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# Research brief: Revolutionising Multi-Hazard Risk Assessment: Innovative Methods for a Safer Tomorrow



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## Revolutionising Multi-Hazard Risk Assessment: Innovative Methods for a Safer Tomorrow

### Highlights

- **Comprehensive Vulnerability Database:** A database for six urban hazards reveals insights into commonalities and differences in vulnerability drivers, informing targeted risk reduction strategies.
- **Data Innovation for Impact Analysis:** Novel data sources like Google Trends offer real-time understanding of public response during extreme events, aiding timely interventions.
- **Advanced Techniques for Risk Assessment:** Machine Learning, analysis of Nighttime Lights (NTL) data, and disaster forensic approaches provide evidence-based insights, improving multi-hazard risk management and resilience planning.

### Recommendations

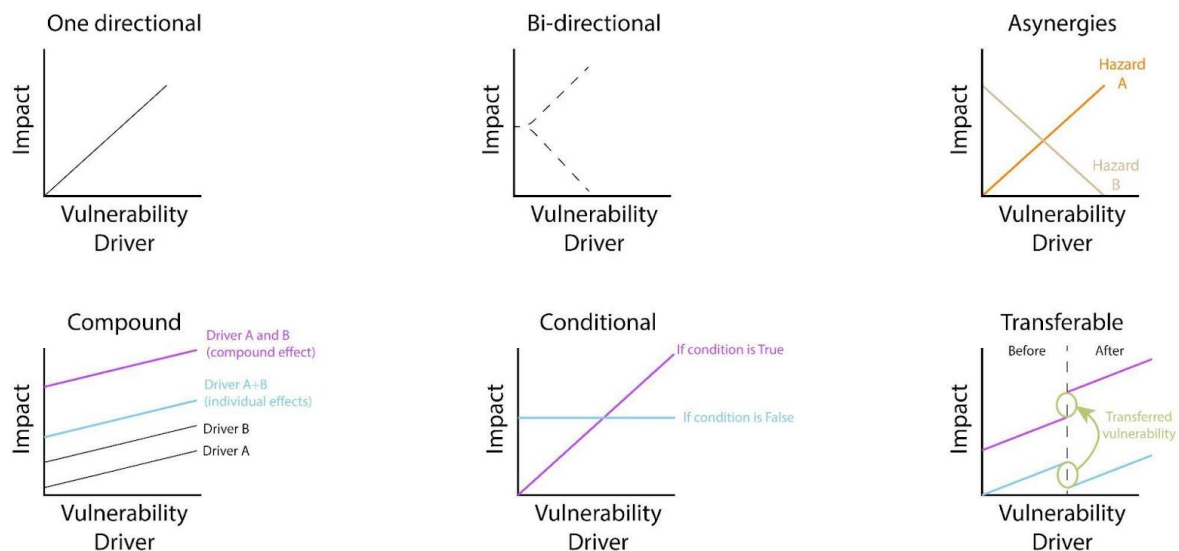
1. **Strengthen Data Infrastructure:**
  - Invest in improving data quality and availability, particularly for hazard, exposure, vulnerability, and impact data.
  - Collaborate internationally to create comprehensive, standardised global datasets and reporting frameworks.
2. **Utilise Emerging Data Sources:**
  - Leverage novel data sources such as NTL data and Google Trends to enhance risk assessment and public awareness during extreme events.
  - Invest in tools and resources for higher-resolution data analysis.
3. **Enhance Risk Understanding:**
  - Support comprehensive disaster forensic analysis to identify root causes and vulnerabilities, enabling informed policy decisions and risk reduction strategies.
  - Develop high-quality, high-resolution multi-risk event datasets to advance Machine Learning applications for more accurate multi-hazard risk assessments.
4. **Promote Multi-Hazard Awareness:**
  - Educate the general public, businesses, and stakeholders about multi-hazard events to foster a broader understanding of interconnected risks and encourage preparedness efforts.

### Context

Natural hazards pose significant threats to communities worldwide, and addressing these challenges has never been more crucial. Traditional approaches to risk assessment, which often focus on individual hazards in isolation, are inadequate in today's inter connected world. The MYRIAD-EU project recognises the pressing need to shift our approach from single-hazard assessments to a comprehensive understanding of multi-hazard dynamics.

Therefore, we explore innovative methods and data sources employed by MYRIAD -EU to assess risk dynamics and feedbacks between risk components in a multi-hazard context. We address the need for a holistic risk framework, encompassing hazard analysis, exposure, vulnerability, and response, to enhance decision-making across diverse sectors. By considering interactions between multiple hazards and the implementation of disaster risk reduction (DRR) measures, this research aids risk managers and decision-makers in preparing for and recovering from multi-hazard risk events.

## Illustration/Graph/Picture



Dynamics of (urban) vulnerability. Each graph shows the relationship between a vulnerability driver and the impact of a hazard.

## Want to know more?

- **Full reference:** de Ruyter, M., Jäger, W., Buijs, S., Tiggeloven, T., Stolte, T., De Polt, K., Critto, A., Torresan, S., Maraschini, M., Sano, M., Ferrario, D. M., Daniel, J., Khazai, B., & Sakic Troglic, R. (2023). Report on Novel Methods for Detecting Empirical Evidence of Dynamics & Feedbacks of Risk Drivers. Deliverable 4.3, report, MYRIAD-EU project.
- **Link to paper:** <https://zenodo.org/records/8329001>
- **MYRIAD-EU website:** [www.myriadproject.eu](http://www.myriadproject.eu)
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