –, Italy, Austria, and Slovenia work together on different projects focused on preventing and preparing for seismic events. Implemented by different EU fundings (INTERREG, DG ECHO/UCPM), the three projects have achieved relevant results and might be considered “good practices”; these include the development of cross-border risk assessments (BORIS projects); the implementation of a monitoring system and the drafting of common protocols/SOPs for rapid post-disaster impact assessments (ARMONIA); the improvement of the seismic networks to ensure a rapid collection of data in real-time (“Beyond Frontiers”).

Since 2017, some specific activities related to emergency planning of the Mont Cenis (Moncenisio) dam have been conducted within the framework of the INTERREG V-A **Italy-France** Project No. 1729 RESBA that ended on 31/12/2020.

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