

Policy brief

October 2023



Reducing Risks Together: a systemic approach to reducing disaster risk in Europe

Executive summary & Recommendations

In the last months, we have seen intense heat waves and wildfires across large parts of southern Europe, while Serbia, Kosovo, and Romania have endured devastating floods. Additionally, Northern Italy has faced an unexpected predicament as floods followed a period of drought. The Netherlands experienced the longest dry spell on record (34 days without rainfall), followed by a very wet July and the most severe summer windstorm (Poly) on record. To reduce the risk of such multi-hazard events, we need a more systemic approach to risk management. This is what the MYRIAD-EU project aims to achieve: Reducing Risks Together.

Natural hazards in the EU have exacted a heavy toll, resulting in approximately ~236,000 fatalities and over €640 billion in economic losses since 2000 ([EEA-CATDAT, 2023](#)). The examples above - all of which have taken place in the last few months - reiterate the need to urgently move towards a more holistic approach to disaster risk management, as also stated in the recent Mid Term Review of the Sendai Framework for Disaster Risk Reduction ([UNDRR, 2023](#)). The MYRIAD-EU project is designed to **catalyse the paradigm shift** required to move **towards a multi-risk, multi-sector, systemic approach to risk assessment and management**. This policy brief summarises key policy learnings from the first 1.5 years of this Horizon-2020 funded project, culminating in the following key recommendations:

- **Real-world applications are vital:** We recommend efforts to widen the number of real-world detailed case studies throughout the EU, in order to gather good practices and share learning across regions.
- **Terminology matters:** We recommend further harmonising key terminologies related to multi-hazard-risk into international frameworks and promoting consistency in understanding across research-policy-practice nexus. The glossary developed in MYRIAD-EU can serve as a starting point.
- **Multi-hazard data are required for evidence-based policy making:** We have developed a global multi-hazard event dataset that can be used in multi-risk assessment. This supports the EU's evidence-based policy making and the risk and resilience knowledge portals and hubs.
- **Leverage synergies between Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA):** Developing future pathways that address DRR and climate change adaptation can help to achieve several policy goals at once. Further integration of these agendas within EU policy is recommended to help develop a shared vision for a sustainable future.
- **Promote systemic, multi-risk thinking:** Co-developing novel interdisciplinary approaches aimed at assessing, evaluating, managing and communicating multi-risk issues with engaged stakeholders can contribute to the paradigm shift.



Current Policy Challenges

The recent Mid-Term Review (MTR) of the Sendai Framework for Disaster Risk Reduction states that progress towards its overall goal of a "...substantial reduction of disaster risk and losses in lives, livelihoods and health..." has stalled and, in some cases, reversed. The MTR makes it clear that achieving the goals of the Sendai Framework and other international agreements (e.g. Sustainable Development Goals, Paris Agreement) requires a systemic approach that manages interdependencies and interactions between goals and targets, for example integrating across Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA). This was exemplified by the Covid-19 pandemic, in which the systemic nature of risk quickly became very apparent. The EU supports this approach, and several EU policies, strategies, and frameworks advocate for a multi-risk and multi-sector approach, such as:

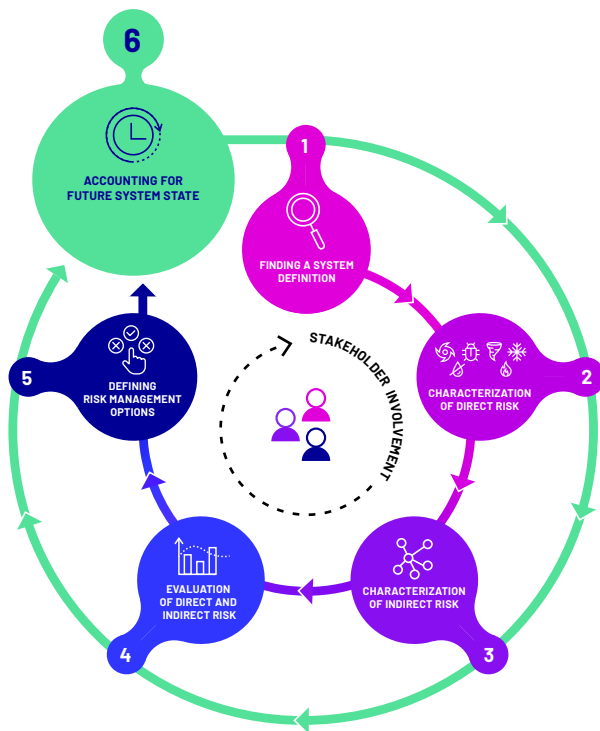
- [The Union Civil Protection Mechanism \(UCPM\)](#), a framework promoting collaboration on civil protection, which mandates regular updates of national disaster risk assessments while also encouraging regional assessments. These assessments focus on high-intensity, low-probability, and cross-border risks. In 2023, the European Commission adopted a Communication on Disaster Resilience Goals, enhancing the Union's capacity to manage cross-border disasters.
- The 2021 [EU Climate Adaptation Strategy](#), which underscores the imperative to intensify adaptation efforts, based on intelligent strategies and systemic interconnections, including multi-risk and risk propagation pathways.
- The [Critical Entities Resilience \(CER\)](#) directive: Critical infrastructure, such as transportation, water, and energy services, also requires systemic multi-risk assessment. The financial disclosure of climate-related risks and prudential regulatory supervision of financial institutions are likewise based on and promote systemic multi-risk assessments.
- EU external actions, such as the [Global Strategy for the European Union's Foreign and Security Policy](#), the [Global Gateway](#), as well as EU humanitarian and development aid policies, emphasize systematic risk assessment.

Context

MYRIAD-EU is designed to address the aforementioned policy challenges. Our vision is to **catalyse the paradigm shift** required to move **towards a multi-risk, multi-sector, systemic approach to risk assessment and management**. To achieve this, the overall aim is to develop forward-looking DRR pathways in five Pilot EU regions: Danube, Scandinavia, North Sea, Veneto, Canary Islands. Within these Pilots, we assess trade-offs and synergies of various strategies across sectors (energy, ecosystems & forestry, finance, food & agriculture, tourism, and transport & infrastructure), hazards, scales, and regions. The project is funded by Horizon 2020, and runs between 2021-2025. We also develop tools and methods to enhance our ability to carry out such multi-hazard-risk assessments.

Importance of Real-World Applications

The lack of a clear framework and guidelines on how to conduct a multi-risk assessment is a major bottleneck towards real-world applications. In MYRIAD-EU, we **co-developed a framework for systemic multi-hazard and multi-risk assessment and management** (Figure 1; [Hochrainer-Stigler et al., 2023](#)). The framework has six steps to guide users through analysing and managing risk on a continuum from single- to multi- and systemic risks. Each step is accompanied by guidance protocols, which help manoeuvre stakeholders through the framework. It is being tested iteratively with stakeholders in our Pilots. The involvement of different stakeholders is an integral and important part of the development of the framework. Stakeholders especially emphasise the need for a clear structure but also flexibility of the framework to integrate a variety of tools and methods, as well as the possibility to integrate diverse views (e.g., risk metrics of interest) of different stakeholders (from the six sectors studied in MYRIAD-EU) across different scales (e.g., from local to



• Figure 1; [Hochrainer-Stigler et al., 2023](#)

national scales). In addition, stakeholders identify five prime challenges encountered by practice and policy when transitioning towards a multi-hazard risk approach: (1) Governance structures and processes that would allow for better interagency collaborations are not put in place (e.g., clear responsibilities, and shared budgets) (2) a lack of (technical) knowledge of multi multi-hazards and multi-risks, (3) limited experience of existing disaster risk management practices, (4) translating science to policy and practice and (5) data(un)availability. Through iterative testing of the framework with stakeholders and development of associated tools and methods, MYRIAD-EU will directly tackle the identified challenges.

Importance of Coherent Terminology

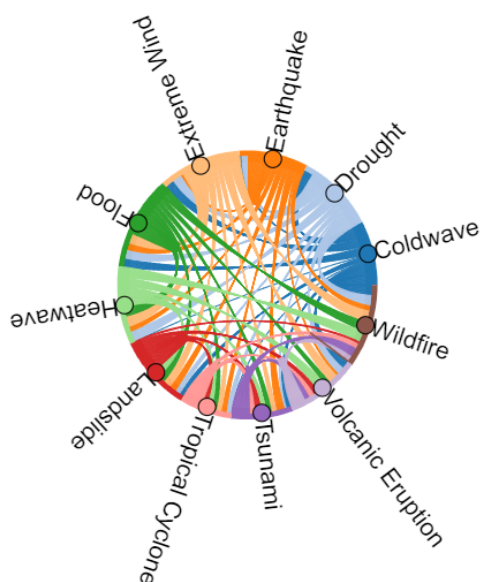
The consistent use of terminology is an important contribution to the design, implementation and monitoring of DRR and

risk-informed investments at all levels, from local to global ([Murray et al., 2022](#)). Diverse and conflicting language used to characterise multi-risk can hamper understanding between stakeholders and hinder accessibility of research in policy and practice. For example, the inconsistent use of ‘multi-vulnerability’ or ‘vulnerability interactions’ in the definition or characterisation of ‘multi-risk’, as shown in the 2010 EC STAFF WORKING PAPER ‘Risk Assessment and Mapping Guidelines for Disaster Management’, the Reporting Guidelines on Disaster Risk Management, Art. 6(1)d of Decision No 1313/2013/EU, and the Recommendations for National Risk Assessment for Disaster Risk Management in EU ([Poljanšek et al., 2019](#)). It is not clear if in these documents changes in vulnerability are considered as a consequence of the interrelated effects between hazards or only as part of the time-dependent nature of (individual) risks. This may allow for an open interpretation and application of these concepts in risk mitigation or adaptation practice. In MYRIAD-EU, we have co-developed a glossary of terminology and made this available via a Handbook ([Gill et al., 2022](#)) and a community-based Wiki-style portal, the Disaster Risk Gateway. These bring together key concepts and definitions from the multi-risk literature, together with an analysis and overview of current approaches. The glossary builds on existing intergovernmental glossaries, such as the UNDRR/ISC Hazard Definition and Classification Review, thereby aiming to strengthen consensus through a unified understanding.

Importance of Multi-Hazard-Risk Data

Designing DRR measures that account for multi-risk requires an understanding of where multi-hazard events occur. In MYRIAD-EU, we have developed a global multi-hazard event set that can be used in multi-risk analyses, through an open-source algorithm (MYRIAD-HESA) that identifies multi-hazard event sets based on event footprints (i.e. maps of hazard

extent and timing) of single hazards (Claassen et al., 2023). We used MYRIAD-HESA to develop a first global dataset of multi-hazard event footprints based on earthquakes, volcanic eruptions, landslides, tropical cyclones, cold waves, heatwaves, extreme wind, tsunamis, floods, droughts, and wildfires. The chord diagram (Figure 2) shows the complexity of interlinkages between actual past hazard events within the EU.



• Figure 2: Chord diagram showcasing different hazard combinations in the EU.

Importance of Accessibility

The field of multi-risk assessment and management is growing rapidly. While this is a positive development, it can be difficult for practitioners and researchers alike to get an overview of current tools, methods, and knowledge. In MYRIAD-EU, the aforementioned [Disaster Risk Gateway](#) brings together existing definitions, tools, methods, and policies. It is intended as a common platform for sharing knowledge across the wider DRR community, and the use of a Wiki-style portal allows for the inclusion of updates as the field evolves. The MYRIAD-EU Gateway complements other existing knowledge portals and shared data

spaces, such as the [Risk Data Hub](#) of the Disaster Risk Management Knowledge Centre, the [Resilience Dashboards](#) of the European Commission, and the [Climate ADAPT platform](#).

Recommendations:

- **Real-world applications are vital:** We recommend efforts to widen the number of real-world detailed case studies throughout the EU, in order to gather good practices and share learning across regions.
- **Terminology matters:** We recommend further harmonising key terminologies related to multi-hazard-risk into international frameworks and promoting consistency in understanding across research-policy-practice nexus. The glossary developed in MYRIAD-EU can serve as a starting point.
- **Multi-hazard data are required for evidence-based policy making:** We have developed a global multi-hazard event dataset that can be used in multi-risk assessment. This supports the EU's evidence-based policy making and the risk and resilience knowledge portals and hubs.
- **Leverage synergies between Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA):** Developing future pathways that address DRR and climate change adaptation can help to achieve several policy goals at once. Further integration of these agendas within EU policy is recommended to help develop a shared vision for a sustainable future.
- **Promote systemic, multi-risk thinking:** Co-developing novel interdisciplinary approaches aimed at assessing, evaluating, managing and communicating multi-risk issues with engaged stakeholders can contribute to the paradigm shift.

List of resources

References

- Claassen, J.N., Ward, P.J., Daniell, J., Koks, E.E., Tiggeloven, T., De Ruiter, M.C., 2023. A new method to compile global multi-hazard event sets. *Scientific Reports*, 13, 13808, doi:10.1038/s41598-023-40400-5
- EEA-CATDAT, 2023. <https://www.eea.europa.eu/ims/economic-losses-from-climate-related>
- Gill, J.C. et al., 2022. Handbook of Multi-Hazard, Multi-Risk Definitions and Concepts. MYRIAD-EU Deliverable 1.2, doi:10.5281/zenodo.7135138
- Hochrainer-Stigler, S., Šakić Trogrlić, R., Reiter, K., Ward, P.J., de Ruiter, M.C., Duncan, M.J., Torresan, S., Ciurean, R., Mysiak, J., Stuparu, D., Gottardo, S., 2023. Toward a framework for systemic multi-hazard and multi-risk assessment and management. *iScience*, 26, 106736, doi:10.1016/j.isci.2023.106736
- Murray, V. et al., 2022. Policy Brief: Using UNDRR/ISC Hazard Information Profiles to Manage Risk and implement the Sendai Framework for Disaster Risk Reduction. International Science Council, Paris, France
- UNDRR, 2023. The report of the main findings and recommendations of the Midterm Review of the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030. UNDRR, Geneva.

For more information

-  info@myriadproject.eu
-  <https://www.myriadproject.eu/>
-  https://twitter.com/Myriad_EU
-  <https://www.linkedin.com/company/myriad-eu-project/>

Authors

- Philip Ward, Stefan Hochrainer-Stigler, Robert Šakić Trogrlić, Marta Machado, Roxana Ciurean, Marleen de Ruiter, Jaroslav Mysiak, Adrian Champion, Timothy Tiggeloven, Michelle Zhang, Lea Appulo.

Other linked resources

- Disaster Risk Gateway (<https://www.disasterriskgateway.net/>)
- Risk Data Hub of the Disaster Risk Management Knowledge Centre (<https://drmkc.jrc.ec.europa.eu/risk-data-hub#/>)
- Resilience Dashboards of the European Commission (https://commission.europa.eu/strategy-and-policy/strategic-planning/strategic-foresight/2020-strategic-foresight-report/resilience-dashboards_en)
- Climate ADAPT platform (<https://climate-adapt.eea.europa.eu/>)
- Union Civil Protection Mechanism (<https://eur-lex.europa.eu/eli/reg/2021/836/oj>)
- EU Climate Adaptation Strategy (<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:82:FIN>)
- Critical Entities Resilience (CER) directive (<https://eur-lex.europa.eu/eli/dir/2022/2557/oj>)