MUNICIPALITY OF EASTERN SAMOS

ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΙΓΑΙΟΥ
UNIVERSITY OF THE AEGEAN

15th IDRiM
SAMOS 2025

IDRiM
FOR A SAFER WORLD

*Book of Abstracts*
*(Draft 23 August 2025)*

# IDRiM2025

15th International Conference of the Integrated Disaster Risk Management (IDRiM) Society

## Advancing disaster risk reduction in islands and remote areas

September 28 – October 1, 2025

Municipality of Eastern Samos and
University of the Aegean,
Samos, Greece

Editors

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International Society for Disaster Risk Management (IDRiM), Japan

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## Acknowledgements

We extend our sincere appreciation to the session chairs, speakers, and participants who played a pivotal role in the success of the IDRiM2025 Conference. Their valuable contributions, insightful comments, and engaging discussions enriched the conference experience and contributed significantly to the advancement of knowledge in the field.

Moreover, we would like to highlight this year's lively Young Scientist Session (YSS), where many early-career researchers presented promising works and cutting-edge research. The energy, creativity, and dedication of these emerging scientists added a dynamic and inspiring dimension to the conference, reflecting the vibrant future of our discipline.

The success of IDRiM2025 would not have been possible without the generous support of numerous individuals and organisations. We are particularly grateful to the local volunteers, the IDRiM Society members around the world, and the many contributors who offered their time, expertise, and in-kind donations to make the conference a reality. We also wish to extend our heartfelt thanks to the Greek organisations, government institutions, and local businesses in Samos, whose support—ranging from logistical assistance to sponsorship—was crucial in creating a welcoming and well-organised event.

We also wish to express our sincere gratitude to the secretariats, technical staff, and support staff, whose dedication and professionalism behind the scenes ensured the smooth running of the conference. Their tireless efforts in managing logistics, technology, and day-to-day operations were essential in providing a seamless experience for all participants.

The combined efforts of participants, young researchers, volunteers, supporters, and staff ensured not only the smooth running of the conference but also an inspiring and memorable experience for all attendees, strengthening the global network dedicated to advancing research, practice, and policy in disaster risk management.

# Preface

*Prof. Ana Maria CRUZ, President of IDRiM Society*

*Paraskevas PAPAGEORGIOU, Mayor of Easter Samos*

# About IDRiM2025 Conference

The 15th International Conference of the Integrated Disaster Risk Management (IDRiM) Society (IDRiM2025), titled "Advancing disaster risk reduction in islands and remote areas", highlights the distinct risk environments and multifaceted challenges faced by islands and remote areas. In this context, the conference places accessibility (physical, social, economic, institutional, etc.) at the centre examining its impact on disaster prevention and mitigation, emergency response, and disaster recovery in the era of climate crisis and globalisation.

Remote areas, such as small islands, peninsulas, forest and rural communities, and mountainous regions, are often characterised by their geographic isolation, limited infrastructure, forced self-reliance, and fragile ecosystems. These regions face significant challenges in disaster risk reduction and management, including difficulties in accessing resources and services, and weak connection to emergency management systems. Communication barriers and fragmented governance structures further hinder communication and coordination among stakeholders, and challenge access to critical information. Additionally, the impacts of climate change and globalisation exacerbate vulnerabilities, making it essential to develop and implement adaptive, sustainable, and locally tailored solutions to reduce risks and enhance resilience.

Addressing disaster risks in complex and resource-constrained settings often reveals critical implementation gaps. To bridge these gaps, emphasis is placed on the pivotal role of implementation science, which integrates research, policy, and practice to develop adaptive, collaborative, and participatory solutions for disaster risk management. Implementation science enables the systematic identification of barriers to effective action and the development of tailored strategies to overcome them, ensuring that interventions are context-specific and feasible. Additionally, it fosters continuous learning through iterative processes, allowing stakeholders to refine their approaches based on real-time feedback and evolving conditions. By focusing on the practicalities of implementing integrated disaster risk management, the conference invites the scientific community, decision-makers, and practitioners to explore strategies for disaster risk reduction and management in contexts where access to locations, infrastructure, services, resources, funding, information, and knowledge is limited, intermittent, or constrained.

To this end, IDRiM2025 encompasses the following topics, preferably focusing on islands and remote areas although other contributions, for example concerning urban areas, will be also considered.

## Key Topics

- ***Understanding disaster risk***
  - (Disaster) Risk assessment at a local level considering global flows and trends
  - Frameworks to bridge knowledge and practice, fostering collaborative approaches to risk assessment
  - Coastal and mountain hazards and risks in the era of climate change
  - All-of-society engagement and participation for better risk and disaster data
  - Citizen science for disaster risk reduction
  - Sharing risk knowledge amongst different geo-administrative levels, sectors, communities, and scientific fields
  - Spatial and temporal dimensions of hazard, exposure, vulnerability and disaster risk
  - Comparing disaster response and recovery capacities in remote vs. non-remote areas
- ***Strengthening disaster risk governance towards reducing and managing disaster risk in islands and remote areas***
  - All-of-society disaster risk reduction and management
  - Risk awareness, information and communication leaving no one behind
  - Capacity-building for participatory and risk-informed decision-making
  - Science-policy-practice-community collaboration in disaster reduction and management
  - Developing capacities and knowledge towards a resilient future
  - Policies for enhancing individual, community and institutional disaster resilience and climate change adaptation
  - Risk governance structures that integrate implementation science to enhance cross-sectoral collaboration and coordination
- ***Investing in disaster risk reduction and resilience in islands and remote areas***
  - Sustainable and resilient infrastructure, tools and systems to improve accessibility
  - Incentivising private sector investment and engagement in disaster risk reduction
  - Innovative investments and financing mechanisms for islands and remote areas
  - Mainstreaming disaster risk reduction towards local development
  - Risk informed investment in islands and remote areas, focusing on health, transport and tourism
  - Investing in Nature based Solutions for disaster risk reduction and climate change adaptation
  - Comparing approaches to infrastructure resilience in remote and non-remote areas
- ***Improving disaster preparedness and response – "Build Back Better"***
  - Multi-Hazard early warning systems considering local priorities and challenges

- Emergency evacuation and relocation through the lens of sustainable development
- Information and Communication Systems for crisis and disaster management
- Disaster recovery and reconstruction of historic / traditional settlements and areas
- Build Back Better from disaster
- Inclusive preparedness, response, recovery and reconstruction
- Leveraging resilience to hazards and sustainability through disaster reconstruction
- Learning from disasters
- Embedding adaptive processes in disaster preparedness and emergency response efforts

# About the Organisers

## International Society for Disaster Risk Management (IDRiM Society)

The Society for Integrated Disaster Management (IDRiM Society) and its Journal (IDRiM Journal) were officially launched on October 15, 2009, in Kyoto, Japan, at the 9th IIASA-DPRI Forum on Integrated Disaster Risk Management (IDRiM Forum). The move to set up the IDRiM Society was based on the success of a series of nine Forums (the IIASA-DPRI Forums) on Integrated Disaster Risk Management organized by the Disaster Prevention Research Institute (DPRI) of Kyoto University and the International Institute for Applied Systems Analysis (IIASA). The launching of the IDRiM Society was promoted also by many national and international organizations including Beijing Normal University, International Institute of Earthquake Engineering and Seismology (IIEES), National Research Institute for Earth Science and Disaster Prevention (NIED), the United Nations International Strategy for Disaster Reduction (UN/ISDR), the Joint Research Centre of the European Commission (JRC/EC) and other organizations. The IDRiM Society was enthusiastically welcomed and its Charter approved by more than 100 international experts, practitioners, and individuals from more than 20 different countries working in the disaster risk management field.

The founding members of the IDRiM Society include Prof. Norio Okada (Director, DPRI), Dr. Aniello Amendola (IIASA), Dr. Peijun Shi (BNU), Dr. Joanne Bayer (IIASA), Prof. Hirokazu Tatano (DPRI), Dr. Mohsen Ghafory-Ashtiani (IIEES), Dr. Reinhard Mechler (IIASA) and Dr. Ana Maria Cruz (DPRI).

The main objective of the IDRiM Society is to promote knowledge sharing, interdisciplinary research, and development on integrated disaster risk management contributing to the implementation of success models for efficient and equitable disaster risk management options. Furthermore, the IDRiM Society aims at promoting knowledge transfer and dissemination of information and concepts on integrated disaster risk management.

## University of the Aegean (UoA)

*Department of Information and Communication Systems Engineering*

The University of the Aegean is a public, multi-campus institution established in 1984, with its central administration in Mytilene, Lesbos. Uniquely spread across six Aegean islands—Lesbos, Chios, Samos, Rhodes, Syros, and Lemnos—it offers an academic environment that integrates local context with global outreach. The university serves around 20,000 students across 17 undergraduate and 28 postgraduate programs in fields such as Marine Sciences, Environmental Engineering, Cultural Informatics, and Communication Systems.

The university is highly internationalized, participating in over 210 Erasmus partnerships and offering bilingual and joint MSc and PhD programs.

Located in Karlovassi, Samos, the Department of Information & Communication Systems Engineering (www.icsd.aegean.gr) of the University of the Aegean was established in 1997 and offers a five-year integrated Master's degree (EQF Level 7) in information and communication systems engineering. It combines strong theoretical foundations with applied knowledge in areas such as cybersecurity, AI, robotics, IoT, telecommunications, big data, and legal aspects of informatics. The curriculum is research-oriented and aligned with international standards, supported by modern labs and over 200 student workstations.

Graduates enjoy full professional recognition as Electronic Engineers (via the Technical Chamber of Greece) and are eligible for roles in both the private and public sectors, including software development, data science, cybersecurity, and ICT consulting.

## Municipality of Eastern Samos

Samos is a Greek island in the eastern Aegean Sea, and off the coast of Asia Minor, from which it is separated by the 1.6-kilometre (1.0 mi)-wide Mycale Strait.

Samos has a rich history dating back to ancient Greece. It was a major cultural and scientific center in the 6th century BCE, known as the birthplace of Pythagoras, and home to other notable figures like Epicurus and Aristarchus. Important historical sites include the Tunnel of Eupalinos, a feat of ancient engineering, and the Heraion of Samos, a major ancient sanctuary. Both are UNESCO World Heritage Sites. The island was later part of the Byzantine and Ottoman Empires before joining modern Greece in 1912.

Eastern Samos features a mix of mountains, forests, and beaches. The region has a Mediterranean climate and a strong tourism industry, driven by its archaeological heritage, scenic beauty, and traditional villages. Popular tourist spots include the ancient ruins of Pythagoreion, the Samos Archaeological Museum, and the beach resorts of Kokkari and Tsamadou.

The local economy is supported by tourism, agriculture, and winemaking. Samos is particularly famous for its Muscat wine, alongside products like olive oil and citrus fruits. Cultural life is vibrant, with local festivals and traditional events throughout the year.

Eastern Samos offers a unique combination of ancient history, natural beauty, and authentic Greek island life.

The Municipality of Eastern Samos is located on the eastern side of Samos Island. Formed in 2019, it includes the island's capital Samos Town (Vathi) and several other towns and villages such as Pythagoreio, Kokkari, and Mytilinioi.

An island near international borders is a suitable place for hosting dialogues on challenges faced by islands and remote areas due to the local conditions and broader trends. The island has learnt from past crises and disasters and is currently taking steps to reduce disaster risk and to build emergency and crisis management capacity. In 2024, the Municipality of East Samos became the first Greek municipality, and the third in the Mediterranean, to receive UNESCO's "Tsunami Ready Community" recognition.

# Online Young Scientist Session Programme

## Online Young Scientist Session (YSS) on 23rd September 2025

## (Draft Programme as of 8th September 2025. Times are in UTC+3)

| YS Session Title | Time in Greece | Title | Speaker | Institution, Country |
|---|---|---|---|---|
| Online YSS I – **'Community Perception and Social Dimensions'**<br><br>Chair: Dr. Mark Ashley Parry (Northumbria University, United Kingdom) | 06:00 - 06:20 | Introduction | TBC | |
| | 06:20 - 06:40 | Neighbourhood perceptions and business recovery outcomes from COVID-19 in Vancouver and Calgary, Canada | Juri KIM | University of British Columbia, Canada |
| | 06:40 - 07:00 | Uncovering Community Perspectives: A Qualitative Exploration of Auckland Residents' Perceptions and Attitudes Towards Wetland Restoration as a Strategy for Disaster Risk Reduction | Aug Zaw LIN | Auckland University of Technology, New Zealand |
| | 07:00 - 07:20 | Perceptions and Emotions Toward False Alarms in Flood Warnings and their Effects on Evacuation Behavior in Kyushu, Japan | Mai WATANABE | Institute of Science Tokyo, Japan |
| | 07:20 - 07:40 | The Potential Earthquake Disaster in Beijing and its Impact on the Socio-Economic System and Residents' Income | Yue LIN | Nanjing University, China |
| 07:40 - 08:00 [Break] | | | | |
| Online YSS II – **'Disaster Education, Response, and Recovery'**<br><br>Chair: Dr. Haris Rahadianto (Lund University, Sweden) | 08:00 - 08:20 | Examination of Disaster Prevention Education Practices to Promote Consideration of Vehicle Tsunami Evacuation - As an Example of Practice in Kuroshio Tow, Kochi Prefecture, Japan | Wataru OMOTO | Kyushu University, Japan |
| | 08:20 - 08:40 | Measurement of Reconstruction Fund Allocation Optimization on the Effectiveness of Post-Disaster Reconstruction: Insights from Business Interruption Losses and Ripple Losses | Zilong LI | Harbin Institute of Technology, China |
| | 08:40 - 09:00 | Assessing the Potential of Mosques in Disaster Response in Tokyo | Seiya HYODO | Institute of Science Tokyo, Japan |
| | 09:00 - 09:20 | Modeling Regional Production Capacity Loss Rates Considering Response Bias: Insights from a Questionnaire Survey on Zhengzhou Flood | Yan LUO | Harbin Institute of Technology, China |
| 09:20 - 09:35 [Break] | | | | |
| Online YSS III – **'Infrastructure Resilience and Preparedness'**<br><br>Chair: TBC | 09:35 - 09:55 | Offshore Wind-to-Hydrogen Standards – Case Study Kyushu | Peiyin JIANG | Kyoto University, Japan |
| | 09:55 - 10:15 | The Chain Disaster Mainly Caused by the Flood Resulting from the Breach of the Dike at Huayuankou in 1938 | JuanJuan HU | Qinghai Normal University, China |
| | 10:15 - 10:35 | Estimation of Population Exposure to Flood Risk by Using a Geospatial Information System Overlay of Mobile Statistics (MSS) Data, Flood Inundation Map, and Land Use Zone | Diva SYANDRIAJI | Gifu University, Japan |

| YS Session Title | Time in Greece | Title | Speaker | Institution, Country |
|---|---|---|---|---|
| | 10:35 - 10:55 | Impact on Urban-Rural Income Inequality of Flood Disasters in China: Insight from Mixed-Irio Model Considering Households Endogeneity | Dan LAI | Wuhan University of Technology, China |
| | | 10:55 - 11:10 [Break] | | |
| Online YSS IV – **'Climate and Hazard Modelling'**<br><br>Chair: TBC | 11:10 - 11:30 | Temporal and Spatial Variation Characteristics of Precipitation Isohyets on the Qinghai-Tibet Plateau from 1961 to 2023 | Xuan LIU | Qinghai Normal University, China |
| | 11:30 - 11:50 | Modeling Enterprise Capacity Loss Through Infrastructure Interruptions: A Nested Logistic Framework for Natural Disaster | Shengjin ZHANG | Harbin Institute of Technology, China |
| | 11:50 - 12:10 | Learning From the Past Multi-Hazard Events. Forensic Analysis Application for 2018 Kerala Floods | Pritam GHOSH | University of Twente, Netherlands |
| | 12:10 - 12:30 | Modeling and Quantifying the Impact of Climate Stress on Coffee Yield: A Comparative Study of Yunnan, China and Ethiopia | Xiaojie WANG | Beijing Normal University, China |
| | | 12:30 - 13:15 [Break] | | |
| Online YSS V – **'Governance and Communication in Risk Settings'**<br><br>Chair: TBC | 13:15 - 13:35 | Towards a Theoretical Framework for Assessing the Role of Religious Institutions in the Disaster Recovery | Anam AMJAD | Indian Institute of Technology Roorkee, India |
| | 13:35 - 13:55 | Standard Tool for Assessing and Evaluating the Cultural Resilience of Cities | Eleni LINAKI | National Technical University of Athens, Greece |
| | 13:55 - 14:15 | Enhancing Communication for Adoption of Hazard-Resilient Housing: Co-Creating Cognitive and Peer Learning Tool for Rural Nepal's Flood Recovery | Garbhit NAIK | University of Twente, Netherlands |
| | 14:15 - 14:35 | Local Heat Action Plan: Developing Framework for Mobilizing Governance in Rural Areas – Case Study, Moodady Gramapanchayath, Kozhikoda | Arya NARENDRAM | Kerala State Disaster Management Authority, India |
| | | 14:35 – 14:50 [Break] | | |
| Online YSS VI – **'Gender, Inclusion, and Vulnerable Populations'**<br><br>Chair: TBC | 14:50 - 15:10 | Towards Inclusive Vulnerability Mapping: A Systematic Review of Gender Integration in Vulnerability Analyses | Emily ADAMS | University of Twente, Netherlands |
| | 15:10 - 15:30 | Investigating the Roles and Gendered Implications of Volunteering in Disaster-Affected Communities: A Case Study of Cameroon | Reine Suzanne KADIA | Independent Researcher, Cameroon |
| | 15:30 - 15:50 | Water Insecurity and Anxiety in Post-Disaster Nepal: A Gendered Analysis from Earthquake Affected Remote Communities in Nepal | Garbhit NAIK | University of Twente, Netherlands |
| | | 15:50 - 16:05 [Break] | | |

| YS Session Title | Time in Greece | Title | Speaker | Institution, Country |
|---|---|---|---|---|
| Online YSS VII - **'Crisis Communication & Multi-Hazard Governance'**<br><br>Chair: TBC | 16:05 - 16:25 | Seismic Crisis Communication and Response Under Uncertainty in Islands: The Perspectives of Science, Administration and the Local Community | Anna FOKAEFS | Harokopio University of Athens, Greece |
| | 16:25 - 16:45 | A Framework to Quantify the Impacts of Multi-Hazard Interactions | Mariya SUNIL | University of Twente, Netherlands |
| | 16:45 - 17:05 | Enhancing Disaster Risk Governance in Remote Areas Through a Multi-Hazard, Multi-Stakeholder DSS: A Mediate Project | Godfred BOATENG-ANTWI | Côte d'Azur University, France |
| | 17:05 - 17:25 | Vulnerability and Resilience: Older Adults in the 2021 Ahr Valley Flood | Chen SONG | University of Twente, Netherlands |
| 17:25 – 17:40 [Break] | | | | |
| Online YSS VIII – **'Nature-based, and Resilience-Building Strategies'**<br><br>Chair: TBC | 17:40 - 18:00 | Addressing the interplay between local development planning and drought resilience building in insular areas through a Social-Hydrological Systems approach. | Ioannis DASKALAKIS | Harokopion University of Athens, Greece |
| | 18:00 – 18:20 | Nature-Based Solutions for Reducing Flood Risk: A Case Study in South Tongu District, Ghana | Flossie Antwiwaa Kyerewaa FRIMPONG | University of Twente, Netherlands |
| | 18:20 - 18:40 | Understanding Expert Discourses for Improved Wildfire Risk Management | Xiran DONG | International Institute for Applied Systems Analysis, Austria |
| | 18:40 - 19:00 | Scenario-Based Urban Growth Modelling for Dominica Island | Malavika MANOJ | University of Twente, Netherlands |
| | 19:00 – 19:10 | Closing Remarks | TBC | |

# IDRiM2025 Conference Programme

# Keynote Speakers

*IDRiM2025 | Samos, Greece | Sep 28-Oct 1, 2025*
*Advancing disaster risk reduction in islands and remote areas*

## Adriana GALDERISI

*Professor*
*Università della Campania 'Luigi Vanvitelli', Italy*

Keynote

## Revitalisation strategies and risk management in inner peripheries: The need of integrated approaches

*Keynote Abstract*

The so-called inner peripheries, largely widespread all over Europe and especially in Southern Europe, represent peripheral and marginal areas, experiencing depopulation and ageing phenomena due to multiple factors, such as geographic remoteness, poor connectivity, weak socio-economic performance, and limited access to key facilities. Furthermore, most of these areas are threatened by different hazards, often playing as accelerators of the on-going abandonment processes, also due to the constantly increasing physical and systemic vulnerabilities.

Current strategies aimed at revitalizing these areas, which are crucial to a balanced and sustainable development of wider regions, seem to ignore or neglect risk issues. Therefore, with reference to a research project developed and tested on selected inner peripheries located in Southern Italy, the potential of the concept of resilience as a key tool to understand the multiple fragilities of these territories, exposed to chronic stresses and sudden shocks, and support the definition of integrated revitalization strategies, will be examined and discussed.

*Brief Curriculum Vitae*

Adriana GALDERISI is a full Professor of Spatial Planning at the Department of Architecture and Industrial Design – University of Campania 'Luigi Vanvitelli'.

She is a member of the Coordinating Board of the Thematic Group Resilience and Risk Mitigation Strategies of the Association of European Schools of Planning (AESOP) and a member of the Board and Council of Representatives of the Italian Society of Urban Planners (SIU).

Her research activities have been mostly focused on methods and tools for natural, technological and climate-related risks reduction, with a particular attention to vulnerability and resilience of urban systems and remote areas in the face of heterogeneous hazard factors.

*IDRiM2025 | Samos, Greece | Sep 28-Oct 1, 2025*
*Advancing disaster risk reduction in islands and remote areas*

She has coordinated research teams within numerous National and European Projects (EU Project ARMONIA – Applied Multi Risk Mapping of Natural Hazards for Impact Assessment". VI Framework Program; EU Project SCENARIO – Support on Common European Strategy for sustainable natural and induced technological hazards mitigation).

She has been the Scientific Responsible for the European Project "ENSURE – Enhancing resilience of communities and territories facing natural and na-tech hazards" and for the National Project RI.P.R.O.VA.RE – Rehabiting Small Villages. Operational Strategies for Enhancing Resilience of Inner Peripheries.

Currently, she is collaborating to the following projects: the "Cultural Heritage Active Innovation for Sustainable Society" (CHANGES) Project, funded by the European Union (Next Generation EU); the National Project "Reloading city: a new systemic approach to urban and territorial regeneration", funded by the Ministry of University and Research; the National Project "URBANSENSE", funded by the Ministry of University and Research She is author of numerous papers presented at national and international conferences and more than 160 publications (monographs, chapters in books and scientific articles).

*IDRiM2025 | Samos, Greece | Sep 28-Oct 1, 2025*
*Advancing disaster risk reduction in islands and remote areas*

## Mohsen GHAFORY-ASHTIANY

*Distinguished Professor*
*International Institute of Earthquake Engineering and Seismology (IIEES)*

*Member of the Iran Academy of Science and Iran National Science Foundation*

Keynote

# Revitalisation strategies and risk management in inner peripheries: The need of integrated approaches

*Keynote Abstract*

Urban resiliency for the rapid development of cities in Asia which are exposed to all type of natural hazards, as well as facing the challenges for safe energy and water with existing climate changes; requires an integrated look with system thinking. System Approach to the Urban Resiliency (UR) represents an innovative approach to enhance urban resilience against a spectrum of urban shocks and stressors, including natural hazards. This initiative supports the objectives of the Sendai Framework for Disaster Risk Reduction and the SDG-11 by promoting evidence-based decision-making in urban environments. The UR employs the Abstract Hierarchy (AH) methodology, a systems thinking approach, to integrate both tangible (urban built environment, buildings, and infrastructures) and intangible values (such as equity, community well-being, and governance) elements into a coherent framework across scales, and timeframes. By adopting a network-centric perspective, UR provides a comprehensive understanding of the interconnectedness within urban systems; identifies synergies and trade-offs; and assesses urban resilience. Focused on disaster prone cities, UR aims for a unique collaboration bridging Asian cities, embodying a cities-to-cities approach with an unparalleled level of integration across various research and a practice-oriented synthesis for urban landscapes.

Considering the transboundary, interconnected multifaceted and complex concept for urban resilience one requires:

- Paradigm shift with system thinking toward enhancing synergy between sectors involved in DRR (people, scientists, socio-economist, and policymakers);
- Integration of all sectors in one system with inter- and transdisciplinary cooperation and implementation, since the emerging risks are too complicated to be overcome by a single entity or discipline;
- Use of system thinking to Identifying problems related to natural hazard, energy, water, climate change to be used for system dynamic modelling of all contributing parameters;

*IDRiM2025 | Samos, Greece | Sep 28-Oct 1, 2025*
*Advancing disaster risk reduction in islands and remote areas*

- Creation of nexus and integration among all sectors for effective implementation. This is the principal to good governance, where the elements of a system should work together in order to solve the complex problems of being safe against natural disasters.

Measuring and monitoring urban resilience, requires designing an indicator-based system models using different quantitative to qualitative approaches, in order to describe how resilience can be captured in its different dimensions (e.g., physical susceptibility, social-cultural issues and socio-economic contexts). Most of these approaches incorporate inductive, deductive and hybrid methodologies with top-down or bottom-up methods by making a combination between different indicators and sub-indicators on physical, socio-economic and institutional parameters. In this program, experts from natural hazard, energy, climate change, water, socio-economic and governance should collaborate to develop a system-based model and toolbox that can be used for urban resiliency assessment and measures.

Finally, the application of the proposed model to Kish Island in the Persian Gulf is presented. The findings highlight which parameter plays a key role in optimizing urban resilience performance under budget constraints across different levels of resilience improvement.

### *Brief Curriculum Vitae*

Mohsen GHAFORY-ASHTIANY is a distinguished professor of earthquake engineering and risk management. He currently holds a position at the International Institute of Earthquake Engineering and Seismology (IIEES). He is also an Associate member of the Iran Academy of Science, member of Iran National Science Foundation, and guest Professor of Beijing Technical University (BJUT). Additionally, he serves as the Chairman of the SP Insurance Risk Management Institute (SPRMI). Throughout his career, Mohsen Ashtiany has collaborated with various international organizations such as UNESCO, UNDRR, UN-HABITAT, UNESCAP, UNDP, WB, WHO, Global Alliance of Disaster Risk Institutes (GADRI), International Institute of Applied System Analysis (IIASA), and Inter-Academy on risk and resilience.

As the founder of the IIEES in Iran in 1989, he served as its president until 2007. He has made significant contributions to the field of earthquake engineering, structural design and analysis, strengthening of existing structures, structural resilience, development of guidelines for safe school and hospital design, seismic and flood hazard and risk analysis, risk management, disaster risk insurance, disaster risk economy and finance, urban resilience, system approach for urban resilience to natural hazards, climate change, and water and energy stress, and risk reduction policy development.

Mohsen Ashtiany is a prolific author, having written over 380 papers, 6 books, and 75 research reports. He serves as the Editor of the Journal of Seismology and Earthquake

*IDRiM2025 | Samos, Greece | Sep 28-Oct 1, 2025*
*Advancing disaster risk reduction in islands and remote areas*

Engineering and Co-editor of the Integrated Disaster Risk Management (IDRiM) Journal. He is also an editorial member of several other journals. He is the founder and past President of the Iranian Earthquake Engineering Association (IEEA), and a pioneer in Risk mitigation activities in Iran. He has served as a member of Iran's Natural Disaster Prevention and Management Headquarters, Iran's Risk Reduction Comm., Iran Scientific Research Council, National Building Code Council, Natural Disasters Think Thanks and Housing Think Thank of Iran Academy of Science, Expert Engineer at Law, Insurance Loss Adjustor, Chairman of Tehran Disaster Risk Finance WG, etc. He is also a member of many scientific associations such as: The International Association of Earthquake Engineering, European Earthquake Engineering, UNESCO Scientific Board of the International Geoscience Program, IUGG-GeoRisk, IUGG-IASPEI, ex-member of UNISDR-STC, ex-chairman of IASPE-SGM- Hazard-Risk, WSSI, etc. With more than 43 years of professional experience, Mohsen Ghafory-Ashtiany has demonstrated expertise in project management, structural design, program directorship, institutional building, disaster risk finance, stakeholder engagement, and policy development at national and international levels.

*IDRiM2025 | Samos, Greece | Sep 28-Oct 1, 2025*
*Advancing disaster risk reduction in islands and remote areas*

## Paraskevi (Evi) NOMIKOU

*Professor*
*National and Kapodistrian University of Athens (NKUA), Greece*

Keynote

# The 2025 Seismic Crisis Reveals a Coupled Magma Feeding System at Santorini and Kolumbo

*Keynote Abstract*

The 2025 volcano-tectonic crisis of Santorini and Kolumbo in the Aegean Sea offered an unprecedented opportunity to study the dynamics of interconnected magmatic systems. Ground deformation began in July 2024, with GNSS and satellite data revealing uplift of up to 50 mm within Santorini caldera, accompanied by elevated $CO_2$ and $H_2$ emissions. On 27 January 2025, a vigorous earthquake swarm initiated northeast of Santorini, near Kolumbo volcano, and persisted for more than a month. Seismicity evolved in phases, beginning with deep events (12–18 km) and migrating northward toward Anhydros Island at ~1 km/h. At least 12 seismic surges were identified, marked by bursts of seismicity, tremor activity, and MW>5 earthquakes concentrated at the dike tip.

Moment tensor analysis of 180 events (MW>3.6) indicated normal faulting with a NW–SE tension axis, consistent with dike intrusion. A high-resolution catalogue of >28,000 earthquakes revealed a segmented, rapidly ascending dike fed by sustained magma inflow. Geodetic inversion identified two main sources: deflation of a mid-crustal reservoir beneath Kolumbo (~0.08 $km^3$ at ~7.6 km depth) and emplacement of a ~13 km long dike between Kolumbo and Anhydros (~0.3 $km^3$). The sequence—Santorini inflation, Kolumbo deflation, and dike intrusion—demonstrates strong coupling between the two systems, likely mediated by stress transfer within the crustal plumbing network.

REFERENCE

M. Isken, J. Karstens, Nomikou et al. (2025). Volcanic crisis reveals coupled magma system at Santorini and Kolumbo. NATURE (in press).

*Brief Curriculum Vitae*

Paraskevi (Evi) NOMIKOU is a Professor at the Department of Geology and Geoenvironment of National and Kapodistrian University of Athens (Greece). She is a marine geologist studying the morphology of underwater volcanoes and has extensive experience in marine volcanic and seafloor extruding processes.

*IDRiM2025 | Samos, Greece | Sep 28-Oct 1, 2025*
*Advancing disaster risk reduction in islands and remote areas*

She has participated in more than 80 oceanographic cruises on submarine volcanism, mud volcanoes, landslides and slope stability and the exploration of seafloor mineral deposits. She is the Principal Investigator of SANTORY (SANTORini seafloor's observatory), which monitors the Kolumbo submarine volcano and provides solutions to understanding and mitigating impacts of explosive volcanic eruptions. Recently, she has played a leading role in the evaluation of the potential hazards associated to the tectono-magmatic activity NE of Santorini volcano.

Prof. Nomikou inspires her students to explore sea floor using innovative marine technologies and is a role model for women considering a career in oceanography.

In recognition of her outstanding contributions, she was awarded the 2025 Fisher Medal by the International Association of Volcanology and Chemistry of the Earth's Interior.

*IDRiM2025 | Samos, Greece | Sep 28-Oct 1, 2025*
*Advancing disaster risk reduction in islands and remote areas*

## Kalliopi SAPOUNTZAKI

*Professor Emerita*
*Harokopion University of Athens (HUA), Greece*

Keynote

## (Disaster) Risk Governance in Islands: Theoretical Possibilities, Real-world Difficulties

*Keynote Abstract*

(Disaster) Risk Governance has been widely acknowledged as the best path to risk assessment and management because it is a holistic, integrated and proactive approach, it represents a more democratic and transparent process for risk decision-making, it enhances the prospects of risk policy social acceptance and implementation, and ensures some degree of risk accountability. A critical query is whether these merits of Risk Governance apply in every geographical location and every community case, as for instance in places featured by geographical isolation and remoteness.

The presentation examines in depth the factors that may facilitate or cancel Risk Governance efforts in islands (with a focus on the Mediterranean region). Taking into consideration that Risk Communication is an omnipresent component and a critical prerequisite of Risk Governance the presentation delves into the two distinct phases of Risk Communication: Crisis/Emergency Communication and Pro-active Risk Communication. The major challenges for the islands, in the first case, is how to handle multiple layers of Uncertainty and in the second, how to reinforce Risk Perception [versus (tourism) development benefit perceptions] so as to activate appropriate mitigation responses. This is the necessary background for an autonomous but well net-worked DRM system based on insular community participatory processes.

*Brief Curriculum Vitae*

Kalliopi SAPOUNTZAKI is Professor Emerita (Spatial Planning and Disaster/Risk Management) at Harokopio University of Athens, Department of Geography, Greece. She has been Dean of the Faculty of “Environment, Geography and Applied Economics” (2017-2024).

She holds PhD on Risk Management and Spatial Planning from the National Technical University of Athens (1990), MA diploma in Urban Design from the University of Manchester and Diploma in Architecture from the National Technical University of Athens.

*IDRiM2025 | Samos, Greece | Sep 28-Oct 1, 2025*
*Advancing disaster risk reduction in islands and remote areas*

She is Board member of the Society for Risk Analysis – Europe and she has offered lectures as visiting professor at several universities across Europe (University of Vienna, Technical University of Dortmund, University of Valencia etc). She has contributed to the UNISDR Global Assessment Report (GAR) 2019 and in several chapters of the report of the European Commission "Science for Disaster Risk Management 2020: Acting today, protecting tomorrow". She has been Guest Editor of International Scientific Journals for open access Special Issues featuring disasters, climate change and spatial planning. She has been the principal author of a co-authored textbook on Risks and Disasters (in Greek) and the scientific leader of European Commission funded and national research projects focusing on risk and vulnerability analysis, resilience building and risk governance, mitigation and adaptation to climate change, sustainable development, urban and regional planning. She has published her work in international books and scientific journals, and she has chaired the organizing and scientific committee of the 2024 international conference "Risk in Time and Space" (under the auspices of the Society for Risk Analysis – Europe) that was held in Athens (2-5 June 2024).

*IDRiM2025 | Samos, Greece | Sep 28-Oct 1, 2025*
*Advancing disaster risk reduction in islands and remote areas*

## Ioannis SPILANIS

*Professor Emeritus*
*University of the Aegean (UoA), Greece*

Keynote

## Islands' sustainable strategy: From vulnerability to resilience

*Keynote Abstract*

Demographic and productive shrinkage were the main impacts caused by the unique characteristics of insularity (small size, peripherality and isolation, uniqueness but high fragility of natural and cultural resources) under the pressure of the dominant economic model of mass production in the 20th century, placing them in a vulnerable position.

Tourism development in recent decades has changed the trend, as islands are considered worldwide as very attractive places to visit and tour. New incomes, often very high, have been created, as well as new jobs. This development has created new challenges and another type of vulnerability.

Given the characteristics of islands, the principles that must govern their development in order to be sustainable -and par consequence more resilient - are: (a) Quality islands: production of high-quality and value-added products and services based on the exploitation of natural, cultural, productive and marine resources as compensation for the high production costs that make the competitive production of "common" products prohibitive; (b) Green islands with strict use of resources given their insufficiency and (c) Equal opportunity islands: provision of public interest services comparable to those of the mainland so that islanders are not second-rate citizens.

*Brief Curriculum Vitae*

Ioannis SPILANIS is an economist, graduate of the University of Athens (1979). After postgraduate studies in "European and International Studies", he obtained a PhD on "Tourism and regional development. The Greek case" in 1985 at the University of Grenoble (France). He worked at the Ministry of the Aegean as an expert in regional development (1987-1990).

He was Professor in the Department of Environment of the Aegean University and used to teach at the Master Programs "Planning, Management and Tourism Policy" and "Islands". Today is Professor Emeritus.

*IDRiM2025 | Samos, Greece | Sep 28-Oct 1, 2025*
*Advancing disaster risk reduction in islands and remote areas*

His research interests within sustainable development issues, focus on islands' development and tourism planning. As director of the Laboratory of Local and Insular Development, he was recently responsible for various studies as "European Islands and Cohesion Policy" (EU/ESPON), «Towards an Observatory and a Quality label of tourism sustainability in the Mediterranean» (UNEP / MAP / Plan Bleu), the "Atlas of Greek Islands", "Insularity and Development Paths through funding opportunities" and "Strategic Planning for sustainable tourism in Ionian Islands". In his capacity of director of the Aegean Sustainable Tourism Observatory, is taking part at the International Network of Sustainable Tourism Observatories and the Measuring Sustainable Tourism initiative of UNWTO. He was General Secretary of Aegean and Island Policy at the Ministry of Marine and Aegean during July 2012 – July 2013 and regional councillor at Vorio Aigaio Region (Region of Northern Aegean) during 2014-2023.

# Oral Presentations

## Venue

Room 1 – Main Venue (Epicurean Cultural Center)

## Session Title

# Session ‘Risk and Resilience Assessment 1’

## Chaired By

Ana Maria CRUZ, Professor, Norwegian University of Science and Technology, Norway

Norio OKADA, Professor, Kwansei Gakuin University, Japan

## Date and Time

Monday, September 29, 2025

09:40-11:10

# UNDRR/ISC Hazard Information Profiles Updated for the Global Platform on Disaster Risk Reduction June 2025

A080-O

Virginia MURRAY[1], Helene Jacot DES COMBES[2]
on behalf of the UNDRR and ISC Hazard Information Profiles Review Steering Group and our many partners

[1] *UK Health Security Agency Authors (UK)*
[2] *International Science Council (France)*

**Keywords:** Hazards, Hazard Drivers, Hazard Impacts, Multi-Hazard Context, Machine Actionable.



Standardized hazard definitions are a key element of the analysis of disasters. Without them, monitoring and reporting of the impacts of the hazards is difficult, and so is the development of effective systems and response plans. Forecasting of future events and the generation of disaster risks reduction strategies are also hindered by a lack of standardized definition. To address this gap, in 2019 the UN Office for Disaster Risk Reduction (UNDRR) and the International Science Council (ISC) established a Technical Working Group to identify the full scope of hazards relevant to the Sendai Framework for Disaster Risk Reduction as a basis for countries and other actors to review and strengthen risk reduction policies and risk management practices. The resulting UNDRR/ISC Hazard Information Profiles (HIPs) were published in 2021 (Murray at al. 2021). They provide to a broad range of users standardised definition and information on more than 302 hazards organized into 8 groups: meteorological and hydrological, extraterrestrial, environmental, geological, chemical, biological, technological and societal.

Following on from the recommendation in the UNDRR/ISC HIPs for regular review and update, experts from different disciplines, types of organizations (United Nations agencies, academia, government agencies, intergovernmental organizations and the private sector) and geographical regions are again working together to review the UNDRR/ISC HIPs. This process is systematically reviewing all sections of the current HIPs to identify potential updates in alignment with new scientific information. and decide on the inclusion of additional evidence additionally addressing the multi-hazard context of each hazard. One of the main additions to the updated version of the HIPs is a section on multi-hazard context. The experts are specifically reviewing the interrelations between the hazards in a multi-hazard approach. The HIPs aim to summarize direct interactions between hazards in a concise and visual way.

In the future, the HIPs will be coded to be machine actionable, to support a broader range of applications when machine readability is extremely useful, for example, for analysis of large databases and datasets. This is especially relevant in the context of disaster risk management and of loss and damage associated to climate change.

This second review concludes in 2025, with the release of the enhanced UNDRR/ISC Hazard Information Profiles at the Global Platform for Disaster Risk Reduction. The updated document will continue to inform a broad community and support data analysis resulting in better early warning and event forecast and disaster risk management and planning.

## REFERENCES

1. Murray, Virginia; Abrahams, Jonathan; Abdallah, Chadi; et al. (2021) Hazard Information Profiles: Supplement to UNDRR-ISC Hazard Definition & Classification Review: Technical Report: Geneva, Switzerland, United Nations Office for Disaster Risk Reduction; Paris, France, International Science Council. DOI: 10.24948/2021.05.

# Understanding Seismic Hazard and Risk in Islands and Remote Areas

A059-O

Catalina YEPES-ESTRADA[1], Catarina COSTA[1], Alejandro CALDERÓN[1], Kendra JOHNSON[1], Kirsty BAYLISS[1], Marco PAGANI[1], Vitor SILVA[1]

[1] *Global Earthquake Model (GEM) Foundation (Italy)*

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**Keywords:** Seismic Risk Assessment, Exposure, Hazard, Vulnerability, Disaster Risk Reduction.



Understanding seismic hazard and risk is fundamental to developing and implementing effective disaster risk reduction (DRR) strategies. The accuracy and comprehensiveness of these assessments play a crucial role in shaping risk perception, influencing policy decisions, and guiding preparedness and mitigation measures. In disaster risk management, accurately identifying, estimating, and communicating seismic risk is essential for designing earthquake prevention, mitigation, and response strategies that enhance societal resilience.

A comprehensive seismic risk assessment requires an interdisciplinary approach integrating multiple key components. These include seismic hazard data, which describes earthquake sources, ground motion models, and site conditions; exposure data, which details the location, characteristics, and value of buildings and their occupants; and vulnerability data, which assesses how structures perform under different levels of seismic shaking. Using the OpenQuake engine's probabilistic risk calculator, these datasets are processed to generate critical risk metrics, including identifying high-risk building classes, estimating average annual economic losses, and calculating probable maximum loss curves. These insights inform DRR efforts such as retrofitting campaigns, strengthening building codes, improving construction monitoring, designing earthquake preparedness drills, and establishing financial protection mechanisms.

Despite the importance of seismic risk assessment at a global scale, many remote and sparsely populated regions, particularly islands and oceanic territories, often receive limited attention in risk studies. However, global seismic risk assessment results reveal that several nations in the Southwest Pacific, including the Solomon Islands, Vanuatu, and Tonga, are among the top ten countries experiencing the highest relative economic losses due to earthquakes.

To address this gap, the Global Earthquake Model (GEM) Foundation has publicly made available seismic hazard and risk models for the globe, and most recently, seismic hazard models for the Pacific and Indian Ocean, which were initially excluded due to data limitations. Improving data quality and coverage in these areas is essential for developing more reliable risk assessments to inform decision-making and resource allocation for disaster preparedness and mitigation.

An equally important aspect of seismic risk assessment is ensuring that findings are effectively communicated to relevant stakeholders, including governments, policymakers, engineers, emergency responders, and local communities. For the Southwest Pacific territories, as part of the FORCE (Forecasting and Communicating Earthquake Risk) project, tailored country profiles,

as shown in Figure 1, were developed for each country, summarising key hazard and risk metrics in an accessible format. These profiles provide a clear, data-driven overview of seismic risk, supporting evidence-based decision-making for DRR planning. Additionally, on-site workshops are an essential platform for knowledge transfer, combining risk communication with capacity-building initiatives to enhance local expertise in seismic risk assessment and management.

These efforts aim to strengthen resilience in earthquake-prone nations by improving seismic risk models and facilitating knowledge exchange. Integrating scientific advancements with local capacity-building initiatives ensures that disaster risk reduction strategies are not only data-driven but also practically implementable, ultimately reducing seismic vulnerability and protecting communities.

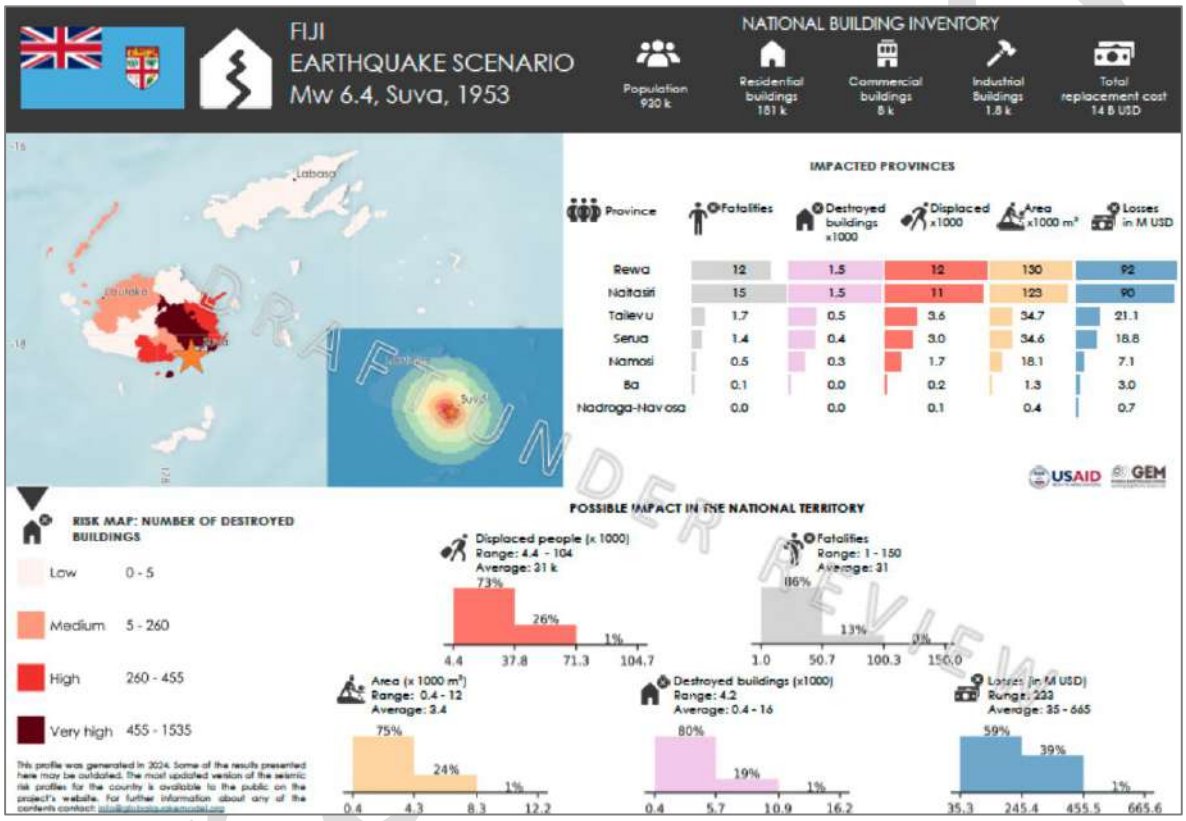


Figure 1. Example of an earthquake scenario profile in Fiji for the Mw6.4 Suva earthquake in 1953

# Uses of Remote Sensing for Coastal Risk Mapping and Improved Climate Change Resilience in Tropical SIDS

A019-O

Richard TEEUW[1], Athanasios ARGYRIOU[2], Mark CANNATA[3]

[1] *CEDRR, University of Portsmouth (UK)*
[2] *IMS/Forth, Crete (Greece)*
[3] *Kassandra Srl (Italy)*

**Keywords:** SIDS, EO, DEM, Geoinformatics.



Tropical island states tend to have limited financial and human resources with which to develop climate change resilience, and yet they face bigger changes in climate than mid-latitude countries. Those island states that are archipelagos face further problems when preparing for, and responding to, disaster events. That is primarily because of their many widely dispersed communities, as well as logistical issues associated with mapping the resources and risks of numerous remote islands. For instance, in the South Pacific, Fiji, Vanuatu and the Solomon Islands collectively contain about 1,400 islands, spread over millions of km2.

The CommonSensing project, funded by the UK Space Agency, has developed various satellite-derived Earth Observation (EO) datasets, covering all the islands of Fiji, Vanuatu and the Solomon Islands, to assist the mapping of hazard zones, vulnerable features and exposed elements. Archipelago-wide maps of the Low Elevation Coastal Zone have been produced from the ALOS PALSAR 12.5m-pixel digital elevation model (DEM), assisting the mapping of slope and drainage hazard zones. Further country-wide mapping was applied to coastal relative bathymetry, down to approximately 30m depth, using Sentinel-2 imagery, from which wave run-up hazard maps can be derived to highlight high-risk communities.

The application of freely available satellite-derived datasets, applying recent software developments, such as big data analytics, Machine Learning and cloud computing, can provide map data to inform coastal risk analysis and disaster preparedness activities, even with regard to remote island communities. Beyond satellite data, Uncrewed Aerial Vehicles (aka ‘drones’) can provide cm-detail imagery and 3-D digital models of features in communities – such as roads, buildings and trees – for more detailed assessments of risk. An example is provided from Dominica, a Caribbean Small Island Developing State (SID), of such a decision support system for improved coastal community resilience.

# Temporal and Spatial Variation Characteristics of Precipitation Isohyets on the Qinghai-Tibet Plateau from 1961 to 2023

A115-O

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**Keywords:** Isohyet, Climate Change, Qinghai-Tibet Plateau.

Against the backdrop of warming and humidifying climate change [1], the "solid-liquid structure" of water bodies in the Qinghai-Tibet Plateau has become unbalanced [2-3], and the spatial pattern of precipitation has undergone significant changes. Based on the monthly precipitation spatial data of the Qinghai-Tibet Plateau from 1961 to 2023, the 200mm and 400mm isohyets of the plateau were extracted. The climate tendency rate method and the center of gravity migration method were used to depict the spatial distribution of annual precipitation and the temporal and spatial variation pattern of isohyets [4-6]. The results show that: (1) Precipitation increased significantly (4.17 mm/10a), decreasing from southeast to northwest. Regionally, precipitation increased in areas such as the southern Qinghai plateau, but decreased in the southern Himalayas and the south-central Altun Mountains. (2) The 200mm isohyet line moves northward in southeastern Qiangtang and shrinks around the Qaidam Basin, generally moving north-eastward; the 400mm isohyet line moves westward in eastern Qiangtang and the Hehuang Valley, and northward in southern Qinghai, generally trending north-westward. (3) The center of gravity of the 200-mm isohyet line shifted northward by about 49 km and eastward by about 17 km from 1961 to 1990 to 1991 to 2023, with an overall north-eastward trend; the center of gravity of the 400-mm isohyet line shifted northward by about 22 km and westward by about 19 km from 1961 to 1990 to 1991 to 2023, with an overall north-westerly trend. The overall trend is moving to the northwest. (4) During the period 1961 to 2023, the 200mm isohyet line migrates to higher elevations on the vertical gradient at a rate of 7.11 m/10a; the 400mm isohyet line rises at a more moderate rate of 2.61 m/10a.

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# Assessing Disaster Resilience in Remote Areas: A Case Study in Southern Italy

A121-O

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**Keywords:** Disaster Resilience, Remote Areas, Resilience Assessment, Understanding Disaster Risk.



The resilience of an urban or territorial system is generally defined as the ability to cope with, absorb, adapt to, and recover from shocks (natural or anthropogenic sudden-onset hazards) or chronic stress (slow-onset hazards, economic crises, etc.). In particular, in the field of Disaster Risk Management (DRM), resilience is interpreted as the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including the preservation and restoration of its essential basic structures and functions through risk management [1]. Since the resilience of a system is a dynamic process [2], it must be constantly supported by the ability to learn, understand, and evaluate the risk dimensions and the effective actions to implement in each phase of the DRM cycle.

The paper aims to develop and test a resilience assessment methodology for remote areas [3] for a broader understanding of the risk features of such areas. In Italy, remote areas are explicitly defined Inner Areas by the National Strategy for Inner Areas (NSIA), first released in 2014. The NSIA document defines the remoteness of all Italian municipalities based on their distances from the urban areas providing essential services (health, education, mobility).

In remote and rural contexts such as Italian inner areas, low population density, settlement sprawl, poor redundancy of infrastructures, dependence on external essential and strategic facilities, limited technical, human, and economic resources for planning and DRM are the main issues related to an effective DRM. Here, traditional urban-centered risk assessment methods can lead to misleading results. The proposal aims to define a set of indicators useful for assessing the resilience characteristics of remote areas. The set of indicators will be tested on a sample Italian inner area in the Campania region (Southern Italy), to analyze the current characteristics of the territorial system and orienting future DRM strategies towards an increase of resilience.

The development of a resilience assessment based on the peculiarities of inner areas represents an operational tool useful for interpreting more effectively both the critical issues of such vulnerable territorial contexts and the possible strategies to be implemented.

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# 1st National Comprehensive Survey on Natural Disaster Risk and National Comprehensive Disaster Prevention and Control Regionalization in China

A031-O

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**Keywords:** Comprehensive Survey, Disaster Risk Assessment, Disaster Prevention and Control Regionalizations, China.



The third meeting of the Central Finance and Economics Committee launched the 9 projects for National disaster prevention in China, 10 October, 2018. First project is disaster risk investigation and key hidden danger investigation projects. According to the decisions and plans of the CPC Central Committee and the State Council, the first national comprehensive survey on natural disaster risks was carried out in 2020. The survey is aimed at figuring out hidden hazards across the country and enhancing the disaster prevention capabilities across all sectors of the society. The leading group of the survey is also established, with a subordinate general office.

This paper mainly introduces the background, objectives and tasks and major outcomes of the 1st national disaster risk survey. Based on the theory of regional disaster system, the first national comprehensive risk survey of natural disasters was designed. This project focusses on 23 kinds of hazards in 6 categories, such as earthquake, geological hazards, meteorological hazards, hydrological hazards, marine hazards, forest and grassland fires, and 27 types of disaster exposures in 6 categories, such as people, housing, infrastructure, public facilities, industries, resources and environment. This project also focusses on annual historical disasters, such as annual major disaster information of various natural disasters in all county-level administrative regions of China from 1978 to 2020, major disaster events from 1949 to 1999, with the provincial administrative region as the basic statistical unit, disaster mitigation resource survey and capacity assessment, investigation and evaluation of key hidden dangers.

Major outcomes of the project are to formulate technical specifications, developing the comprehensive national disaster risk survey software, China's national basic databases on comprehensive natural disaster risks, China's historical disaster assessments, China's comprehensive disaster mitigation capacity assessments, China's comprehensive assessments of hidden danger posed by hazards, China's key natural hazards assessments, China's key natural hazard risks assessments, China's comprehensive risks assessment by natural hazards, China's natural disaster prevention and control regionalizations.

## Venue

Room 1 – Main Venue (Epicurean Cultural Center)

## Session Title

# Session ‘Risk and Resilience Assessment 2’

## Chaired By

Chunyang HE, Professor, Beijing Normal University, China

Virginia MURREY, Professor, UK Health Security Agency, United Kingdom (TBC)

## Date and Time

Monday, September 29, 2025

11:30-13:00

# Managing The Systemic Risks of Multi-Hazards with the Support of Disaster Risk Assessment Tools Co-Developed with and for Stakeholders

A155-O

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**Keywords:** PARATUS Project, Disaster Risk Stakeholder Hub, Systemic Risk Assessment, Multi-Hazard Assessment, Co-development.

PARATUS Project aims to address the issue of limited and inaccessible loss assessment tools for first and second responders and local authorities. Existing tools operate with complex data sets that are difficult to obtain in time- sensitive decision-making situations. PARATUS project co-developed various tools together with stakeholders in the interactive workshops in four main case study areas, i.e. an impact chain builder, where users can develop their impact chain of past events, or scenarios for possible future disaster events, which is used as a basis for quantifying direct damage and prioritizing secondary losses in different sectors; the FastHazard tool which provides fast estimations of multiple hazards and can be used as basis for risk reduction planning; the RiskChanges tool for the quantification of losses; serious games for training with the other simulation tools. We are still working on various other tools, i.e. a resilience indicator tool, a tool for developing future scenarios and risk reduction alternatives, an impact-based forecasting tool and a tool for collaborative planning. We host these tools in the Disaster Risk Stakeholder (DRS) Hub, a co-developed web-based simulation and information service for first and second responders and other stakeholders to evaluate the impact chains of multi-hazard events, with particular emphasis on cascading impacts. This presentation provides an overview of the PARATUS project and the disaster risk stakeholder hub.

The DRS-Hub has two major blocks: an information service that provides static information (regularly updated) and a simulation service, which is a dynamic component where stakeholders can interactively work with the tools in the platform. The information service contains components like: terminology WIKI, links to other platforms developed by EU Horizon Europe projects with similar objectives; the standardized impact chains for a number of historical disasters, and which can be queried by users on several aspects; a module linking to hazard and exposure datasets and modelling results; a tool guiding users to various resources on risk reduction measures, good examples. The simulation service contains a series of tools that the users can use to develop new hazard and risk information for their area, develop multi-hazard risk scenarios, and test risk reduction alternatives. The exact number of components and the final structure of the platform will be determined iteratively through a series of stakeholder consultations, following a user-centred design. The platform has been designed in a flexible way with the collaboration of more than 25 EU funded projects to be able to cater for stakeholders that work in different sectors, geographic setting, and interacting hazards, and at the same time to address their needs for analysing the impact of compounding and multi-hazard events, with cascading impacts.

# Employing Participatory Concept and Timeline Mapping to Explore Drivers of Change in British Columbia's Flood Management System

YS15-O

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Increasing adaptive capacity in the face of rising flood risk demands an understanding of the factors shaping current flood management systems. In the province of British Columbia (B.C.), Canada, floods are one of the most damaging hazards, affecting everywhere from large urban centers to the province's many remote and rural communities. Flood management in B.C. has been inconsistent. It has undergone varying degrees of decentralization, resulting in fragmented governance and a complex network of interconnected organizations, legislation, and management tools. Floods are now managed primarily by local governments, who often face resource challenges. The complexity of B.C.'s flood management system makes it difficult to pinpoint the key actors and mechanisms driving effective change, in turn making it hard to determine which parts of the system should receive attention to strengthen adaptive capacity and enhance flood resilience. To address this gap, we aimed to identify key drivers of change in B.C.'s flood management system. Our research focused on illuminating the diverse lived experiences of local experts' and analyzing their personal visualizations of the system. In the first of two participatory workshops, 70 disaster professionals undertook timeline mapping of the key events and processes they believed were influential in the evolution of B.C.'s flood management. In the second workshop, 14 experts from flood related roles across governments in B.C. created open-ended concept maps of their understanding of the system's structure and dynamics. These participatory research methods were selected based on their accessible and adaptable nature, enabling experts from diverse backgrounds to visualize their locally tailored knowledge of who and what is important. The methods also resulted in reported knowledge sharing and perspective shifts amongst workshop attendees. We transcribed the concept maps and timelines and categorized key components, before producing final master-versions through an iterative process. The final visualizations provided insight into the experts' perceptions of important drivers of change in the B.C. flood management system, allowing priority targets for the building of future adaptive capacity to be identified. Surprising findings included the importance of international disasters and policies in driving change in the province, and the diversity of non-government organizations that fulfil important decision-making roles across different flood management approaches. This case study offers a transferable methodology for the assessment of change drivers within disaster management systems, particularly in contexts where fragmented governance poses persistent challenges.

# Decline in Dust Storm Activity Over Northern China During 1961-2020: An Examination of Likely Causes

A074-O

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**Keywords:** Northern China; Dust Storm Frequency; Trend and Variability; Atmospheric Circulation, Cause.

Dust storms represent a serious global environmental disaster due to their adverse effects on air quality, crop growth and energy supply, as well as on regional to global weather and climate. However, a solid understanding of the long-term changes in dust storms and their possible causes remain largely unknown, such as northern China.

Utilizing dust storm observation data from 957 meteorological stations in northern China during 1961-2020 and reanalysis data, we analyze the long-term variability of dust storm frequency, explore their potential links with large-scale atmospheric circulation, quantify the contribution of large-scale circulation to dust storm frequency changes, and further reveal the physical processes through which atmospheric circulation influences dust storm frequency variations. The results indicate that: During the period 1961-2020, annual mean dust storm frequency declined significantly over 1961-2020 across the northern China (-0.762 days·dec-1, $p < 0.05$), This is true for most stations in the study area with the most pronounced decrease observed at stations in Northwest China. Seasonally, the largest decline occurred in spring while the smallest was recorded in autumn.

The decline in dust storm frequency is associated with large-scale atmospheric circulation patterns. The Atlantic Multi-decadal Oscillation Index (AMOI) and the East Asian Winter Monsoon Index (EAWMI) exhibit the strongest correlations with dust storm frequency. Specifically, dust storm frequency shows a negative correlation with AMOI, peaking in summer (-0.4, $p < 0.05$), and a positive correlation with EAWMI, reaching the highest correlation in winter (0.45, $p < 0.05$). Multivariate linear regression results indicate that large-scale atmospheric circulation modes can explain 27%-43% of the variability in dust storm frequency.

The decrease in the pressure gradient force between Western Siberia and northern China, the weakening of near-surface wind speed in northern China, and the increase in soil moisture content have been identified as potential causes of the decline in dust storm frequency in the study area.

# Soil Erosion Intensity Assessment of the Agro-pastoral Transitional zone of Northern China Based on Remote Sensing Images and Machine Learning

YSS19-O

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**Keywords:** Soil Erosion; Machine Learning; Remote Sensing Images; Agro-Pastoral Transitional Zone, Northern China.

Agro-pastoral transitional zone of northern China is a sensitive region affected by global climate change, a region with fragile ecological environment, the key ecological barrier for Northern China and a typical natural synthesis, as well as sources of water and dust1-2. With varied climate and mixed agriculture and animal husbandry, the changed impact of anthropogenic activities on natural environment and alternately superimposed multiple erosion agents, soil erosion process is complicated and changeable3. The process of soil erosion occurs on the surface, and different intensities of soil erosion have different manifestations on the surface. Drawing on the cutting-edge technologies of ground object classification based on remote sensing images and machine learning4, it is theoretically possible to achieve the classification and quantitative assessment of soil erosion intensity based on remote sensing images, thereby providing timely and accurate data support for the assessment of ecological environment quality and the formulation of soil and water conservation policies.

This study takes the Agro-pastoral transitional zone of northern China as the research area. By using multi-source remote sensing images and soil erosion intensity datasets5, it attempts to establish soil erosion models by applying various machine learning methods (including random forest, support vector machine, BP neural network and convolutional neural network, etc.). The results show that:

1. Using village-level administrative divisions as the smallest unit, classification based on soil erosion classification and grading standards achieved a training set accuracy of 97.30% and a test set accuracy of 63.02% with the best-performing method.
2. Using grid cells from the soil erosion intensity dataset as the smallest unit, the method demonstrated significant performance differences: it achieved 68.2% accuracy in identifying the top 20% of high soil erosion intensity areas, but only 9.58% accuracy for the top 20% of low-intensity areas, highlighting its stronger capability in recognizing high-risk erosion zones.

3. For smaller regions (0.02°×0.02°), optimization of the soil erosion intensity dataset was conducted using 0.5m high-resolution imagery from Google Earth. The best-performing method achieved 98.04% classification accuracy on the training set and 79.09% accuracy on the test set. Key spectral bands, including shortwave infrared 1 (SWIR1), blue band, and thermal infrared band, exhibited higher importance in the analysis.

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# Mapping the Initial Mosquito Surveillance Response Following Storm Daniel in Thessaly: A Case Study from September 2023

YS36-O

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**Keywords:** Mosquitoes, Surveillance, Response, Storm"Daniel", Thessaly.

Natural disasters pose significant public health challenges, notably increasing the risk of vector-borne diseases, especially those transmitted by mosquitoes [1, 2]. Recent studies indicate a direct correlation between such disasters and the proliferation of these diseases. Following a flood, mosquito populations often surge, leading to an increased risk of mosquito-borne diseases such as West Nile virus, with cases tending to peak approximately two to three weeks post-flooding and disease incidence in affected areas doubling even one year later [3, 4]. Integrated mosquito management programs, including entomological surveillance and control measures, are implemented routinely, while during public health emergencies, a comprehensive response and action plan is followed [5, 6]. In Greece, the Ministry of Health annually issues detailed guidelines and objectives to the relevant authorities, including regional and municipal administrations, through official circulars [7]. The primary objective of this study is to comprehensively analyse the establishment of an ad hoc, enhanced mosquito surveillance network initiated immediately after the flooding caused by storm "Daniel" in Thessaly in September 2023.

This study employs a qualitative case study approach, utilising semi-structured interviews with four experts directly involved in the initial mosquito response planning in flood-affected areas of Thessaly. Two interviewees were exclusively involved in operational aspects of implementing surveillance, primarily participating in field activities, while the other two participated in daily meetings and contributed to decision-making processes. The interview questions focused on immediate response actions, criteria for establishing the response mechanism, any encountered challenges and their impacts on the initial response plan, and suggestions for improvement.

Findings identified two primary components of the initial response plan: organisational and operational. Initially, the organisational component was implemented, involving the evaluation of pre-existing entomological data, the preparation of operational maps of flooded regions, and the determination of larval sampling and trap placement points. Subsequently, the operational component was executed, encompassing actions such as selecting trap locations for adult mosquito

capture, sampling immature mosquito stages, and conducting daily risk assessment of affected areas.

Both components were conducted in parallel and were interdependent, necessitating systematic communication and information exchange among the involved stakeholders.

The current study highlights the importance of rapidly establishing mosquito surveillance networks following natural disasters, offering valuable guidance for policymakers and public health practitioners in enhancing preparedness and response strategies to mitigate mosquito-borne disease outbreaks.

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# A System for Detecting Signs of the Spread of Animal Disease in Indonesia Based on Textual Information in Daily Reports

A046-O

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**Keywords:** Sentiment Analysis, MDL (Minimum Description Length) Principle, Decision Making.

In recent years, there have been global outbreaks of zoonoses such as foot-and-mouth disease, bovine infectious lymphoma, and African swine fever. International guidelines for the prevention of infectious diseases in livestock exist with the aim of minimizing damage. However, in addition to the ongoing implementation of routine infection prevention efforts, there are still no effective measures other than, in principle, the slaughter of infected livestock and surrounding farms.

Livestock infectious disease control measures fall into three broad categories: culling, vaccination, and movement restrictions, and the decision to take any one of these measures is based on close discussions with the farmers who own the livestock. Therefore, it is a rare case that a decision is made based solely on numerical values calculated from a numerical model.

Therefore, this study attempts to construct a system that supports judgment before one step of infectious disease countermeasures. Specifically, we used information from daily reports on infectious diseases obtained continuously by livestock health centers as part of their daily work in Indonesia, where the spread of foot-and-mouth disease has been intermittently confirmed in recent years.

The reports are entered by veterinarians who actually check the status of livestock owned by each farmer on site as part of their daily work, and there are also descriptions of the results of diagnosis and treatment. Therefore, what infection risks occurred at what time are stored in tabular files under professional insight.

In this study, we attempted to use those data for sentiment analysis to create time-series data that will serve as primary data for understanding the signs of the spread of infection. In the early stages of an outbreak, it is said to be important how efficiently the signs are identified and how quickly an initial response can be taken [1]. In this study, we attempted to extract predictive signs of infection by applying the MDL principle [2], which excels in detecting gradual changes, to time series data generated by sentiment analysis.

The system developed in this study is expected to improve the importance of information obtained in daily operations and to help eliminate the need to accumulate information only for infectious disease countermeasures.

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## Venue

Room 1 – Main Venue (Epicurean Cultural Center)

## Session Title

# Session ‘Emergency Warning and Evacuation’

## Chaired By

Hamilton BEAN, Professor, University of Colorado Denver, United States of America

James GOLTZ, Assoc. Professor, University of California, Berkeley, United States of America

## Date and Time

Monday, September 29, 2025

14:40-16:10

# A Comparative Study of Earthquake Evacuation Behavior

A134-O

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**Keywords:** Earthquake Evacuation Behavior, Kahramanmaras Earthquake, Noto Peninsula Earthquake.

This international comparative study aims to understand how people behave in the event of an earthquake, whether their evacuation behaviors differ across countries, and what factors influence these actions. It also seeks to clarify the underlying causes of such differences and identify evacuation practices that are globally recommended. Although evacuation behaviors during earthquakes share certain common features, specific actions—and the sequence in which they are taken—vary from one country to another.

The study focuses on the massive earthquakes that occurred in two countries; the 2023 Kahramanmaras Earthquakes (Mw 7.7 and Mw 7.6) in Turkiye and the 2024 Noto Peninsula Earthquake (Mw7.4) in Japan. In order to understand evacuation behavior, a questionnaire-based interview survey was conducted in both Turkiye and Japan with people who experienced these earthquakes. The research scope and questionnaire were jointly prepared by authors referring to previous research literature on evacuation behaviors. The interview survey was first conducted in Turkiye in August 2023. While the results were being analyzed, the Noto Peninsula Earthquake occurred in Japan in January 2024. Based on the Turkish survey, a corresponding questionnaire was then developed and conducted in Japan in December 2024.

Findings revealed that while the types of evacuation actions were broadly similar, the sequence in which they were taken differed. In Turkiye, people typically prioritized checking on their family members' safety before taking measures to secure their own safety. In contrast, respondents in Japan tended to first secure their own safety, then check on their families. In both countries, people evacuated their homes shortly after confirming the safety of their family members. These results point to culturally shaped priorities in emergency response, despite shared core concerns for family and personal safety.

# Building Precise Flood Evacuation Models through the Inclusion of Social Data: A Japan Case Study

YS48-O

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It is impossible to escape the reality that natural hazards like flooding are reaching evermore disaster-prone communities where vulnerability is high. When intensity of hazards is substantial and coping capacity is low, the resultant effect is tragedy - lives lost, infrastructure destroyed, and long-term socio-economic damage. Research has for some time posited the need to engage in climate change adaptation (CCA) to reduce the above risks, however; focus has often excluded the role of human behaviour and other social elements that underpin DRR, especially within evacuation planning. This novel research study proposed the inclusion of social datasets such as evacuation start times within an agent-based modelling (ABM) framework to enhance understanding about this type of CCA. Through participatory action research (PAR), school children surveyed their families and locals in Inami town, Wakayama, Japan, as part of their homework activities. Their collected data was used to generate an enhanced computational (improved ABM) model, which showed greater insight into evacuation behaviour compared with initial modelling without social data. Through engagement in this, children experienced a greater level of awareness about their safety, which they relayed via feedback surveys to the research team. This research expressed that social data inclusion in ABM can benefit DRR, especially CCA, and use of ABM can help foster DRR awareness in children, raising their disaster resilience. Ultimately, this study will need to be replicated to consider wider circumstances - more stakeholders, different locations, and other limiting factors in ABM modeling.

# Cultural Effects in Early Warning Decision Behaviors After a DRR Educational Strategy, Pichucalco, Mexico Case

YS66-O

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**Keywords:** Disaster Risk Reduction Education, Early Evacuation Behaviors, Self-efficacy, AMETORE.



At par with the increase in the complexity of possible disasters scenarios reflected over the likelihood of occurrence reported in global risk indexes (Cavaciuti-Wishart et al., 2024; Inter-Agency Standing Committee & European Commission, 2025) humanity have produced significative technological and social developments that allow individuals and communities understand, monitor, communicate and prepare for the occurrence of hazards better than before. Formal education has played a critical role in this task through the dissemination of knowledge throughout society, while schools have also provided space for individuals to acquire disaster preparedness and response skills, making them a fundamental element in promoting an all-society disaster reduction strategy.

Because of this, many different approaches to improve disaster education have been developed [1], [2], [3] differentiated for example by their scopes, teaching styles, dissemination mechanisms, aims and others, even so, many of them would agree that an educational strategy that promotes an increase in self-efficacy feelings on students as well as DRR timely action, not only enhance resilience [4], but ultimately can save lives[5].

Under these assumptions, we aimed to evaluate the effects that different teaching styles and delivery mechanisms on popular DRR themes (risk awareness development, disaster-prevention map-making, hazard monitoring, and early warning) had on 51 high school students learning, and in their evacuation dispositions from Chiapas Mexico. By using a pre-post experimental design, we found that “experience” played a critical role in promoting disaster-prevention activities, interest in community response, and increasing students’ self-efficacy for an emergency response, outperforming the information-centered track, but both groups showed delayed results regarding early evacuation disposition after the strategy was applied against our expectations.

It is proposed that the increases in self-efficacy, situational awareness, and hazard information produced a belief of higher capability to deal with events, which added to the lack of trust and fear of thievery influenced early evacuation decision-making, making evident that judgement of action in the particular social context outranked expected protective actions toward anticipatory action promoted in the educational strategy.

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# An Island Within an Island: A Case of Early Warning Dissemination for Tropical Cyclones and Flooding in Marovoay District, Madagascar

YS56-O

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**Keywords:** Disaster Communication and Dissemination, Early Warning Systems, Flooding, Preparedness, Tropical Cyclones.

Marovoay District, Madagascar is highly vulnerable to disasters, particularly tropical cyclones, and flooding, which occur 2-3 times a year and are expected to increase due to climate change. The district is also geographically isolated, lacking basic transportation infrastructure, roads, electricity, and cell phone networks. These elements hamper the dissemination of early warning systems (EWS) that can save lives and lessen the impact of disasters. This paper investigates how the district effectively prepare and disseminate EWS with own available resources. Following a mixed-method research design, the research aimed to gather insights from an array of stakeholders involved in EWS dissemination and community members. Through expert interviews, surveys, and focus group discussions, the paper finds that geographical isolation complicates the coordination of EW communication between community members, administrative agencies, and humanitarian actors. Due to poor accessibility and limited technological infrastructure, the population at-risk experiences delayed communication of early warnings, which, subsequently diminishes their effectiveness and intended purpose. Furthermore, the findings revealed that traditional knowledge (birds' movement; word of mouth) are significantly underutilized, despite their potential to enhance disaster response capacity in rural areas. While there has been advancement in technologies and methods of dissemination across Madagascar, a critical gap persists between the delivery of EW messages and their comprehension by Marovoay district. The findings have also unearthed limited understanding of classification of alert categories as recommended by the World Meteorological Organisation (WMO). In most cases, alerts are only disseminated within a 24-hour window, once meteorological thresholds have been exceeded and confidence levels are high, conditions that often correlate with higher fatality rates. This research underscores the importance of creating accessible communication channels, fostering of strong community networks between administrators, humanitarian actors and the community, and integration of traditional knowledge in disaster preparedness and response. Additionally, improvements in local infrastructure and the implementation of a comprehensive four-stage alert system, aligned with WMO standards, are critical. These interventions are essential to enhance the resilience of Marovoay District in the face of the increasing frequency and severity of tropical cyclones and flooding events.

# Regional Characteristics and Their Influence on Tsunami Evacuation Risk: The Impact of "Stopover Behavior"

YSS020-O

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**Keywords:** Tsunami Tendenko, The Great East Japan Earthquake 2011, Evacuation Behavior, "Stopover Behavior".



In the Sanriku coastal region of Tohoku, Japan, there is a traditional adage known as "Tsunami Tendenko," which instructs, "When a tsunami strikes, each person should promptly flee separately to higher ground." This saying encapsulates the idea that rapid, individual evacuation is essential for increasing survival rates during a tsunami and is widely accepted. However, data from the tsunami-evacuation survey conducted following the Great East Japan Earthquake reveal that nearly half of evacuees engaged in Stopover Behavior, pausing to verify the safety of family members or assess on-site conditions. It is important to note that such actions may be necessary; therefore, eliminating them is unrealistic. This study focuses on the ethical decisions people face in life-threatening situations, quantifying how Stopover Behavior affects survival risk. While the principle of Tsunami Tendenko remains a crucial guideline, it is imperative to determine the extent to which unavoidable stopovers increase overall hazard and to develop countermeasures.

We conducted GIS-based analyses using data collected by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) immediately after the earthquake to evaluate evacuation behaviors. We classified the observed behaviors into three patterns: Direct Evacuation (Tsunami Tendenko), Post-Stopover Evacuation, and Stopover Evacuation Completion. Furthermore, we quantitatively analyzed the influence of regional characteristics, such as inundation extent and topography, on each pattern. We employed indicators including start time, distance, exposure duration, and safe-zone attainment rate. We also proposed a "required-evacuation-time" classification that computed shortest routes and walking times, clarifying how stopovers exacerbate overall hazard during evacuation.

The findings of this study quantify how Stopover Behavior increases hazard during tsunami evacuations. These insights highlight the moral tension between self-preservation and solidarity under extreme time pressure, providing empirical evidence that can inform public education campaigns, vertical evacuation facility placement, and early-warning messaging strategies for at-risk coastal communities worldwide. By incorporating regional characteristics into our analysis, we provide a robust foundation for designing tsunami disaster-prevention plans tailored to local conditions. By replacing the underlying datasets—such as road networks and inundation zones—this framework can be applied to other tsunami-prone regions, thereby supporting region-specific countermeasure planning. Ultimately, we expect that our work will contribute to the development of more effective tsunami evacuation strategies that not only discourage unnecessary stopovers

but also offer measures to mitigate hazard for those who, for various reasons, must deviate from ideal Tsunami Tendenko behavior.

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# Operationalizing Flood Early Warning in Greece: Systems for the Transboundary Basins of Evros/Maritsa and Axios/Vardar Rivers

A177-O

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**Keywords:** Flood Management, Early Warning Systems, Transboundary Basins.

Floods are one of the most common and destructive natural hazards, causing loss of life and damage to infrastructure and property around the world. Climate change is expected to increase the frequency and severity of floods in many regions, reinforcing the need for effective flood monitoring and warning systems.

As part of Interreg Transboundary Cooperation Programmes (FLOODGUARD "Greece-Bulgaria 2014-2020"and FLOOD SHIELD "Greece – Republic of North Macedonia 2014 – 2020"), two Flood Early Warning Systems (FEWS) have been designed and developed for the Axios/Vardar and the Evros/Maritsa River Basins, respectively. These territories are vulnerable to climate change and its negative impacts and need to increase significantly their adaptive capacity.

The two FEWS bring into decision-making data from three tiers of forecasting (weather – hydrology – hydraulics) by providing an organized, uninterrupted and unattended forecasts of meteorological variables, river flow, flow characteristics (flow velocity and depth) and flood inundation (flood extent), every day with a five (5) day forecast. This is achieved by linking a chain of forecasting models, from weather forecasting throughout the river basin, to runoff forecasting at numerous points throughout the basins, to depth, speed and flood inundation. The models are seamlessly connected and forecasting services are provided through an online, interactive, and operational platform. The systems incorporate data from telemetry stations to improve the forecast and lead to the generation of custom-built warnings of various levels and types, based on predefined alert thresholds. The systems are installed and operating on the G-cloud services of the Hellenic Republic.

## Venue

Room 1 – Main Venue (Epicurean Cultural Center)

## Session Title

# Session ‘Gender and Inclusiveness in Disaster Risk Reduction and Management’

## Chaired By

Kaori KITAGAWA, Assoc. Professor, University College London, United Kingdom

Subhajyoti SAMADDAR, Assoc. Professor, Disaster Prevention Research Institute, Kyoto University, Japan

## Date and Time

Monday, September 29, 2025

16:30-18:00

# A Field Study of Peer Grouping Empowerment of Women Affected by the Noto Peninsula Earthquake: A Social Capital Approach

A116-O

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**Keywords:** Social Capital, Community Development, Women Empowerment, Noto Peninsula, Victims of Earthquake Noto.

On January 1,2024, an M7.6 earthquake occurred in the Noto region of Ishikawa Prefecture in Japan. This huge seismic disaster killed 241 people and injured 1,296 others. The earthquake also resulted in the complete or partial destruction of residential houses, as well as extensive damage to other structures.

In September of the same year, torrential rains caused damage mainly in the Okunoto area, resulting in double damage to lifeline, including power and water outages, and damage to roads and transportation networks, causing extensive damage. Japan is no stranger to natural disaster but compared to other large-scale disasters that have occurred in recent years, reconstruction assistance for the Noto Peninsula earthquake has lagged.

This study briefly discusses the results of a field study of peer grouping empowerment efforts for women who were affected by the Noto Peninsula earthquake. The study period was six months, from November 2024 to April 2025. The following points were key in supporting the victims. 1: Social Capital Relationship Population, 2: Peer group creation for women with a similar circumstances group, 3: Remote ongoing support by social media, 4: Coaching services by professional counselling and coaching staff, 5: Involvement of local workers through stakeholder analysis.

This approach is named by the author a “method for strengthening residents’ organizational capacity”. A case study was conducted under the application project of JICA (Japan International Cooperation of Asia). Based on the author`s experience from the rural areas of the Dominican Republic and the Republic of Haiti, an attempt has been made to depopulated areas in Japan as a “method for strengthening residents’ organizational capacity”.

As a result, one of the damaged residents successfully repaired her mouse that collapsed due to the earthquake and started a new store; one and the last ones is playing the role of local managers and peer group leaders, supporting other women’s groups and coordinating with other support groups and the government.

As a discussion, the Noto region of Ishikawa Prefecture is a depopulation area, and the local people tend to be less receptive to outsiders. However, the Noto earthquake brought many volunteers to the area to assist with the reconstruction, and friendship and exchange knowledge. Thus, people are found to be more open now. In addition, open relationships grew among migrants living in two locations and tourists visiting temporarily, volunteers, etc. Contributed that they can a shift from

the closed and fixed relationships among residents in the Noto Peninsula. This led to the development of a self-support system.

In conclusion, thought the sample is yet very much limited, we need to continue to study the foregoing process of social changes, by applying the same approach to more extended samples.

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# Women Nature and Theatre: An Experimental Exploration

A077-O

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**Keywords:** Theatre, Eco-feminism, Awareness, Relation between Women and Nature.

In today's world Violence against Nature (VAN) and Violence against Women (VAW), these two social problems are highly discussed. Women and nature both are subject to domination by patriarchal society. Several researchers have argued regarding the interconnection of Mother Nature and Women. Women are the primary sufferers of environmental degradation and forest resource depletion. Eco-feminism has great role to play in this regard.

One of the main objectives of this research is to understand the nature of change in eco-feminist consciousness using theatre as a tool and its influences on the audience's perception, here the disadvantaged people of Metyal Sahar, a village in the Purulia district of West Bengal, India. Another objective of this research is to explore the well-known concept of the role of theatre as a powerful tool for communication and creating awareness amongst the masses.

This study is primarily descriptive in nature and it uses a blend of qualitative and quantitative methods. A field survey was conducted in that village with 60 respondents and 10 case narratives were also gathered for strengthening the study. After the survey, the level of awareness regarding the relationship between women and nature was assessed. The output of the field survey shows that the majority of the respondents agreed on theatre as the most preferred medium for creating awareness among the masses. Two case studies out of ten case narratives are also presented for in-depth understanding.

The findings of the work at hand provide ample scope to influence government policies to combat environmental problems along with the improvement of the status of women in disadvantaged areas through creating awareness on such issues using theatre as a tool.

Here I am going to present a brief performance in line with the theme of the theatre that was used to influence the awareness of the respondents.

# Flood Disaster Impacts on Female-Owned Businesses: A Case Study from the Bangkok Metropolitan Region

YS11-O

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**Keywords:** Flood, Business Recovery, Gender, Industrial Sector, Bangkok Metropolitan Region.

Flood disasters present significant challenges to business operations [1,2], particularly impacting small and medium-sized enterprises (SMEs) [3]. While academic interest in gender differences during disasters has expanded [4,5], empirical evidence detailing how female business owners experience recovery remains limited. Understanding these distinct experiences is crucial for informing policy and creating effective disaster recovery programs. This study addresses this gap by examining post-flood organizational recovery within Bangkok Metropolitan Region (BMR) companies based on data from the three major flood surveys conducted in 2011, 2017, and 2022. The analysis involved key variables such as damage rate, flood exposure duration, business size, sector, insurance access, and owner gender, which were identified through regression models and non-parametric tests to determine what variables influenced recovery time and business resilience measures.

The analysis reveals significant gender-based disparities. On average, female-owned businesses suffered more severe flood damage and faced more extended periods of exposure to flood risk than their male-owned counterparts. Recovery times also differed notably by gender, with women-led firms generally taking longer to return to normal operations. Although female-owned businesses experienced longer average recovery times, there was notable variation in the duration of their recovery. Some firms managed to rebound relatively quickly, while others faced prolonged delays. This variability underscores both the heightened vulnerability and the remarkable resilience of many women entrepreneurs, who navigated complex recovery challenges often without equitable access to critical resources. Moreover, disparities in insurance coverage further reflected gender-based inequalities: female-led enterprises were significantly less likely to possess insurance, placing them in a more precarious financial position following disaster events. All business types showed similar patterns regarding the impact, but large and medium-sized female-led organizations faced the most severe effects. Statistical testing (Mann-Whitney U) confirmed that these disparities in damage and recovery are significant.

These findings emphasize female entrepreneurs' systemic vulnerability in flood-prone regions, including the BMR, underscoring the need for targeted disaster risk reduction policies. Coping with post-flood economic recovery in urban areas after a disaster requires ensuring equal access to recovery funds. Additionally, the delivery of business support and risk mitigation strategies to firms should include gender-sensitive approaches that address their unique requirements. These measures are necessary for building resilience and promoting a more inclusive recovery following urban flooding.

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# Practicing of Inclusive Disaster Preparedness Education Based on the Experience of Vulnerable People Affected by the 2024 Noto Peninsula Earthquake

A049-O

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**Keywords:** The 2024 Noto Peninsula Earthquake, SDGs, Inclusive Disaster Prevention, Disaster Preparedness Education.



The SDGs uphold the principle of “leaving no one behind”. To achieve the SDGs, inclusive disaster prevention is being promoted in different parts of the country to ensure that no one is left behind and can be saved in the event of a disaster. On the other hand, despite the fact that disaster preparedness education is actively being carried out in communities and schools, there are few practical examples of disaster preparedness education based on the theme of “inclusive disaster prevention”, even though Japan is an area that is frequently struck by disasters.

By the way, the 2024 Noto Peninsula Earthquake caused great damage, especially in the Noto area of Ishikawa Prefecture. As a result of the earthquake, people in need of assistance during disasters, especially the elderly and disabled, were forced to live in evacuation shelters with limited facilities. The Noto Peninsula Earthquake made it clear that it is essential to promote “inclusive disaster prevention” in Japan.

The purpose of this study is to develop teaching materials and learning programs based on the theme of “inclusive disaster prevention” based on the experiences of vulnerable people during the 2024 Noto Peninsula Earthquake, and to report on the results of their implementation in elementary schools in Anan City, Tokushima Prefecture, where there are concerns about extensive damage in the event of the Nankai Trough earthquake, as well as to consider the importance of implementing inclusive disaster prevention.

This study developed teaching materials and a learning program to consider how to safely evacuate and provide necessary assistance to people with special needs in hazardous areas around schools in the event of a disaster, and put them into practice in elementary schools in Anan City.

As a result, it was possible to understand the need for preparation and action tailored to each person with special needs in the event of a disaster. It also provided an opportunity for the children to develop a perspective of mutual help, to think about what they themselves can do for people with special needs in the event of a disaster, and to think about how to interact with people with special needs in the event of a disaster.

# Island Disaster Management and Resilience: Inclusive Response and Recovery Strategies After Hurricane Irma in Florida Keys

A055-O

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**Keywords:** Islands, Disaster Management, Resilience, Hurricane Irma.



Hurricane Irma made landfall across several Caribbean islands before hitting Cudjoe Key in Key West, Florida as a Category 4 hurricane on September 10, 2017, with sustained winds at 132 mph and storm surge up to 8 feet in the hardest-hit areas. Islands have unique challenges in disaster management, including supply chain logistics in preparedness and response. Like other small islands, the Keys are geographically challenging to reach and have a fragile ecosystem experiencing the impacts of climate change. They face elevated risks and consequences for disasters including sea level rise related flooding, storms, earthquakes, tsunamis, volcanoes, and marine hazardous materials spills [1,2].

This study investigates the disaster management successes, challenges, and changes made to disaster policy in the Florida Keys after Hurricane Irma struck. In consideration of the unique challenges of islands in disaster management, this study examines the preparedness, response, and the early recovery period phases after the disaster.

The analysis uses data obtained through in-depth, semi structured interviews with key members from the local disaster management community, including elected officials, governmental agencies, VOADs (voluntary organizations active in disasters), selected to include representatives from the primary local actors in disaster response and recovery. Purposive sampling was used to identify initial potential interviewees, with additional participants identified through snowball sampling. The purposive sampling method is commonly used in qualitative disaster research, as it allows for the identification of interview subjects who are most relevant to the study. Supplementing this with snowball sampling facilitates the identification of additional interviewees who are not readily identifiable to the researcher a priori but can add important insights [3].

These insights are supplemented with a content analysis of related state and local government documents to identify challenges, best practices and policies for successful strategies for disaster risk reduction and management in island communities. The results of this study provide insights to inform future research and contributes to the development of successful strategies for preparedness, response and recovery specific to island communities facing unique challenges and vulnerabilities.

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## Venue

Room 2 (Amphitheatre of the Region)

## Session Title

# Session ‘Risk Perception – Risk Awareness – Disaster Education’

## Chaired By

Mayumi SAKAMOTO, Professor, University of Hyogo, Japan

Dimitrios TZIOUTZIOS, Researcher, Norwegian University of Science and Technology, Norway

## Date and Time

Monday, September 29, 2025

09:40-11:10

# Perceptions of Climate Threat in Ireland: An Analysis of Socio-Economic Divides and Trends (2019–2023)

A159-O

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**Keywords:** Climate Change; Ireland; Risk Perception; Socio-Economic Analysis.

Climate change is increasingly recognised by academics and subject-matter experts as one of the greatest, far-reaching, and consequential threats to society in the twenty-first century. This is due to the multifaceted impacts climate change poses, including environmental degradation, economic instability, and public health challenges, alongside more traditionally recognised threats such as sea-level rise, increased temperatures, and the greater frequency and intensity of storms.

The Republic of Ireland is generally perceived as being at lower risk from climate change compared to countries in Southern Europe, Africa, and small island nations. However, this does not mean that Ireland is immune to the threats posed by climate change. In recent years, Ireland has experienced increasingly intense storms, such as Storm Ellen in August 2020 and Storm Éowyn in January 2025. Additionally, Ireland has recorded record temperatures and heatwaves in recent years, and 2023 was the wettest year on record, accompanied by significant flooding events across the island.

In order to tackle climate change, governments, not only in Ireland but globally, must secure public support for climate policies focused on both mitigation and adaptation. Therefore, understanding the Irish public's perception of the threat of climate change is crucial.

This study uses data from The Lloyd's Register Foundation World Risk Poll, analysing all three available iterations (2019, 2021, and 2023). A statistical analysis was conducted to examine differences in beliefs across various sub-groups and over time. Specifically, Chi-squared tests were used to identify significant differences between sub-groups, including age, gender, education level, and income. Additionally, a time-series analysis explored how beliefs have changed between 2019 and 2023, allowing for the identification of trends and patterns over time, both overall and within each sub-group.

The findings reveal that the majority of the Irish public across all three datasets believe that climate change poses a threat to Ireland within the next 20 years. Over the four-year period, there was a 2.6 percent increase in this belief; however, this increase was not statistically significant. Significant differences were found across sub-groups, particularly among different income groups, suggesting that socio-economic factors influence perceptions of climate risk in Ireland. This is important, as lower-income groups, in particular, may face heightened vulnerabilities due to fewer resources for adaptation and the recovery from disaster derived from extreme methodological events.

# Risk Perception and Preparedness for Emergencies and Environmental Hazards in Greece

A087-O

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**Keywords:** Emergency Preparedness, Risk Perception, Occupational Health and Safety, Environmental Hazards, Disasters.

In recent years, the Hellenic Institute for Occupational Health and Safety (ELINYAE) has conducted annual public surveys to investigate contemporary challenges and prevention priorities within a changing environment. This paper presents the findings of the most recent survey and offers comparisons with results from previous years. The survey was implemented using a structured questionnaire, distributed to a randomly selected sample through an online platform. The study examined public awareness and preparedness in relation to emergency situations and environmental hazards, including natural and technological disasters, epidemics, and environmental pollution. Additionally, it explored levels of concern regarding the risk of armed conflict.

The findings reveal that participants are most concerned about high temperatures and heatwaves, environmental pollution, and the threat of war. A substantial proportion also reported being very or extremely worried about the possibility of being affected by a public transportation accident, reflecting the ongoing psychological impact of the tragic Tempi railway incident. Elevated levels of concern were also recorded regarding epidemics, natural, and technological disasters—excluding tsunamis.

Notably, levels of awareness and concern vary significantly across different demographic and geographic factors. Place of residence and prior experience with catastrophic events emerged as key influences. For example, individuals living near forested areas or in regions previously affected by wildfires expressed significantly higher concern about such events. Similarly, those residing near industrial facilities reported greater concern about the potential for large-scale technological accidents.

The survey also assessed public trust in the capacity of state authorities to manage natural and technological disasters. Four out of five respondents indicated that they believe the authorities are poorly or inadequately prepared. Across all hazard scenarios, respondents reported low levels of personal preparedness. Compared with earlier ELINYAE surveys, there is a noticeable increase in the proportion of individuals who feel only minimally or not at all protected from threats such as natural disasters, technological accidents, environmental pollution, armed conflict, and epidemics.

The study identified several factors that positively and statistically significantly influence subjective perceptions of preparedness. These include proactive information-seeking, communication from local or regional authorities, and participation in evacuation drills. Among employed individuals, workplace training and the operation of occupational health and safety structures—such as Health and Safety Committees, Safety Technicians, and Occupational Physicians—were also found to significantly enhance perceived preparedness.

# Knowledge Integration and Communication Strategies in the Process of Creating a Guidebook for Rebuilding the Lives of Flooded House Owners

A103-O

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**Keywords:** Knowledge Management, Implementation Gap, Risk Communication, Aid Workers and Flood Victims.

The network of aid workers in times of disaster, co-chaired by the authors, compiled a handbook titled “Rebuilding from a Flood Disaster” in 2017, aimed at assisting individuals whose homes were flooded during a flood disaster.

Matsuda (2018) [1] described the creation process of this handbook as an integration of specialized knowledge from the perspective of disaster victims and positioned the aid workers involved as “reflective practitioners” as defined by Schoen (2017) [2].

This booklet has been distributed to tens of thousands of flood victims across Japan over the past eight years, playing a crucial role in the initial stages of their recovery efforts when they were most vulnerable.

At the same time, aid workers recognized that the booklet had an “implementation gap,” where it failed to address the specific needs of disaster victims.

This paper observes the specific gaps that existed, how they were addressed, and how these improvements were reflected in the revised edition published in 2025.

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# Promoting Disaster Education by Utilizing the "Gaps" In Needs: A Case Study of Brazilian Residents in Aichi Prefecture, Japan

YS22-O

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**Keywords:** Disaster Education, Foreign Residents in Japan, Gaps in Needs, Action Research, Polyrhythm Theory.

The disaster needs of foreign residents are diverse and multi-layered, and some of the needs are common to non-Japanese. Community involvement should be more ongoing, not a one-off, irregular activity. In such a case, is it possible to create disaster preparedness activity that meets these elements, and if so, how exactly should it be promoted?

In this study, we would like to explore how to develop disaster education that reflects the "voices" of foreign residents in Japan through collaborative practice. The research subject of this study is Brazilian community members in Handa City, Aichi Prefecture. In this study, action research was conducted as the research method, and two disaster education programs for foreign residents held in 2021 and 2023 were documented in field notes and were compiled into an ethnography. In order to examine the multiple needs that emerged through the involvement of the participants and their supporters, we utilized the "polyrhythm" theory of Yasuhiko Murakami (2021) [1], which focuses on the coexistence of multiple activities.

The two disaster education programs were held to fulfill the "initial need" of raising awareness and knowledge of disaster prevention among foreign residents. However, in order to achieve the "initial need," we dared to include the "another need," Japanese learning course, so that they were able to achieve not only the "initial need" but also the "another need" to improve Japanese language. What is important here is that the program was open to both needs, without excluding no one from the course. The program was not structured as a group solely to meet "initial needs" toward the same goal; rather, it was also for those who participated for "another needs" they felt they needed at the time.

In the second disaster education program, Japanese participation emerged as "another need. The participation of Japanese members created a "place" for Japanese and non-Japanese to talk about their true feelings toward each other. There was a scene where a Japanese person in the community asked whether it would be better to separate Japanese and non-Japanese in a disaster shelter, and the Brazilians immediately requested to be kept together. Such a "gap" in perception was confirmed by the words exchanged between each other. The same situation occurred, when a Brazilian family suddenly came in to ask about moving during the class. The Brazilian community leader was consulting with the family right next to where the disaster education program was being held. The family members who had no intention of attending the program also participated

in such as playing disaster prevention card game and meeting with community members in the class.

In this study, it became clear that utilizing the “gaps” in needs can also lead to a “place for dialogue”. The use of the “gap” between the needs of those involved and those who support them can be a catalyst for developing disaster education that reflects the “voices” of foreign residents in Japan.

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# Beyond Traditional Disaster Education: A Three-Tiered Framework for Disaster Education

A120-O

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**Keywords:** Disaster Education, Generative Psychology, Organizational Studies.



In real disaster situations, both mitigation (pre-disaster countermeasures) and preparedness (planned post-disaster responses) often fail to fully prevent or reduce damage caused by hazards. While it is generally accepted that, in theory, disasters could be prevented through measures such as constructing earthquake-resistant buildings, retrofitting infrastructure, and building river levees and seawalls, in practice, issues such as poor workmanship, delays, and unforeseen hazard intensities make complete disaster prevention unrealistic.

When pre-disaster countermeasures are inadequately implemented, or when hazards exceed planned preparedness levels, a certain amount of damage must be tolerated. Managing this damage relies heavily on post-disaster measures, such as emergency medical services, evacuation to pre-planned evacuation site or shelter. Pre- and post-disaster countermeasures are commonly understood as the fundamental framework for disaster risk reduction. Importantly, even “post” countermeasures—like evacuation planning—are typically prepared before a disaster occurs.

Yet, returning to the core concept, as the UNDRR defines a disaster as “a serious disruption of the functioning of a community or a society at any scale” [1], disasters can be considered the situations that represent the residual damage that remains despite pre- and post-disaster countermeasures. This is simply because if pre- and post-disaster countermeasures work properly, we will not face disruptions. In this light, not only the research that tries to expand the known area before disasters occur but also acknowledge the unknow area of disaster studies of management and encourage flexibility of people to deal with unplanned events is important to minimize damage by disasters. Therefore, to further reduce disaster impact, it is crucial to also consider post-emergent countermeasures—those developed in response to unforeseen damage after a disaster has occurred. In this context, three types of countermeasures can be proposed:

1. Pre-prepared pre-disaster countermeasures
2. Pre-prepared post-disaster countermeasures
3. Post-emergent post-disaster countermeasures

The presentation will examine disaster education approaches that facilitate all three countermeasure types, with particular emphasis on the often-overlooked third category. Special attention will be given to education for post-emergent post-disaster countermeasures, drawing on concepts from generative psychology and organizational studies.

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Venue

Room 2 (Amphitheatre of the Region)

Session Title

# Session ‘Natech Risks’

Chaired By

Fivos ANDRITSOS, Hellenic Mediterranean University, Greece

Zoe NIVOLIANITOU, National Centre for Scientific Research ‘DEMOKRITOS’, Greece

Date and Time

Monday, September 29, 2025

14:40-16:10

# Understanding the Probabilities of Tropical Storm-Triggered Natech Events Based on Future Climate Scenarios

A099-O

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**Keywords:** Natech Events, Climate Change, Fragility Analysis, Wind Energy, Tropical Storm.

Natech events (natural hazard-triggered technological accidents) represent a significant industrial vulnerability exacerbated by climate change. This research introduces a sophisticated fragility modeling framework at 1km resolution that evaluates current and future Natech probabilities with unprecedented precision. The methodology integrates multi-decadal meteorological records with CMIP5 and CMIP6 climate projections, employing wind energy density as a comprehensive indicator of tropical storm intensity. This approach successfully captures both direct structural impacts and complex cascading effects that characterize Natech incidents. Our analysis reveals substantial spatial heterogeneity in tropical storm-induced Natech probabilities across different locations. The high-resolution modelling significantly enhances prediction accuracy, particularly for vulnerable coastal industrial zones where small-scale topographic features critically influence risk profiles. These findings carry substantial implications for risk management practices. The documented spatial variability necessitates region-specific prevention strategies rather than one-size-fits-all approaches. The kilometer-scale resolution enables precise identification of high-risk industrial clusters, facilitating targeted mitigation investments where they deliver maximum benefit. This research establishes a novel framework for Natech risk assessment that bridges climate science and industrial safety engineering. The approach supports evidence-based facility siting decisions, enhances emergency preparedness planning, and informs climate-adaptive regulatory frameworks. As extreme weather events intensify under climate change, such high-precision assessment tools become increasingly essential for protecting industrial infrastructure and surrounding communities.

# Land-Use Planning for Chemical Industrial Sites Involving Natech Risks from Floods and Earthquakes: A Comparative Analysis of Risk Assessment Methods

A107-O

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**Keywords:** Natech, Land-use Planning, Consequence, Risk, Uncertainty Analysis.

The increasing use of hazardous substances in industry, coupled with growing human settlements in natural hazard-prone areas, creates significant territorial incompatibility issues. This highlights the need for Natech risk assessment across different sectors, particularly the chemical industry, and the integration of risk results in land-use planning.

This research primarily investigates how Natech scenarios influence risk assessment results, including safety zones and territorial compatibility, by comparing two different risk assessment methods and identifying their key differences when applied to flood and earthquake hazards. The first, a consequence-based method, assesses the maximum impact of potential accidents, while the second, a risk-based method, considers both the consequences of events and their frequency, estimated using fault trees and event trees. In both cases, the same set of scenarios was considered, including potential technological failures of equipment and Natech events triggered by floods and earthquakes, due to the vulnerability of technological equipment to these natural hazards.

Our analysis reveals that while the consequence-based approach provides more conservative safety distances, the risk-based method offers more nuanced insights for complex industrial landscapes by incorporating probability distributions.

The uncertainty analysis demonstrates that both methods have varying sensitivities to input parameters, with the risk-based approach showing greater robustness in areas with multiple natural hazard sources.

This work provides policymakers and industrial safety practitioners with a framework for selecting appropriate risk assessment methodologies based on specific regional contexts and available data. The recommendations offered can help authorities develop more resilient land-use planning strategies that balance industrial development needs with public safety concerns, particularly in regions experiencing increased natural disaster frequency.

# Vegetation as a Risk-Influencing Factor for Natech Scenarios: Implications for Power Accessibility and Emergency Response in Remote Areas

A139-O

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**Keywords:** Natech, Risk Management, Power Grid, Risk Influencing Factor, Vegetation.



The availability of critical lifelines such as electrical power is essential for effective industrial risk management, especially in preventing and mitigating technological accidents caused by natural hazards—commonly referred to as Natech [1]. Remote and isolated areas, including forested regions, and mountainous terrain, often face both physical and systemic accessibility challenges that compound risks when extreme weather events disrupt lifeline services. One frequently overlooked but consequential risk influencing factor [2, 3] in such contexts is vegetation.

Vegetation encroachment is a leading cause of power outages, either through direct contact (e.g., tree fall) or indirect interactions (e.g., line short-circuiting) [4], and becomes particularly critical in disaster scenarios where continuous power supply underpins emergency response and process safety systems. Moreover, two major Natech events in Texas highlight the vulnerability of industrial systems to extreme weather. In 2017, Hurricane Harvey caused flooding that disabled power and backup systems at the Arkema plant, leading to uncontrolled chemical degradation, fires, and gas releases, injuring responders and endangering hundreds [5]. In 2021, the “Great Texas Freeze” exposed a lack of winterization in critical infrastructure, triggering widespread power outages and chemical releases across petrochemical facilities. The freeze resulted in mass emissions of hazardous substances, exposing nearby communities to pollution, and led to huge economic losses [6].

This study focused on vegetation-induced power outages as a significant yet underappreciated risk influencing factor in Natech-prone settings, using Norway as a case study—where vegetation was the primary cause of grid failures in 2018 [3]. We propose a preliminary risk-based decision support framework to guide vegetation management along power lines, tailored for deployment in remote and high-risk areas. This tool integrates spatial risk assessments, seasonal forecasts, and infrastructure vulnerability to help grid operators proactively identify ‘hotspots’ where vegetation-related disruptions are most likely.

By enabling early, targeted interventions—such as strategic clearing and prioritisation of maintenance—the framework aims to enhance the reliability of power infrastructure, reduce the likelihood of cascading disasters, and improve accessibility to emergency services during critical events. Moreover, this approach aligns with implementation science principles by bridging the gap between data, local context, and operational decision-making. Ultimately, the discussion provides

valuable insights for integrated Natech risk management strategies, particularly for areas with limited access to emergency resources and adaptive infrastructure.

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# Using Serious Games to Support Natech Risk Governance

A170-O

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**Keywords:** Risk Management, Risk Governance, Stakeholder's Involvement, Risk Communication, Serious Gaming.

Natural hazard-triggered technological events involving the release of hazardous substances are referred to as Natech events. These events have the potential to cause substantial and widespread impacts, resulting in significant economic and environmental damages. Natech events are generally considered compound events that represent a complex, highly uncertain challenge for disaster risk governance (DRG). It is now widely accepted that addressing these challenges requires the involvement of multiple stakeholders, and greater participation among them. The overall goal of the study is to support DRG through the use of a serious game. The study objectives include the application of a serious game for raising Natech risk awareness and risk perception in real-world settings; understanding the effectiveness of the use of the serious game as a way to raise risk awareness and promote risk communication both in the short-term, and in the mid-to-long term (10-12 months after). The study uses a serious game - developed by Tzioutzios (2022) and first tested with students - and applies it through eight multi-stakeholder workshops with representatives from communities, government, industry, first responders and academia in Colombia. Then, using a survey, the changes in participants' awareness and perceptions were measured before, just after, and in the mid-to-long term. The research adopts a mixed-methods approach, combining quantitative assessments of awareness and communication practices with qualitative insights concerning the participants' experiences and implemented actions. The findings from this study suggest that the serious game approach was highly effective in raising awareness among the stakeholders and significantly enhancing communication in the short term. The study also evaluated the lasting effects in the mid to long term, conducting a follow-up study. Furthermore, as one of the big challenges for DRG remains to be the implementation, the study explores the concrete implemented actions taken by the participants and their positive views on the outcomes of the workshops. The application of serious games emerges as a promising tool for supporting DRG. By fostering stakeholder engagement and facilitating the exchange of knowledge and diverse perspectives, serious gaming offers a dynamic and interactive platform that significantly enhances communication. This interactive approach enables stakeholders to explore risk scenarios, evaluate the effectiveness of DRR strategies, and deepen their understanding of the complex and compound risks they face. This study has demonstrated the substantial potential of serious gaming to increase risk awareness, enhance communication, and catalyze concrete actions, thereby supporting the governance process within a given territory.

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# Modelling the Consequences on the Environment of Oil Spills in Flooded Areas

YS27-O

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**Keywords:** Natech; Flood hazard; Environmental Pollution; Quantitative Risk Assessment.

The present contribution addresses the definition of a methodological approach for modelling the consequences of oil spills triggered by flooding in industrial areas. These accidental scenarios, which fall within the category of Natech (natural hazard-triggered technological accidents), are characterized by the initial formation of an oil slick floating on the water surface. The oil slick on the water surface undergoes subsequent oil weathering processes, which take place as the slick is transported by floodwaters [1]. This work was motivated by the need to include such scenarios within Natech Quantitative Risk Assessment (QRA), as they remain largely overlooked in current practice despite the fact that climate change is expected to worsen their outcomes [2,3]. The analysis of a case study based on a real accident served as the starting point for the development of the proposed approach.

The flood-triggered oil spill that occurred on the island of Kyushu, Japan, in 2019 was selected as a reference case study, as it represents a notable example of the scenarios under analysis [4]. During the event, floodwaters entered an ironworks facility, leading to the release of approximately 103 $m^3$ of oil into floodwaters. The spill contaminated an area of about 0.42 $km^2$, including residential zones, agricultural land, and a nearby hospital. The present paper presents work that involved the development of a method for the estimation of the extent of contamination from oil spills in flood scenarios. The approach involves coupling hydrodynamic modelling of floodwaters with an oil weathering and transport model. A review of the simulation tools available for the analysis led to the selection of MIKE+ 2D Overland for flood simulation [5] and the Computational Model for Large-Scale Oil Spill Fires on Water in Tsunamis for oil dispersion [6]. A high-resolution digital elevation model, rainfall data, and water level time series are to be used as input to the MIKE+ 2D Overland model, which provides as output the spatial distribution of floodwater height and velocity. These variables are then used as input to the Computational Model for oil dispersion. Since the latter was developed for tsunami conditions, it is currently being adapted for inland flooding scenarios.

The proposed approach will provide a preliminary basis for assessing the environmental consequences of oil spills in flood-affected areas. Grounded in the analysis of the case study, it represents a step toward the development of a more comprehensive framework for consequence assessment within the Natech QRA.

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# Probabilistic Natech Risk Analysis for Earthquake and Cascading Tsunami Hazards

A015-O

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**Keywords:** Natech Risk Analysis, Storage Tanks, Earthquake, Tsunami.

Natural hazard-triggered technological (Natech) accidents involve emission, fire, or explosion events due to the release of hazardous material from industrial or military facilities subject to natural hazard impacts. Such accidents can occur due to immediate structural damage, disruptions to critical networks and systems, or hazard propagation due to domino events, leading to uncontrolled operations with adverse consequences for human health and the environment. When Natech accidents occur in islands and remote locations, additional challenges emerge due to geographical constraints and limitations in available infrastructure services and emergency resources.

In this study, a probabilistic Natech risk analysis is conducted for a fictitious industrial facility, assumed to be located on an island of high seismicity and prone to cascading tsunami hazards [1]. The considered facility comprises a diesel oil tank farm with four storage tanks, each equipped with a leak collection tank. A concrete dike is further assumed to exist around the tank farm, which acts as a passive risk mitigation measure by containing oil spills and preventing their spread into the environment. A multi hazard Natech risk analysis is conducted for earthquakes and cascading tsunamis that directly impact the tank farm. Site-specific hazard curves are obtained from the European Seismic Hazard Model 2020 (ESHM20) [2] and the NEAMTHM18 model [3-4] for earthquake and tsunami hazard, respectively. Using appropriate fragility curves from the literature [5-6], the storage tank damage is probabilistically assessed for various failure mechanisms at several severity levels.

Two Natech consequence scenarios are examined: (1) pool fire; and (2) substance dispersion. For scenario (1), the annual risk to human health is computed and mapped in contour plots. The computed individual risk expresses the probability of death and irreversible injuries due to human exposure to heat radiation, following the release and ignition of flammable diesel oil. Scenario (2) qualitatively assesses the environmental risk due to contamination of land and water bodies. This assessment relies on the dispersion of substances leaked from damaged storage tanks in the aftermath of the examined natural hazards and the failure of the containment dike due to exceedance of its capacity to contain the released substances. The following risk reduction measures are recommended:

- retrofitting of storage tanks to reduce their vulnerability against earthquakes and tsunamis; use of appropriate protection systems and measures to ensure accident prevention, mitigation, and control;

- re-location of the industrial facility to regions of lower seismicity and away from coastal and residential areas, if possible.

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Venue

Room 2 (Amphitheatre of the Region)

Session Title

# Session ‘Resilient Infrastructure’

Chaired By

Yoshio KAJITANI, Professor, Kagawa University, Japan

Zoltán TÖRÖK, Professor, Babes-Bolyai University, Romania

Date and Time

Monday, September 29, 2025

16:30-18:00

# East Med Offshore Safety Hub: Preparedness Against Offshore Accidents

A069-O

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**Keywords:** Offshore Safety, Pollution Prevention, Underwater Intervention, Preparedness, East Mediterranean.



The Mediterranean Sea is a vital maritime supply route, particularly in what concerns Europe's energy supply. Europe's dependence on seaborne trade for energy, food and other basic commodities will be further accentuated in the decades to come. The inevitable exploitation of the important East Med hydrocarbon reserves, will increase substantially the risks and the environmental pressure in an area already stressed, environmentally and socially. In such a context, new instruments, tools and methods are required for managing the new resources, their transport, distribution and, most importantly, the associated risks. The development and deployment of suitable means for safe underwater operations, even at abyssal depths, is a fundamental requisite for a sustainable exploitation of the vast mineral resources under the East Med seabed.

Following the accidents of Erika, Prestige and, later, the Deepwater Horizon blow-out, important regulatory steps have been taken towards the maritime and offshore safety. Nevertheless, the nature of the East Med reserves as well as the environmental and social particularities of the region require additional practical measures, in particular towards a regional emergency response readiness. The present paper focuses on how to achieve such readiness through a transnational (EU, Mediterranean cooperation or East Med) center / hub for the support of all offshore operations in Eastern Mediterranean. Such hub would:

- Provide operational and logistic support for exploratory, drilling, and production operations
- Support operations regarding the application and the control of the safety measures as per the EU regulatory framework
- Build and maintain the capacity for intervening in case of accidents all along the exploration, drilling and production phases, on surface or at the seabed.

The paper argues for the necessity of such a center, strategically placed in the island of Crete. It elaborates on the shortcomings of past deep-sea interventions, in particular those after the Prestige and the Deepwater Horizon accidents, and argues on the necessity to deploy an operational prototype of a novel system, developed in the frame of the DIFIS collaborative European project for the prompt intervention and caping of underwater pollution sources like sunken tankers or offshore well blow-outs, even in abyssal depths.

# Locally Established Renewable Energy Sources for Insular Energy Resilience in Times of Crisis

YS46-O

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**Keywords:** Insular Energy Resilience, Renewable Energy Sources (RES), Energy Autonomy, Crisis Management, Aegean Islands.

Energy resilience is crucial for island regions, especially during crises such as natural disasters, geopolitical disruptions or economic downturns. Self-sufficient energy systems are crucial for maintaining basic services, including healthcare, communication and emergency management.

Islands face unique challenges in energy production, supply and distribution due to their geographical isolation and limited resources. Many of them struggle with insufficient electricity grids and power outages during high energy demand, such as in disasters or emergencies. Conventional energy is costly and has significant ecological impacts, while reliance on imported fossil fuels increases vulnerability to supply chain disruptions. These factors make islands ideal candidates for innovative technologies that enhance energy autonomy.

Renewable energy sources (RES), such as solar and wind power, provide promising alternatives to conventional systems, in order to cover scenarios of energy demand that gets over the ordinary peaks and it is featured by uncertainties (e.g., drought and extreme temperatures in high seasons for tourism and other emergencies). Nevertheless, achieving energy self-sufficiency with RES depends on several factors, including selecting and investing in appropriate technologies, geographical and climatic conditions, energy storage capacities, resource availability and community consensus. However, transition to locally established RES is worthwhile: It enhances local energy security, emergency resilience, sustainability, climate adaptation and local economic growth.

In Greece, many islands benefit from excellent conditions for developing renewable electricity generation systems due to high levels of sunlight and strong wind potential. The present work explores the potential for locally installed RES in Greek island territories, focusing on both the opportunities and the challenges for their integration into the insular energy systems.

The approach combines a literature review with a case study of Tilos, an island in the Dodecanese, Aegean. Key literature review issues include: (a) the importance of energy source redundancy and self-sufficiency in times of crisis and (b) the technical, political and economic feasibility preconditions for the islands' transition to RES, starting from the decarbonization of the power sector. Tilos has been chosen as a good practice example among the Aegean islands for its innovative RES solutions and consensus-based decisions. The authors' ambition is dual. First, to provide the reader with a list of preconditions (e.g. targeted economic incentives) and a roadmap for smooth transition of insular communities to energy self-sufficient communities through

exploitation of RES and second, to showcase how important is the resulting energy autonomy in emergency periods and (disaster) crisis management.

# Risk Assessment of Navigational Disruptions in the Tokyo Bay Central Fairway as Critical Infrastructure of the Tokyo Metropolitan Area

A010-O

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**Keywords**: Blockage of Fairway, Hotspot, Fault Tree Analysis, Business Flow Analysis.

Marine transport is the foundation of the modern world economy and trade. Energy and manufacturing raw materials such as crude oil, LNG, iron ore, and coal; intermediate goods such as electrical machinery parts, automobile parts, and steel products; finished products such as home appliances and furniture; and a wide variety of food and beverages are transported by sea, and any major disruption in this transport could cause serious damage to the economy and society. The IRGC[1] investigated the risk and impact of the suspension of navigation at the Straits of Malacca and Singapore.

In recent years, maritime transport has frequently experienced navigational disruptions in hot spots where ships are concentrated; the 2021 Suez Canal blockage, Panama Canal drought restrictions in 2023-24, Red Sea and Gulf of Aden detours to avoid Houthi attacks from 2023, and the 2024 Baltimore bridge collapse blocking navigation.

This study analyzes and evaluates risk scenarios of navigational disruptions in the Tokyo Bay Central Fairway, which is an access route to all ports in Tokyo Bay, by discussing various disaster events and the transmission mechanism of such disasters. The Tokyo Bay ports account for 35% of Japan's international containerized cargo throughput, 30% of crude oil imports, and 44% of LNG imports in 2023, and a serious navigation disruption could cause catastrophic damage to the metropolitan area's economy and society. Disruption scenarios were generated by collecting and analyzing past possible events, interviewing experts, and conducting workshops, and then evaluating its probability and severity.

In this study, the possibilities of navigational disruption due to ship collision or grounding were rated as probable, the possibilities due to ship fire, engine failure, power loss, hull damage, ash fall from volcanic eruption, and cyber-attacks on ships were rated as impossible to rule out, and the possibilities due to fires and explosions in petroleum complexes, pumice drift from volcanic eruptions, cyber-attacks on navigation control systems and petroleum complexes, and aircraft crashes were rated as difficult to completely exclude. If any of the risk scenarios were to become reality, particularly if several large vessels were to sink in the fairway due to collision or fire, the worst-case scenario would be a suspension of navigation for approximately one month and

navigation restrictions for more than one year. Additionally, the economic and social impacts of navigation disruptions, as well as policies designed to mitigate them, were discussed.

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# Comprehensive Identification of Disaster Communication Failures using Large Language Models and Interdependency Analysis

A140-O

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**Keywords:** Large Language Models, Communication Failures, Infrastructure Interdependency, ICT Resilience.

This study aims to systematically extract and evaluate communication failures that may occur during disasters—especially composite and cascading disruptions—and to clarify the extent of their downstream impacts. Although contemporary society relies heavily on ICT for governmental procedures, confirmation of citizens' safety, and many other activities, large-scale disasters are infrequent, making it difficult to anticipate and accumulate knowledge about potential failures. While many existing efforts summarize faults after they have occurred and propose individual countermeasures, this research endeavors to comprehensively identify latent failures that have not yet manifested and, by incorporating task interdependency, to generate previously unknown compound-failure scenarios.

First, we organize composite responses, i.e., groups of ICT-related tasks undertaken during disaster operations. Next, a large language model (LLM) is prompted to extract, for each task, potential communication failures, specifying both their causes and impacts. Taking dependencies among tasks into account, we then analyze the compound failure patterns that can arise when multiple tasks interact. Bidirectional dependencies with other infrastructures—such as power grids and road networks—are also examined. Finally, the generated results are compared with analyses produced by telecommunications operators and disaster-management practitioners to verify their validity. By revealing yet-unseen disruption scenarios grounded in task interdependency, the proposed framework contributes new knowledge for building more resilient communication systems in future disasters.



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# Evaluating Resilience Strategies for Pandemics in African Countries: A Case of Health Care Facilities

A003-O

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**Keywords:** Disaster Resilience; African Literature; Indigenous Knowledge; COVID-19 Pandemic; Community Solidarity.

The COVID-19 pandemic exposed vulnerabilities in global disaster resilience strategies, particularly in African contexts where historical, socio-economic, and cultural factors significantly shape crisis responses. This study explores disaster resilience strategies embedded in African literature, identifying indigenous knowledge and traditional coping mechanisms that offer valuable lessons for modern crisis management. By analysing selected African literary works, the research uncovers narratives highlighting community solidarity, oral traditions, and adaptive strategies that have historically helped societies withstand pandemics, conflicts, and environmental disasters. This study was conducted with the objectives to 1) analyse disaster resilience strategies embedded in African literature; 2) examine themes of resilience in African literary works; 3) assess the role of African literature in documenting societal and governmental responses to the COVID-19 pandemic; 4) explore the resilience strategies and modern disaster preparedness. The study adopts a purely qualitative research approach, using a systematic literature review (SLR) as the primary data collection and analysis method. Databases such as Google Scholar, ScienceDirect, Scopus, Web of Science, EBSCO, and PubMed were used to source relevant materials. Policy documents from environmental agencies and the African governments were. Studies that lack empirical evidence, opinion pieces without substantial data, and literature not relevant to Africa were excluded from this study. A thematic analysis approach identified recurring themes across different studies. Thematic coding was applied to categorise key findings and generate evidence-based insights. Triangulation was used by cross-referencing data from multiple sources (scientific papers and government reports). The study bridges the gap between historical resilience strategies and modern disaster preparedness, arguing that African literature provides a repository of culturally relevant insights that should inform policy development. Findings suggest that integrating these literary narratives into disaster risk management can enhance responsiveness, especially in communities with limited access to formal relief systems. Drawing from African storytelling traditions and indigenous coping mechanisms, policymakers and disaster response agencies can develop context-specific strategies that resonate with local populations and ensure more effective resilience-building initiatives. Ultimately, this study highlights the value of literature as both a record and a guide for disaster resilience, demonstrating that African narratives offer crucial insights for strengthening preparedness, adaptation, and recovery in the face of future global crises. Once this study is published after rigorous peer review,

a policy brief will be developed to translate academic findings into actionable recommendations for policymakers.

# Investigation of Key Coastal Defence Structure Damage Mode to Enhance Disaster Resilience: Lessons Learnt from the Previous Catastrophic Tsunamis

A033-O

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**Keywords:** Coastal Defence Structures, Tsunami-Generated Erosion, Laboratory Experiments, Dam-Break Waves, Novel Disaster Resilient Design.



The 2004 Boxing Day tsunami and the 2011 Great East Japan Earthquake and tsunami exposed the catastrophic consequences of coastal infrastructure failures, particularly in islands and remote regions such as Sri Lanka, Thailand and Japan. A key lesson learnt from the previous post-disaster engineering field surveys was the role of erosion as a primary cause of damage to the structures. When the coastal defence structures such as seawalls and breakwaters damage, excessive water inundate inland, increase destruction, and reduce critical evacuation time. This is particularly dangerous in remote areas where emergency services and evacuation routes are limited.

Despite these findings, many existing design guidelines and risk assessments are based on erosion characteristics measured after the tsunami event, when much of the evidence has already been washed away or covered by new sand. The most damaging erosion often happens at the peak of the tsunami process but goes unrecorded. To address this knowledge gap, we conducted a new set of fully controlled laboratory experiments using a dam-break method to simulate tsunami-like wave at the University of East London open channel facility.

These experiments explore how different engineering parameters such as wet soil, types of ground materials (soil types), and dam-break wave properties affect the amount of erosion that occurs behind coastal defence structures. Results show that wet soil conditions, common in most coastal environments, leads to deeper and faster erosion. The study compares experimental results with predictions from well-established engineering tools and finds out that many of them underestimate the actual extent of erosion during extreme wave events like tsunamis.

This work helps bridge the gap between engineering and practice. By improving our understanding of how and when coastal structures fail, we can design better, more resilient systems that protect vulnerable communities during future tsunamis. The findings support international efforts like the “Tsunami Ready” programmes and provide practical guidance for strengthening disaster preparedness in vulnerable and hard-to-reach areas.

Our research underscores the urgent need to rethink coastal infrastructure design in the era of climate change, and to invest in protective solutions that are grounded in local conditions and realities.

## Venue

Room 1 – Main Venue (Epicurean Cultural Center)

## Session Title

# Session ‘Spatial Planning – Emergency Housing’

## Chaired By

Pavlos-Marinos DELLADETSIMAS, Emeritus Professor, Harokopion University of Athens, Greece

Michio UBAURA, Professor, Tohoku University, Japan

## Date and Time

Tuesday, September 30, 2025

09:40-11:10

# The Post-Disaster Community Reconstruction Process Undertaken by the Residents

A097-O

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**Keywords:** Reconstruction Town Development, The Great East Japan Earthquake 2011, Resident's Perspective.

This study revisits post-disaster reconstruction through the lived perspective of residents, selecting the Taro district of Miyako City, Iwate Prefecture, as a critical case after the 2011 Great East Japan Earthquake and tsunami. Combining extensive documentary analysis with semi-structured interviews, the author charts the decision-making pathways of the local reconstruction town-development council and place them in dialogue with state-led reconstruction policies unfolding on the same temporal axis. This dual analytical frame permits a fine-grained reading of how contestation, negotiation, and collaboration between citizens and government co-produced both policy outputs and community practice.

Three interlocking dynamics emerge. First, resident initiative was not derived of top-down prescriptions; rather, it was catalyzed by confrontation and sustained bargaining with governmental authorities. Initial opposition—especially over relocation sites and land-use zoning—obliged citizens to articulate their own hierarchies of need, thereby transforming them from passive beneficiaries into proactive planners of livelihood restoration and spatial reconfiguration. Second, amid acute informational uncertainty, the community adopted an adaptive learning and management process: frequent study circles, iterative scenario testing, and provisional compromises enabled locally calibrated solutions to crystallize despite fluctuating constraints and incomplete data. These reflexive practices re-balanced the asymmetry of technical knowledge that typically privileges formal institutions. Third, leadership within the community proved relational and situational rather than rigidly hierarchical. A small cohort of boundary-spanning "key persons" served as epistemic brokers—translating specialist jargon, mediating intra-community conflicts, and sustaining morale. Their facilitative labor wove heterogeneous households into a more cohesive civic fabric, laying an affective foundation for collective action.

The implications extend beyond the Taro district. Effective reconstruction, the findings suggest, is more than the physical reinstatement of infrastructure; it is a profound social process of re-making place, meaning, and mutual obligation. Resident-centered governance mechanisms—capable of embracing constructive dissent, iterative co-design, and continuous learning—appear indispensable where futures are uncertain, and resources contested. Governmental agencies, for their part, enhance both legitimacy and policy efficacy when they recognize community forums as their partners, integrate vernacular knowledge into formal plans, and institutionalize transparent channels for joint problem solving.

Accordingly, the Taro experience advances a paradigm of "survival-driven community building" with three actionable principles: (i) early activation of citizen agency, (ii) institutional space for experimental co-production, and (iii) cultivation of brokerage leadership that converts ambiguity into collective purpose. Adopting these principles can strengthen resilience, equity, and long-term sustainability of recovery endeavors in future disaster contexts.

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# Practitioner-Driven Innovation Procurement of Renewable Energy Solutions for Emergency Shelters and Bases of Operations

A027-O

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**Keywords:** Emergency Shelters, Bases of Operations, Innovation Procurement, Renewable Energy, Disaster Scenarios.



This document explains and demonstrates how to prepare the IDRiM2025 abstract. Please read and follow these instructions carefully.

During large-scale natural and man-made disasters, emergency shelters are set-up for accommodating evacuees from the affected communities, while often first responders deploy bases of operations, for accommodation and coordination of their activities on site. When critical infrastructure is damaged or unable to provide non-disruptive electricity, both facilities, in tent camps or in existing covered structures, heavily rely on portable energy supply, typically offered by diesel generators. The extensive use of the latter has been proved to contribute to greenhouse gas (GHG) emissions and to the generation of poor air quality, noise, heat and vibrations, negatively affecting the beneficiaries of the facilities. Moreover, the dependence in local fuel further impacts the already disaster-stricken areas, exacerbating resource challenges faced by local communities, while adding complexity to the operations of emergency responders. Nevertheless, no other technology has so far surpassed diesel generators in meeting full energy supply requirements for sheltering facilities.

In order to address the aforementioned challenges, POWERBASE project guides and supports the development of innovative low-emission energy solutions, leveraging the advances in renewable energy technology and taking into account different extreme conditions under which bases of operation and emergency shelters may be deployed. POWERBASE is designed to drive the green transition towards a low-emission, reliable, self-sufficient, mobile power supply for emergency response missions, contributing to EU Green Deal 2050 target of 55% GHG emission reduction, while bolstering the EU´s energy independence. Practitioners from emergency response and disaster management organizations, with hands-on experience on the deployment and management of bases of operations and emergency shelters describe their operational and functional requirements for power supply (in terms of inter alia efficiency, performance, scalability, interoperability) which are assessed in three disaster scenarios: a) wildfire on a Mediterranean island in very hot climatic conditions, b) cross-border flooding in central Europe with a high number of displaced people and large scale destroyed critical infrastructure in winter, c) earthquake in a rural Himalayan region with complex logistics.

POWERBASE is a Horizon Europe Coordination and Support action which, following a practitioner-driven needs assessment, enables interaction of the end-users with the market to identify the

innovation gap laying solid foundations for a Pre-Commercial Procurement (PCP). The latter is an instrument that, through a competitive phase and risk sharing procurement approach of R&D services, effectively creates opportunities for suppliers to develop innovative solutions, meanwhile, enabling public procurers to drive innovation, currently, for mobile renewable energy power supply.

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# Evaluation Policy Model for Mitigation and Adaptation Policies for Climate Change in Urban Planning

A100-O

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**Keywords:** Mitigation, Adaptation, Evaluation Policy Model.

In recent years, the impact of climate change is more frequent and severe than ever before, threatening all three dimensions of sustainable development, namely the environment, economy and society. In such a context, policy actions should be undertaken towards mitigating Greenhouse Gas (GHG) emissions, but also implementing adaptation measures to address climate change.

Mitigation and adaptation policies are the main answer to the threat of climate change, marked by certain attributes, distinguishing spatial levels of implementation etc. According to the Kyoto Protocol (Article 10, Paragraph (b), p. 9), all Parties should:

'Formulate, implement, publish and regularly update national and where appropriate, regional programs, containing measures to mitigate climate change and measures to facilitate adequate adaptation to climate change'.

In this sense, mitigation and adaptation consist of the two principal policy mainstreams to cope with the climate change impacts.

The goal of the present paper is to explore synergies and conflicts among adaptation and mitigation policy actions, in the urban context. Additionally, a decision-making tool is proposed in support of decision-making centers to effectively resolve adaptation and mitigation conflicts, promoting at the same time social dialog and citizens' interaction.

In the first part of the paper, a short introduction to the concepts of the 'mitigation' and 'adaptation' is presented, while in the second part, indicative synergies and conflicts among adaptation and mitigation, in urban areas, are described. In the third part follows a short description of mitigation targets and respective policy measures, together with adaptation measures in two Nordic cities, assessing synergies and conflicts, based on specific urban contexts. Finally, a set of integrated approaches are introduced, proposing the selection of an optimal combination of mitigation and adaptation strategies that resolve conflicts among them.

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# Bridging Knowledge and Practice in the Field of Climate-Resilient Urban Planning: Evidence from Integrating Local Authorities' Insights into a Postgraduate Studio

A150-O

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**Keywords:** Urban Planning, Climate Resilience, Planning Education, Local Authorities.



Spatial planning for climate adaptation constitutes a major preventive measure for protecting urban areas from climate-related disasters. As climate change brings an acceleration in the intensity and frequency of floods, forest fires and heatwaves, spatial planning needs to be informed with and incorporate these vulnerabilities. Policy agendas at the UN as well as the EU level, for instance the New Urban Agenda, have highlighted this approach, which is also reflected at the national level, for instance through spatial planning specifications. This transition calls for a new approach to conventional urban planning which has to be integrated in planning education. Even though in recent years spatial planning education programs have started to address climate resilience issues, linking knowledge with practice is an open issue at the academic and applied levels. At the same time, local authorities have also started integrating relevant actions into their official operational planning, while in some cases undertake action for enhancing adaptation to climate risks.

For implementing changes at the local level, there has to be a collaboration framework between local authorities (Municipalities) and academic knowledge. In this paper, the focus is how local authorities' experience in site-specific climate risks and vulnerabilities can be utilized in the context of spatial planning education. Evidence is drawn from the implementation of an urban planning studio at Master's level, entitled "Spatial Planning for Resilient Metropolitan Areas," which is taught at the Aristotle University of Thessaloniki. The studio is based on the methodology proposed by the Urban Adaptation Support Tool, while focusing on a specific urban area (municipality) pertaining to Thessaloniki's Greater Metropolitan area. The students are called upon to simulate a real-world scenario of drafting a local strategy for the site area, drawing information from related geodata platforms, municipal plans and strategies, as well as field research. A close collaboration with the municipal authorities is fostered through site visits and knowledge exchange.

The paper focuses on how insights from local authorities regarding climate risks have been considered by and contributed to the implementation of this postgraduate studio, based on last - year's experience from one municipality of Thessaloniki. It presents how input from local authorities has been integrated in the successive stages of the studio, along with critical reflections and lessons learnt.

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# Supplementing Activities of Resilience in Rural Japan – Designing Places that Enhance Disaster Risk Management

A088-O

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**Keywords:** Social Capital, Rural Communities, Demographic Change, Informal Networks, Disaster Resilience.

Research has demonstrated that social capital and social relationships are beneficial for the resilience of local communities [1, 2, 3], particularly the frequent amount of informal social exchange ingrained in everyday village life [4]. However, against the backdrop of demographic change, places and occasions for social exchange have become fewer in numbers in these communities. I understand the decrease in population and the subsequent thinning-out of village life as a major challenge and "persistent disruptive risk" [5] for contemporary rural areas in Japan. If under these conditions, spontaneous social exchanges, such as "a chat at the local well" (idobata kaigi), become less frequent, how can the informal network of social support crucial for resilience be kept alive?

Based on qualitative fieldwork in four regions in Japan (rural Kanto, Tottori, Kumamoto, Noto) I demonstrate how networks of local and non-local actors collaborate to create places that enable an open atmosphere for communication and community-building. I illustrate differences between these four regions due to their different social and political structure and discuss how these places contribute to enhanced disaster risk management by supplementing activities that have been strengthening disaster resilience. One key finding is that current initiatives explicitly highlight the benefits of a rich social life in rural communities, further encouraging residents to participate in local activities. This talk adds a comparative perspective to existing calls for "social places" [6] or "communicative spaces" [7] in Europe and Japan.

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# From Disaster Risk Reduction Strategies to Resilience Planning: Implications for Spatial Planning and Evidence from Thessaloniki

A157-O

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**Keywords:** Spatial Planning Specifications, Resilience, Risk Reduction, Thessaloniki.

Disaster risk reduction has been gradually recognized as a major task in the context of the UN agenda and especially after the establishment of the International DRR Strategy, in 2000. In the context of the Sendai framework for action, DRR is linked to the sustainable development agenda and SDGs, the Paris Agreement goals, as well as the New Urban Agenda. All these have been reflected in and transferred to supranational and national levels, as is the case with the European Union and its member states. At the same time, the various crises that have intensified in recent years, and especially the economic crisis together with the pandemic and the climate change impact, have triggered the request for resilience. Cities and metropolitan areas all over the world develop resilience strategies to better adapt to current challenges. On the other hand, it is important that these strategies to be mainstreamed into established policies. This is especially the case with spatial planning, the role of which is crucial in DRR and resilience strategies, since it operates as a coordinating framework as well as one that enables interventions on the ground. Therefore, a complex relationship between risk reduction, resilience, and spatial planning has emerged, the characteristics of which differ between countries. In Greece, recently some efforts have been made to introduce these parameters into the specifications of new spatial plans at the municipal level. However, as risk reduction and spatial planning have their origin in different policy contexts, it is not clear how these policies relate to each other. This paper examines the above issues, with a focus on their perception by involved actors in the Thessaloniki metropolitan area, and endeavors to draw conclusions for spatial planning.



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## Venue

Room 1 – Main Venue (Epicurean Cultural Center)

## Session Title

# Session ‘Economic Dimensions of Disaster Risk Reduction and Management’

## Chaired By

Subir SEN, Professor, Indian Institute of Technology Roorkee, India

Hirokazu TATANO, Professor, Disaster Prevention Research Institute, Kyoto University, Japan

## Date and Time

Tuesday, September 30, 2025

11:30-13:00

# New Frontiers in Disaster Management Research

A180-O

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The beginning of my presentation will focus on Regional Science, but my presentation will go beyond Regional Science and cover the emerging social science. I have done a lot of work in the field of Regional Science. I may say something about the work I have done in this field, and it may appear that I might talk much about myself, I hope you don't mind.

In face of the political conflicts and situations in the world now, coupled with the multiple natural and man-made disasters and crises, there is a lack of support in food, healthcare, and international assistance for poor people around the world. We need to develop new techniques and mathematical models to address these disasters in addition to natural disasters considered so far in IDRiM for a long time.

Later I will move on to Peace Science, Disaster Management, the pandemic, the Russian-Ukraine War, conflicts in the world, including Africa. These topics have rarely been covered before.

# A Conceptual Modeling of Optimal Disaster Reduction Investment Considering Both Rare and Frequent Hazard Risks

A058-O

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**Keywords:** Rare Disaster, Disaster Prevention, Stochastic Control, Jump-Diffusion Process, Climate Change.



Hazards of tectonic origin, such as earthquakes and volcanoes, and those of meteorological origin, such as typhoons and torrential rains influenced by climate change, differ in terms of the frequency and probability of disaster occurrence and the spatial extent of damage to the socio-economy. In general, tectonically induced hazards, such as earthquakes and volcanic eruptions, occur less frequently than meteorologically induced hazards, making it challenging to predict their exact timing precisely.

Among meteorological hazards, typhoons and torrential rains are seasonal and occur almost yearly, including small-scale events. In other words, considering the time horizon as a cycle of more than a year, weather-related hazards and associated disasters such as floods and inundations are almost regular phenomena, although their frequencies are stochastic.

Hazards with different uncertainty characteristics coexist, which is an essential element in disaster risk management. However, no concept has been established that explicitly considers this aspect. This study develops a mathematical programming model for optimal disaster prevention investment planning that considers the heterogeneity of uncertainties between rarely occurring and regularly occurring hazards. Specifically, our methodology employs a stochastic control approach to minimize long-term economic losses by explicitly incorporating the risk of disaster damage, utilizing Brownian motion with drift and Poisson processes. Our model is a dynamic system with two state variables: the capital stock for disaster reduction and the level of disaster damage. Since the model is formulated as a functional problem and is difficult to solve analytically, we also develop computational methods for quantitative analysis.

We applied the model to several scenarios with different disaster risk characteristic parameters and conducted numerical simulations. The analysis derived the optimal policy function associated with the state variables and the dynamics of the two state variables, i.e., the capital stock for disaster reduction and the disaster-affected state, respectively.

The simulation analysis suggested that the severity of damage is more sensitive to the optimal investment policy than the probability of rare disaster occurrence. Furthermore, the results indicated that the increase in the severity and frequency of frequent disasters due to climate change progress affects the optimal investment in disaster reduction more than the risk of rare disasters; i.e., it requires more investment and capital stock development for disaster reduction.

# Interregional Strategy to Strengthen Disaster Resilience in Peninsular Areas

YS26-O

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**Keywords:** Noto Peninsula Region, Earthquake, Disaster Resilience, Interregional Relationship.

This study aims to identify the current status and challenges faced in the symbiotic relationship between the peninsula region and other regions of Japan as a means to enhance disaster resilience. The research subject is Wajima City, Ishikawa Prefecture, which was affected by the 2024 Noto Peninsula Earthquake. The following three research methods were adopted. (1) We used local historical materials and newspapers, including the geographical characteristics of the Noto Peninsula region to assess its relationship with other regions. In doing so, we focused on the discourse about how people perceive the relationship between the Noto Peninsula and other regions. (2) We conducted field surveys and interviewed people who functioned as coordination hubs with other regions during the disaster. (3) We conducted interviews and questionnaire surveys with stakeholders from other regions that provided support to the Noto Peninsula region.

As a result, we made the following observations. (1) The geographical characteristics of the Noto Peninsula region have changed in meaning over time. Geographical conditions had contributed to a symbiotic relationship with other regions through the region's unique culture and tourism. On the other hand, tourism has a relatively small socio-economic impact on other regions in the short term (e.g., [1]), so it takes time to recover, and we found that care must be taken to prevent the loss of the peninsula's unique culture. (2) Flexible response capabilities are essential in times of disaster (e.g., [2] [3]), and we found that entities with characteristics of both the public and private sectors that can expand micro-level connections across a wide area functioned effectively. (3) Through interviews and surveys with support practitioners, we found that such micro-level connections have the potential to generate a chain of future support by promoting support from remote areas despite physical and psychological barriers. We concluded that in order for the peninsular region to transform isolation into value, it is important to understand the changing characteristics of the peninsular region over time and to work on building symbiotic relationships with other regions by activating micro-level activities that promote a bridge function between the public and private sectors.

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# Can Risk Informed Investment in Islands on Health, Transport and Tourism Improve their Resilience and Economic Growth?

A168-O

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**Keywords:** Risk Informed Investment, Islands, Climate Change, Tourism.

Risk-informed investment in islands and remote areas is crucial for building resilience, particularly in sectors like health, transport, and tourism [1]. The key considerations and strategies for this approach are a) the understanding of risks related to the climate change, such as water shortages, or changing weather patterns that can directly impact infrastructure, health, and tourism; b) the isolation, i.e. geographic remoteness that can lead to challenges in accessing services and markets, affecting both residents and tourists; and c) the economic vulnerability, namely the overreliance on specific sectors (e.g., tourism) that can make economies susceptible to external shocks. To mitigate the influence of these diversions risk informed decision making is needed through: a) data analysis to inform investment strategies, ensuring that they are responsive to local conditions; b) public-private partnerships to fund projects that address the unique risks faced by islands and remote areas and c) multi-stakeholder engagement, especially residents in decision-making processes to reflect diverse perspectives and needs.

Health Investments comprise resilient health infrastructure that can withstand natural disasters and meet the specific needs of the insular populations with services such as telemedicine reducing the need for travel, backed up by public health programs that implement initiatives on preventative health, vaccination, and maternal and child health, particularly in vulnerable communities.

The infrastructure development i.e. building and maintaining a resilient transport infrastructure (roads, airports, ports) is of utmost importance. This will include eco-friendly transport solutions, such as ferries, bicycles, and electric vehicles, to reduce carbon footprints and enhance connectivity. An efficient supply chain to ensure access to necessary goods and services, particularly during emergencies is also crucial. On the other hand, tourism development should be done in a "healthy" manner promoting eco-tourism and sustainable practices that protect natural resources while enhancing visitor experiences through cultural, adventure, and wellness tourism. The engagement of local communities in tourism planning to ensure that benefits are shared, and cultural heritage should be respected and promoted is also necessary. Factual data on a case study island will be presented along with proposals on how this can be implemented in other locations; a cost-benefit analysis is difficult to be outlined at this stage, as local alternative development scenarios are not currently available.

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# Assessing Ripple Effects of Supply-Side Production-Capacity-Loss from Compound Hazards: A Case Study of Flood and Covid-19 in Enshi, Hubei

A132-O

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**Keywords:** Flood-Epidemic Compound Hazards, Supply-Side Production Capacity Losses, Ripple Effects, Mixed Multi Regional Input-Output Model, Hubei Province.

Understanding the impacts of compound disasters on economic systems is essential for integrated disaster risk management. However, quantifying the economic ripple effects of compound disasters remains challenging, especially as the relative contributions of each hazard to losses in compound disasters are still unclear. This study proposes a methodology framework for assessing the ripple effects of compound hazards, focusing on contributions of each hazard to the overall economic disruption. From a supply-side perspective, overall production capacity loss rates (PCLRs) across industries are evaluated using on-site survey data. A time-series model, utilizing urban travel intensity data, is used to estimate the PCLRs directly attributable to the pandemic, isolating its impact from the overall effects. Furthermore, a mixed multi-regional input-output (Mixed-MRIO) model is constructed to assess the overall and single ripple losses. The methodology is applied to the July 17, 2020 flood in Enshi, Hubei Province, China, during the COVID-19 pandemic. Results indicate that ripple losses of the compound disaster far exceed the direct production capacity losses. The ratio of production capacity losses attributed to the flood versus the pandemic is approximately 6:4, but ripple losses increase to 7:3. Economic core cities exhibit higher resilience, while more dependent small- and medium-sized cities are more vulnerable. The secondary industry is sensitive to floods, while the tertiary industry is sensitive to the pandemic. The study highlights the importance and feasibility of integrating field surveys with economic systems approaches to evaluate supply-side ripple losses, offering new perspectives for understanding compound disaster impacts and disaster management strategies.

## Venue

Room 1 – Main Venue (Epicurean Cultural Center)

## Session Title

# Session ‘Community Resilience’

## Chaired By

Christine KENNEY, Professor, Massey University, New Zealand

Andrew COLLINS, Professor, Northumbria University, United Kingdom

## Date and Time

Tuesday, September 30, 2025

16:30-18:00

# Three Key Elements of the International Intervention to the Community

A011-O

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**Keywords:** International Support, Community-Based Disaster Risk Management, Hierarchy, Acknowledgement, Model.

The formulation of disaster risk management plans at the community level, establishment of voluntary community-based disaster risk management groups, and the capacity building for those groups are being carried out in various parts of the world. As the promotion of the community-based disaster risk management has been clearly stated in the international frameworks (e.g. the Hyogo Framework for Action and the Sendai Framework for Disaster Risk Reduction), many international aid organizations and international NGOs support for the community-based disaster risk management activities within the framework of international cooperation.

The organizations that provide support include international organizations (such as UN agencies), government aid organizations (such as Japan International Cooperation Agency, hereafter JICA), NGOs and NPOs, and as the nature of each organization differs, the interventional approaches to support the community-based activities also vary. In this paper, it aims to propose three key elements to intervene into and promote the community-based disaster risk management activities in the context of the international cooperation carried out by the government aid organization.

The discussion here is based on the authors' experience of supporting and researching lthe communities in the project framework of JICA in the city of San Pedro Masahuat, La Paz Department, El Salvador (2010-2012, 2019), the city of Acajutla in the department of Sonsonate, El Salvador (2023), the city of Zihuatanejo in the state of Guerrero, Mexico (2016-2022), and the city of Manzanillo in the state of Colima, Mexico (2022-2024).

Three proposed key elements are the “hierarchy” (the hierarchical positioning of community-based disaster risk management group in the country being supported), “acknowledgement” (indicating the stakeholders who are practicing together as joint collaborators), and “model” (acceptance of the organizational model of community-based disaster risk management group in the society). The paper concluded with the importance of paying attention not to the supported side of the international cooperation, but to the interventional attitude the supporting side.

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# Review on Modeling the Societal Impact of Infrastructure Disruptions due to Disasters

A129-O

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**Keywords:** Societal Impact; Infrastructure Disruption; Well-Being Impact; Infrastructure Resilience.

Infrastructure systems play a critical role in providing essential products and services for the functioning of modern society; however, they are vulnerable to disasters and their service disruptions can cause severe societal impacts. To protect infrastructure from disasters and reduce potential impacts, great achievements have been made in modeling interdependent infrastructure systems in past decades. In recent years, scholars have gradually shifted their research focus to understanding and modeling societal impacts of disruptions considering the fact that infrastructure systems are critical because of their role in societal functioning, especially in situations of modern societies. Exploring how infrastructure disruptions impair society has become a key field of study. By comprehensively reviewing relevant studies, this paper demonstrated the definition and types of societal impact of infrastructure disruptions, and summarized the modeling approaches into four types: extended infrastructure modeling approaches, empirical approaches, agent-based approaches, and big data-driven approaches. For each approach, this paper organized relevant literature in terms of modeling ideas, advantages, and disadvantages. Furthermore, the four approaches were compared according to several criteria, including the input data, applicable societal impact types, spatial scales, and application contexts. Finally, this paper illustrated the challenges and future research directions in the field.



## REFERENCES

1. S. Smith, J. Johnson, W. Li (2022). Disaster risk reduction in islands. Scientific Journal, 27, 2656-2662. Doi:xxx

# Harnessing Hormesis for Strengthening Disaster Resilience and Adaptive Governance in Remote and Island Communities

A065-O

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**Keywords:** Hormesis, Adaptive Governance, Islands and Remote Areas, Risk Management.

This research introduces an innovative approach, the Hormetic Model of Accidents (MHA), designed to strengthen disaster resilience through adaptive governance practices in remote and island communities, which face unique challenges due to geographical isolation, resource constraints, and heightened vulnerability to climate-related disasters. By leveraging hormesis— where exposure to moderate stress enhances systemic resilience—this study aims to offer practical guidance for policymakers, emergency managers, and communities in these high-risk regions.

Research Objectives:

The central objective is to examine how intentional exposure to controlled stressors and disruptions (hormetic processes) can systematically enhance adaptive capacities, reduce vulnerability, and ultimately foster resilient communities. The research specifically targets the conditions and constraints faced by islands and remote areas.

Approach and Methodology:

Using qualitative methods, the study employs comparative case analyses of disaster governance systems in remote island communities versus non-remote urban areas. A mixed-method approach combines structured interviews, stakeholder workshops, and scenario-based resilience simulations. The MHA framework integrates complexity science principles, resilience engineering, and adaptive governance theories to examine systemic responses to moderate stresses and disruptions.

Findings:

Preliminary findings suggest that moderate and controlled exposure to disruptive events stimulates adaptive learning, enhances community participation, and strengthens governance systems. Islands and remote areas applying the MHA demonstrate improved collaboration between diverse actors, increased preparedness, and greater capacity to mobilize resources effectively in crisis situations. Conversely, communities lacking such adaptive stress exposure exhibit lower resilience, slower recovery, and fragmented risk governance structures.

Significance for Policy and Practice:

The MHA framework provides a novel perspective on disaster risk management by emphasizing proactive, rather than reactive, resilience-building strategies. Policymakers and disaster risk managers can utilize hormetic principles to design innovative governance structures, enhance community-based risk assessments, and foster participatory risk communication strategies. Practical implications include targeted investments in adaptive infrastructure, resilient health and

emergency systems, and policy recommendations specifically tailored to the constraints and opportunities of remote island contexts.

This research thus contributes directly to the IDRiM2025 themes of understanding disaster risk, strengthening governance structures, and embedding adaptive resilience processes, particularly for vulnerable and geographically isolated communities.

# From Memory to Action: Cultural Heritage and Community Resilience in a Mountain Valley: Insights from Val Resia

A085-O

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**Keywords:** Intangible Cultural Heritage, Community Resilience, Disaster Risk Reduction, Natural Hazards, Mountain Communities.

This contribution investigates the role of cultural heritage in fostering community resilience to natural hazards in Val Resia, a mountain valley within the Julian Alps Biosphere Reserve. The research is part of the RETURN partnership funded by the PNRR and aimed at co-developing an understanding of how intangible values such as cultural identity, collective experiences and local practices are key factors in fostering community resilience and can support different phases of disaster risk management.

Stakeholders from different sectors, including local institutions, civil society, cultural organizations and residents, participated in multiple activities based on the future search conference approach. Transdisciplinary participatory methods and visual techniques facilitated a reflective process to uncover how cultural heritages, local practices and sense of belonging influence the design of DRR and CCA strategies. Using temporal lenses - past, present and future- participants engaged in critical dialogue on the role of cultural heritage and collective experiences in community resilience.

Data collected from workshop was analyzed through coding with the support of qualitative data analysis software and tested against a conceptual framework.

Key findings revealed a strong attachment to the territory, expressed through local cultural practices and rich local knowledge, as well as the deep connection between the community's cultural heritage and its response to natural events. They also highlight the multi-faced challenges faced by remote and mountain communities that threaten the preservation and integration of traditional knowledge in DRM strategies. This empirical case study allowed us to benchmark our results towards a theoretical framework previously developed to operationalize the nexus between cultural heritage and community risk resilience, clarifying how different types of heritage can support specific dimensions of risk reduction.

The research underscores the importance of community-based knowledge co-production, raising awareness of local challenges and looking into systemic dynamics leading to risks. Main intended output of this study is to contribute to the development of a replicable model for communities facing similar hazards, emphasizing the role of cultural heritage in fostering resilient societies.

# Heritage in Action: Buddhist Monasteries as Nodes of Community Resilience in Historic Patan

A090-O

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**Keywords:** Courtyard Style Settlement, Shelter Operation, Self-Governance, Community-Based Disaster Risk Reduction, Kathmandu Valley.

Preparedness is a critical phase of Disaster Risk Reduction (DRR), particularly in the planning and management of emergency shelters immediately after a disaster. During the 2015 Gorkha Earthquake, residents in the densely populated Kathmandu Valley spontaneously sought refuge in nearby open spaces such as courtyards, temple plazas, Buddhist monasteries, and community-shared buildings (Tol Chhe). In these informal shelters, evacuees collaborated with local communities and monastic administrative bodies (Sangha) to manage shelter operations independently.

Although some open spaces had been officially designated as evacuation sites, they were often distant from affected neighborhoods and lacked effective administrative support. In contrast, the spontaneous sheltering efforts within walking distance of people's homes underscored the importance of local resilience and community-led response.

This study focuses on Buddhist monasteries that were widely used as voluntary evacuation shelters. While inherently religious institutions, these monasteries also function as vital communal spaces. The research aimed to explore how these spaces were adapted during the disaster and to identify the actors involved in their use and management. Field surveys were conducted at 46 officially registered monasteries in Patan, examining (1) basic attributes, (2) architectural characteristics, (3) everyday spatial uses and management rules, and (4) damage, shelter usage, and operational structures during the earthquake. Both the questionnaires and case studies were carried out with the support of the Society of Buddhist Monasteries (SBM) in Patan.

Findings reveal that monastic spaces, including courtyards, are regularly used for non-religious activities such as traditional music classes, life-cycle ceremonies, and community gatherings—highlighting their hybrid role across spiritual, residential, and communal domains. Many monasteries also maintained localized rules for courtyard access and use. Among the 38 monasteries that responded to the survey, 26 were used as evacuation shelters—primarily by residents of the same neighborhoods. Shelter operations were largely led by disaster-affected residents and Tol communities. Importantly, many Sangha members also resided in the same neighborhoods and held dual roles as community members and monastic caretakers, enabling smoother coordination during emergencies.

Rather than promoting formal designation as official shelters, this study advocates for a preparedness strategy that enhances the disaster response capacities of monasteries while

preserving their existing self-managed systems. Flexible external support can complement—rather than override—the embedded cultural and communal resilience of these shared spaces.

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# Art-Science Fusion to Enhance Community-Building and Societal Resilience

A070-O

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[2] *Bossa Flor Music (France)*

**Keywords:** Culture of Risks, Societal Resilience, Science Communication, Arts-Based Awareness, Disaster Preparedness.

The way societies react to disasters is highly dependent upon the culture of risks that local communities may have acquired through education and/or, sometimes dramatic, experiences. This culture is closely related to social inclusion and societal resilience and the level of knowledge that people may gain from evidence-based information. However, this information rarely reaches local levels owing to poor science communication on one hand, and lack of interest on the other hand. Using arts to improve risk awareness represents an innovative way for enhance the culture of risks and thus disaster societal resilience, acting as an “eye and heart openers” to realities that are too often overlooked by populations. The presentation will address the challenge of creating a new artistic pathway in support of disaster knowledge with a focus on extreme hydrometeorological events. Over the last few years, the multiplication of extreme climate events led to increasing impacts on small to large-scale cities, causing great concern to societies. Scientific research is very active in this area, bridging various disciplines and sectors, but often overlooking the citizen dimension and the local authority levels. This is mainly due to difficulties to transfer knowledge that would support societal resilience to risks and enhance disaster awareness and preparedness. Innovative ways are hence needed for better communicating, raising awareness and education, and enhance disaster preparedness. Using arts as a vehicle to reach people is one of these ways, in other words using various artistic expressions to help changing the “culture of risks” about water-related disasters, targeting vulnerable populations, in particular elderly people and children. The discussion will provide examples of possible artistic pathways representing the nine arts, including digital creations, which will be targeted to knowledge gathering about water disasters in an “All-Society” approach. Such pathway is aligned with a range of policy goals and priorities in the area of disaster resilience related to anticipation and preparation, e.g. the Sendai Disaster Risk Reduction framework establishing a broader, people-centred approach to disaster risk management and reducing the number of directly affected people attributed to disasters.

## Venue

Room 2 (Amphitheatre of the Region)

## Session Title

# Session ‘Climate Change Risks and Resilience’

## Chaired By

Stefan SCHNEIDERBAUER, Professor, EHS-United Nations University, Italy

Peijun SHI, Professor, Beijing Normal University, China

## Date and Time

Tuesday, September 30, 2025

09:40-11:10

# Positive Externalities in the Polycrisis: Effectively Addressing Disaster and Climate Risks for Generating Multiple Resilience Dividends

A137-O

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**Keywords:** Systemic Risk, Triple Resilience Dividends, Decision-Making.



As multiple risks interact and shocks proliferate across geographies and sectors, the concept of Polycrisis has come to the fore describing interwoven and overlapping crises that cannot be understood or resolved in isolation. Analysts have suggested that many of Polycrisis facets have been at least partially triggered by negative externalities and thus not internalized in national and international decision-making, leading to suboptimal decisions on climate action, energy and food security, global financial stability etc. Externalities have generally been framed as negative; yet, positive externalities, thus societal benefits that indirectly arise from economic decisions, have been less often been considered.

International policy debate on disaster risk reduction (DRR) and climate change adaptation (CCA) over the last years, as stipulated by international compacts in 2015 (Sendai, SDG, Paris), has picked up on positive externality discussion, albeit not explicitly. DRR and CCA analysts have emphasized the need for orienting risk management investments toward interventions that generate so-called multiple or triple resilience dividends. The Triple Resilience Dividend (TRD) concept suggests that in addition to risk reduction benefits from project investment (1st dividend), dividends would also arise from benefits associated with unlocked development (2nd dividend) and co-benefits (3rd dividend). Yet, despite increasing burdens imposed by disaster and climate risks it has remained difficult to motivate sustained investment into disaster and climate risk reduction across scales. We argue that this systemic underinvestment is partially due to a lack of conceptual clarity for the TRD, a lack of awareness and solid evidence with regard to the framing around the second dividend, which essentially entails further paying attention to positive externalities, as well as the interrelationships between resilience dividends in space and time.

We review the state of art on the TRD framework and examine dividends in terms of epistemological and methodological contributions from empirical and modelling methods for supporting decision-making as well as evidence for decision-making across scales from local to global.

We show how analysts and decision-makers may better consider the various resilience dividends across micro and macro scales. Enhanced methods and better awareness for potential externalities may enable more comprehensive evaluation of DRR and CCA interventions with benefits arising at

various and may lead to enhanced risk governance necessary for tackling disaster and climate risk challenges in a polycrisis context.

# Amplified Impacts of Combined Heat-Drought Stress on Rice Yield: Stage-Specific Responses and Threshold Effects

A131-O

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**Keywords:** Combined Heat-Drought Stress, Rice Yield, Growth Stage Specificity, Amplification Effect.

Combined heat-drought events, projected to intensify under climate change, pose disproportionate threats to global rice production compared to individual stressors. Yet, experimental evidence on their synergistic impacts across sensitive growth stages remains limited. This study systematically evaluates the effects of single and combined heat (HT) and drought (D) stresses at three critical rice growth stages (jointing, S1; flowering, S2; grain-filling, S3) under controlled conditions, with three stress intensities (L1-L3) (Fig. 1). Results reveal a significant amplification effect of combined heat-drought stress (HTD), causing 70.2% average yield loss—nearly double the average of individual HT (46.6%) and D (37.7%) impacts. Stage-specific responses dominated yield outcomes: S2 (flowering) exhibited the highest vulnerability under HTD (79.9% loss), aligning with HT-driven pollen sterility, while S3 (grain-filling) showed amplified HTD effects (62.5% loss) linked to chalkiness and starch biosynthesis inhibition. Strikingly, HTD during S1 (jointing) induced abrupt yield declines at higher intensities (e.g., L3 caused near-total loss), suggesting threshold-driven collapse. Yield components displayed divergent responses: spikelet fertility and 1000-grain weight under HTD were reduced by 50-80%, showing stronger synergism than panicle number, which paradoxically increased under HT and HTD. Statistical modeling (three-way ANOVA) confirmed significant interactions between stress type, stage, and intensity ($T \times G \times L$: $P<0.001$), with S2 HTD effects statistically indistinguishable from HT alone, highlighting heat's dominance during flowering. In contrast, S3 HTD uniquely disrupted carbon partitioning, reducing grain allocation by 18-25% versus controls. These findings challenge the assumption of additive stress impacts, demonstrating that co-occurrence reshapes physiological thresholds and resource allocation patterns. The study underscores the urgent need for stage-specific adaptation strategies, particularly during flowering and jointing, where short-term HTD events may trigger irreversible yield loss.

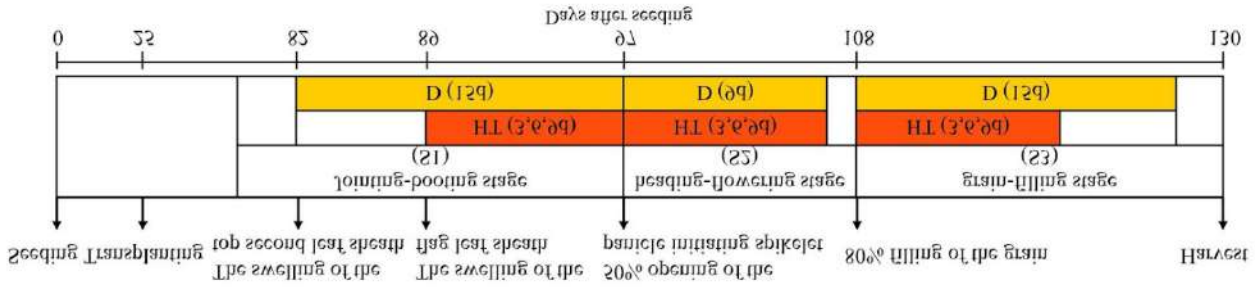

Figure 1. Schematic diagram of experimental design

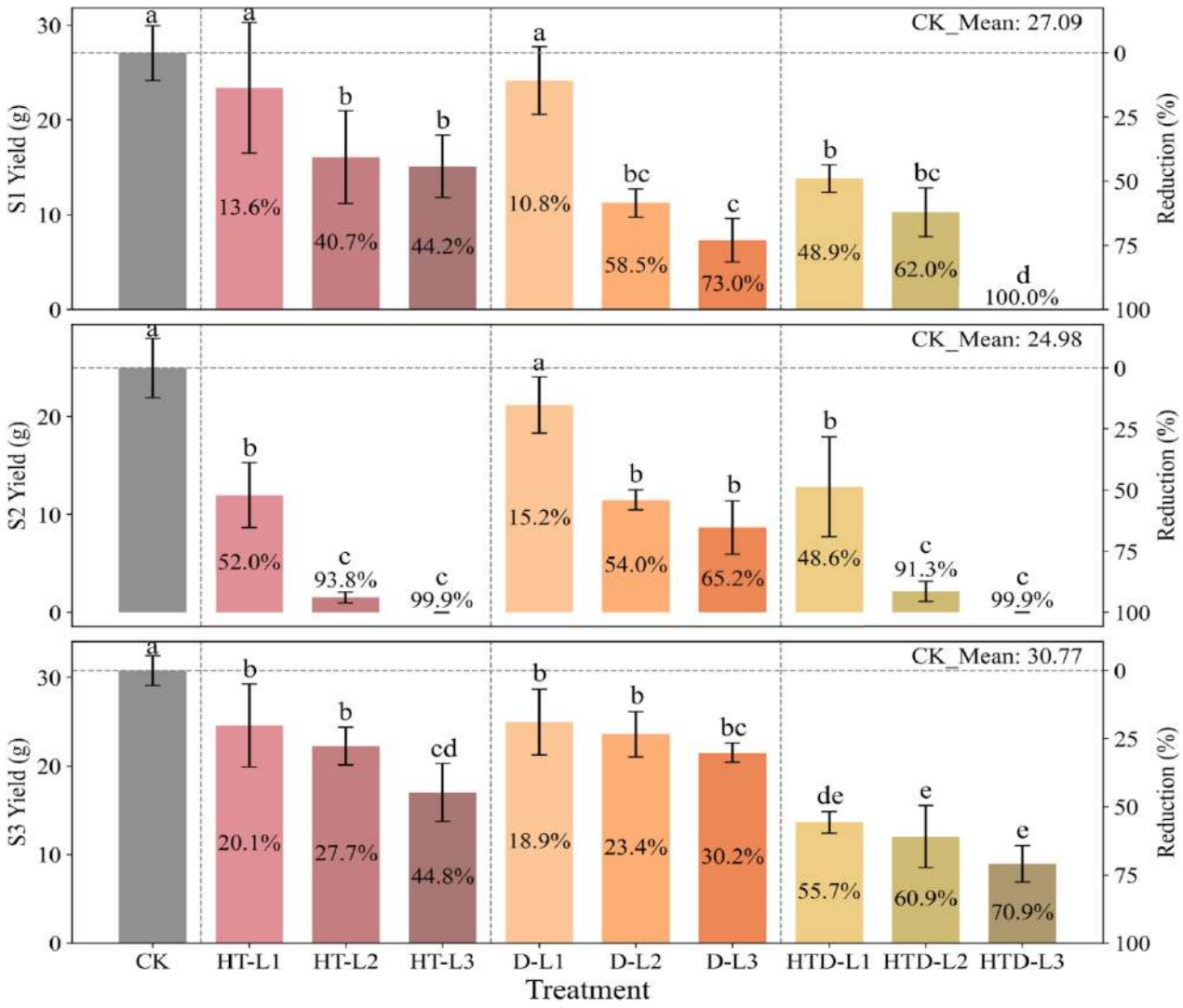


Figure 2. Yield histograms for each treatment group. S1, jointing-booting stage; S2, heading-flowering stage; S3, grain filling stage. HT, individual heat events; D, individual drought events; HTD, combined heat-drought stress.

# Evaluation of the Impact of Multiple Indicators of Compound Hot and Dry in Global Wheat

YS31-O

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**Keywords:** Compound Hot and Dry Event, Wheat Yield, Climate Change, Multiple Indicators.

Compound hot and dry events are extreme disasters triggered by the synergistic effects of drought and high temperature, the frequency and intensity of which have risen significantly in the context of climate change, posing a serious threat to global food production. Due to the multivariate nature of these events, current studies typically use different drought and temperature indicators to characterize them. However, there is a lack of systematic discussion on the uncertainties introduced by the combinations of these indicators in crop impact assessments, which is a key issue that needs to be addressed urgently. This study focuses on major global wheat-producing regions and integrates meteorological drought indicators (SPI, SPEI), agricultural drought indicators (SSI), and atmospheric and soil temperature indicators (STI, SSTI). Using the Copula joint distribution function, we construct a multidimensional compound hot and dry indicator to systematically assess the spatiotemporal evolution characteristics of compound hot and dry events and their impacts on wheat yield during the growing season from 1980 to 2020. The results show a significant upward trend in both the frequency and intensity of compound hot and dry events across global wheat-producing regions. Among the indicators, the compound indicator based on soil moisture (SSI) and soil temperature (SSTI) (SCDHI) shows the fastest rate of increase, with the uncertainty in the trend of compound hot and dry events primarily arising from differences in the selection of drought indicators. Rainfed agricultural areas are most significantly impacted by the intensity of compound hot and dry events, while irrigation measures can partially alleviate their adverse effects. Further analysis reveals that, compared to indicators constructed based on meteorological drought (SPI, SPEI), the SCDHI, which combines soil moisture and temperature, has a stronger correlation with wheat yield loss and can more accurately characterize the nonlinear effects of coupled soil water-heat stress on yield in the rhizosphere. This study highlights the dominant role of soil moisture and temperature synergy in the formation and impacts of compound hot and dry disasters on wheat and provides key indicators to support the development of adaptive management strategies and compound climate risk assessments in rainfed agricultural regions.

# Mō Tātou, Ā, Mō Kā Uri Ā Muri Ake Nei: Indigenous Responses to Climate Change in New Zealand's Deep South

YS09-O

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**Keywords:** Māori, Climate Change, Adaptation, Indigenous, Disaster Risk Reduction.

Tangata Whenua (Indigenous Peoples of Aotearoa New Zealand) have long acted as kaitiaki (guardians) of the environment, drawing on generations of cultural knowledge, values, and practices to manage disaster risks and strengthen community resilience. Although Māori have long adapted to environmental change at all levels—from whānau (extended families), hapū (sub-tribes), and iwi (tribes) to marae (community meeting places)—and have actively contributed to national and international climate discussions, research that is firmly grounded in Māori worldviews remains limited. This study addresses that gap by examining how Ngāi Tahu whānau in Murihiku/Southland are experiencing and responding to climate change impacts such as coastal erosion, inundation, and environmental degradation, which threaten key cultural and physical sites including marae, urupā (burial grounds), mahika kai (customary food gathering areas), and taonga (treasured) species.

Using a qualitative kaupapa Māori (Māori philosophy and methodology) approach, the research is guided by a Kahu Huruhuru (cloak) bricolage framework that weaves together Mātauranga Māori (Māori knowledge), social theory, and narrative inquiry. Data were gathered through interviews with whānau and rūnaka (tribal authorities) members, alongside analysis of climate data and relevant policy documents. This approach foregrounds Indigenous voices and ways of knowing, while acknowledging the lived realities, values, and aspirations of whānau responding to climate disruption.

Findings reveal a range of innovative, place-based strategies emerging within communities that reflect intergenerational knowledge, deep relationships with whenua (land), and a strong emphasis on collective wellbeing. Whānau responses include the revitalisation of tikanga (cultural practices), environmental monitoring rooted in both mātauranga and science, and the assertion of rangatiratanga (self-determination) in local and regional planning conversations. These efforts are often carried out under the weight of ongoing structural challenges, including limited support and fragmented institutional responses.

This research underscores the critical need for climate policy and planning processes in Aotearoa to recognise, support, and resource Indigenous-led adaptation. It highlights the importance of culturally embedded, community-driven strategies that centre whakapapa (genealogy), whenua, and whanaungatanga (relationships). The findings contribute a strengths-based, kaupapa Māori framework for more equitable and effective climate adaptation—both within Aotearoa and across other Indigenous and isolated coastal contexts globally.

# Risk Assessment Under Different Policy Mixes During Marine National Park Transition

YS63-O

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**Keywords:** National Park, Remote Island Communities, Managed Retreat, Coastal Hazards.

The National Park System is becoming a common practice globally. As coastal regions have been recognized as key interfaces between human activity and natural habitats which are prone to global change impacts, to balance the need of habitat preservation, education, tourism and social development of local communities, many "Marine Type" parks have been established on archipelagos and coastal regions with developed areas, residents and industries involved around the world.

Previous National Park-related research mainly focuses on the balance between tourism, local development and habitats. However, Marine National Parks are also special cases where the local communities are also prone to potential intense disruptions and losses, especially considering that many of them are located on isolated archipelagos. The change of policy mixes would significantly change the assessment standards of expected loss and protection levels.

Changdao Archipelago has been regarded as one of the most promising candidates for Marine National Parks in China, featured with both developed coastline, fishing industry and natural coastlines recognized as key habitats. Compared with other piloting regions, Changdao's policy mix includes maintaining a residential and industrial area and a protected core area of the National Park System.

Our research encompasses the major types of disaster risks including storms, strong winds and tsunamis. We utilized ADCIRC simulations and evacuation models to assess the impact and the casualties possibilities. We evaluate lifeline disruption, infrastructure cost and recovery time with references to post disaster evaluations of previous storm events of remote island nations.

By comparing different sets of policies as different scenario inputs to the loss estimation model, we examine the overall disaster mitigation results, change of expected loss by managed retreat and discover new potentials and patterns of local economies developments. Our findings reveal that, by carefully selecting the area of protection and managed retreat, leveraging ecological and tourism resources, and adopting feasible infrastructure upgrades, the risk level can be reduced to near-zero level, which offers the area a comparative benefit over other coastal communities and destinations.

# Enhancing Interoperability for Managing Climate Risks: A Gap Approach Using Systemic Risk Thinking

A079-O

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**Keywords:** Interoperability, Disaster Risk, Climate Risk, Systemic Perspective, Modelling, Governance.

In disaster risk and climate change research there is still the unresolved challenge of how to align natural science-based results with risk governance processes to find sustainable solutions for the future. In addition, it is also now widely accepted that a large part of the reason for this gap lies in the difficulties of bridging so-called top-down and bottom-up approaches where disaster risk and climate change are just two risk factors among many others to consider. The ability of actors to translate available information to usable knowledge for their actual decision-making is often hampered by the highly technical data or is disconnected from their contextual needs. In that sense, the seamless transfer of information is blocked as it is not interconnected with the specific needs of the system or is simply too complex amidst the flood of information. Based on systemic risk thinking we suggest an interoperability gap approach that should be useful to identify most pressing gaps that need to be addressed and prioritized for increasing the seamless exchange of information between systems. We especially argue that knowledge co-production is essential for overcoming gaps between systems and levels. We apply our framework to four real-world case studies within Europe, identifying interoperability gaps to address in knowledge co-production processes that work towards sustainable solutions.

## Venue

Room 1 – Main Venue (Epicurean Cultural Center)

## Session Title

# Session ‘Disaster Recovery and Reconstruction 1’

## Chaired By

Tomohide ATSUMI, Professor, Osaka University, Japan

Adriana GALDERISI, Professor, Università della Campania Luigi Vanvitelli, Italy

## Date and Time

Wednesday, October 1, 2025

09:40-11:10

# Relationship Between Survivors' Recovery Perceptions and Living Conditions During Disaster Recovery

A050-O

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**Keywords:** Recovery Perception, Middle-Term Recovery Process, Living Conditions, Questionnaire Survey, Noto Town.

After the 2024 Noto Peninsula earthquake caused massive damage to Noto Peninsula, survivors had to take urgent activities to save their lives and endure severe conditions in the aftermath of the disaster. In the middle-term recovery phase —situates between the early recovery phase for improving living conditions and long-term reconstruction phase— survivors should also respond to multiple issues to overcome these difficult situations. In order to effective support in affected areas, understanding survivors' living conditions and issues in the recovery process is needed. Many studies have targeted living conditions in emergency shelters and temporary housing, while studies focusing on survivors living in damaged houses after disasters remain limited. Responding to the problems and supporting survivors efficiently in the aftermath of disasters requires examining pre-disaster recovery planning in advance. The support must include not only survivors living in temporary shelters but also survivors and residents living in their damaged houses. This study explores the relationship among survivors' recovery perceptions, attributes, and their living conditions during the middle-term recovery phase after the 2024 Noto Peninsula earthquake. We focus on survivors living in their damaged houses in devastated areas.

The research sites in this study are Omou and Ukawa districts in Noto Town, which were stricken by the 2024 Noto Peninsula earthquake. To clarify survivors' recovery perceptions and living conditions in the middle-term recovery period, the questionnaire survey using interviewing and postal methods was conducted on people living in their houses between December 25th, 2024, and January 22nd, 2025. The recovery perception of living conditions is a focal point in the analysis. Perceptions of dietary life, going out, dwelling conditions, family income, and communication were also included in the analyses. In the questionnaire survey, respondents were asked their subjective perceptions of the recovery states. Path analysis was employed to understand the relationship among recovery perceptions and respondents' attributes. The result indicated that the main factor of the recovery perception of living conditions is the recovery perception of dwelling conditions. Additionally, the recovery perception of dietary life was largely related to the recovery perceptions of going out, dwelling conditions, and family income.

# Integrating Heritage, Risk, and Resilience: Long-Term Reconstruction in Earthquake-Affected Rural China

YS13-O

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**Keywords:** Post-Disaster Recovery, Cultural Landscapes, Longitudinal Research, Participatory Planning, Heritage Resilience.

Based on the continuous fieldwork, this study presents a long-term post-disaster recovery framework for historic rural settlements in the Dujiangyan Irrigation system of China, a UNESCO World Heritage Site with over 2,300 years of continuous cultural and agricultural significance. Severely affected by the 2008 Wenchuan earthquake, many of these traditional villages faced the dual challenge of physical reconstruction and cultural landscape preservation under increasing ecological pressure. The research investigates how to "Build Back Better" by integrating cultural heritage protection with resilient and sustainable development. We adopted a multi-method approach that combines scenario planning, participatory GIS (PPGIS), and numerical simulations to inform community-driven reconstruction planning. Scenario planning was used to develop adaptive strategies under uncertainty, while PPGIS captured local residents' perceptions of place, risk, and recovery priorities. Simulation models evaluated ecological and spatial impacts of different land-use configurations, supporting decisions on safer and more sustainable settlement layouts.

Findings highlight the importance of aligning top-down reconstruction mandates with bottom-up cultural values and local knowledge. By embedding community voices and historical continuity into the recovery process, the project enabled not only safer physical reconstruction but also the revitalization of intangible cultural heritage and traditional water-agricultural systems. This research demonstrates how interdisciplinary planning approaches can transform post-disaster reconstruction into an opportunity for inclusive development, landscape regeneration, and long-term resilience. It provides policy-relevant insights for managing disaster recovery in heritage sites, especially in geographically remote regions where both ecological fragility and cultural identity are at stake.

# Challenges in Implementing the 'Build Back Better' Principle in Romania: Lessons from European Good Practices

YS59-O

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**Keywords:** Build Back Better, Disaster Management, Recovery, Risk Reduction, Policy Gaps.



The "Build Back Better" principle (as defined by UNDRR terminology) refers to the use of the recovery, rehabilitation, and reconstruction phases following a disaster to enhance the resilience of nations and communities. This is achieved by integrating disaster risk reduction measures into the rebuilding of physical infrastructure and societal systems, as well as into the revitalization of livelihoods, economies, and the environment [1,2].

While the BBB principle is progressively being incorporated into post-disaster strategies throughout the European Union, its implementation in Romania remains an ongoing process. This paper explores the challenges between Romania's commitment to the Build Back Better (BBB) principles and their actual implementation, drawing comparisons with effective examples from other European countries.

The study employs a comparative analysis methodology, combining desk research, legislative reviews, and case study assessments from recent post-disaster recovery efforts (e.g., floods, earthquakes, and industrial accidents) to evaluate the integration of resilience-building and sustainable reconstruction strategies.

The findings suggest that Romania's institutional and legislative frameworks only partially reflect the Build Back Better (BBB) principles, with post-disaster efforts often prioritizing immediate intervention and rapid restoration over long-term recovery, rehabilitation and reconstruction. Challenges such as fragmented responsibilities between national and local authorities, limited integration in planning processes, and insufficient funding mechanisms for resilient reconstruction continue to slow down progress. In comparison, other countries started to make notable breakthroughs in embedding BBB into their disaster recovery frameworks and legislation, providing both legal and financial support for resilience-oriented measures.

The paper concludes by emphasizing the necessity for Romania to integrate the BBB principle into its disaster risk reduction plans and strategies through improved institutional coordination and better alignment of funding with resilience goals, drawing on lessons from other EU countries that illustrate the importance of political will, integrated governance, and community engagement in effectively putting into practice the BBB concept. The research contributes to the understanding

of disaster risk governance in Eastern Europe and proposes directions for improving Romania's recovery capacity in alignment with European and global commitments.

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# Post-Disaster Recovery and Social Exclusion: Learnings from the Brazilian Context

A029-O

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**Keywords:** Climate Disaster, Inclusive Recovery, Social Exclusion, Disaster Risk Reduction, Social Support Programs.



An increasing number of individuals are being affected by climate-related disasters [1], raising critical questions about Disaster Risk Reduction (DRR) practices, especially regarding the effectiveness of post-disaster recovery implementation.

Within this context, a persistent challenge in disaster-related research is the consistent omission of disenfranchised populations from official data, policies, and academic discourse. To address these under-researched gaps, this work seeks to examine how post-disaster recovery processes often reinforce, reproduce, and perpetuate social exclusion, particularly among populations already facing significant marginalization. Such outcomes stand in stark contrast with international goals of inclusivity and equitable disaster response.

Brazil serves as a critical case study due to the diversity of recovery outcomes across multiple affected territories. These localized insights provide not only context-specific validation but also resonate with cases from other regions globally. The primary case studies are summarized in Table 1.

Table 1: Multiple case studies and different disaster temporalities.

| Territory | Location | Type of disaster | Date | Victims and displacements | Main affected population |
|---|---|---|---|---|---|
| Vale do Cuiabá | Petrópolis (city) | Flood and landlisde | January 12, 2011 | 71 victims and more than 7,000 were left unhoused and 30 missing people | Low-income black population |
| Alto da Serra | Petrópolis (city) | Landslide | February 15, 2022 | 241 victims and more than 4,000 were left unhoused<br>4 missing residents | Low-income black population, mainly women |
| Alto da Independência | Petrópolis (city) | Landslide | March 22, 2024 | 4 victims and 275 were left unhoused | Low-income black population, mainly women |
| Vila Baiana, Morro do Esquimó, and Pantanal | São Sebastião (city) | Flood and landslide | February 19, 2023 | Around 65 victims and 2251 people were left unhoused | Caiçaras (traditional community) and migrants from the northeast region |

Methodologically, this study draws on a literature review encompassing recent scholarly discussions on neoliberalism, disaster recovery, and decolonial approaches. Additionally, empirical data were collected through approximately 200 interviews with affected households and public officials, as well as over 100 questionnaire responses. Fieldwork was conducted in the municipalities of Petrópolis (RJ) and São Sebastião (SP) throughout 2024-2025 in collaboration with the Movement of People Affected by Dams. The primary focus is on unhoused and landless populations, as well as residents of informal settlements. Graphs, maps, and timelines illustrate the specific nuances of each context.

Key findings include:

(1) For historically marginalized groups, what is initially framed as a temporary displacement often becomes a permanent condition. Continuous relocation and a deepening sense of detachment from newly assigned territories further exacerbate their vulnerabilities. Consequently, disasters extend beyond the initial event, producing repeated secondary social impacts.

(2) The implementation of existing housing programs, combined with the geographic isolation of displaced populations, contributes to a state of “monitored abandonment” [2]. Notably, the newly adopted "social rent" program, intended to provide financial assistance for affected families to secure rental housing, has inadvertently driven real estate speculation. The conditions and effectiveness of social housing initiatives will also be assessed to evaluate both the successes and shortcomings of current social programs.

In conclusion, while the specific manifestations of these challenges vary across regions and disaster events, the underlying patterns identified in this study must be considered by DRR practitioners, policymakers, and scholars seeking to interrupt cycles of social exclusion in recovery planning.

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# Indigenous Cultural Infrastructure and Disaster Recovery in the Island State of Aotearoa, New Zealand

A092-O

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**Keywords:** Indigenous, Māori, Cultural Infrastructure, Disaster Recovery, Aotearoa New Zealand.

Aotearoa New Zealand is a developed island nation, but recovery resourcing is often inadequate and inconsistently mobilised during disasters.[1] Urban area support is privileged, while disaster recovery in smaller or remote towns is often delayed. Indigenous Māori predominantly reside in low socioeconomic areas, including small towns and remote communities and are disproportionately impacted by recovery workforce gaps, delayed logistical support and limited resource access. [2,3] Yet anecdotal evidence suggests that Māori assemble and mobilise Indigenous assets, actors, and knowledges in 'cultural' infrastructures that facilitate disaster recovery.[4]

Previous research identified that Māori emergency management approaches were highly effective at supporting communities impacted by disasters.5 Our current 3-year qualitative research project in the Bay of Plenty, a high-risk area for natural hazards and region with a significant Māori population, builds on these findings. The research team has partnered with local Māori to explore the premises that:

1. Māori disaster recovery actors, knowledges, values, and practices may constitute cultural infrastructures, which are mobilised to support effective disaster recovery in Māori and wider communities.
2. Māori cultural infrastructures may usefully inform local authorities' disaster risk reduction planning and thus the recovery trajectories of wider communities impacted by hazardous events.

Research Objectives:

- Conceptualising 'cultural' infrastructures from an Indigenous perspective
- Documenting how cultural infrastructures support Māori disaster recovery
- Identifying enablers and challenges to implementing cultural infrastructures in disaster recovery settings

- Identifying ways cultural infrastructures may usefully inform local government disaster recovery planning and practice.

Our community-led qualitative research project with Māori partners is underpinned by Māori research principles, shaped by narrative research methodologies and has ethical approval. Intermediaries and snowballing methods facilitated participant recruitment (n= 30). Data, gathered during semi-structured dialogical interviews and five interpretive workshops, were thematically analysed.

Eurocentric definitions describe cultural infrastructures as material resources that facilitate cultural activities. In contrast, Māori cultural infrastructures through combining material assets with metaphysical tools, Māori knowledges, values, and relationships, can be applied to broader objectives. Māori cultural infrastructures mobilised in community-led disaster recovery, draw on locale-specific eco-environmental, hazard and disaster knowledges and recovery practices compiled over centuries. Lessons learned from infrastructures successfully deployed in past disasters are shared intergenerationally. Knowledge dissemination enhances Māori recovery approaches to community and environmental wellbeing. Yet, government recognition that Māori cultural infrastructures contain local information, relational networks, and recovery expertise for usefully informing disaster policies and responses, remains limited.

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## Venue

Room 1 – Main Venue (Epicurean Cultural Center)

## Session Title

# Session ‘Disaster Recovery and Reconstruction 2’

## Chaired By

Elisavet THOIDOU, Professor, Aristotle University of Thessaloniki, Greece

Masamitsu ONISHI, Professor, Disaster Prevention Research Institute, Kyoto University, Japan

## Date and Time

Wednesday, October 1, 2025

11:30-13:00

# Reconstruction in Disadvantaged Areas of Japan: The Case of The Noto Peninsula Earthquake

A112-O

Michio UBAURA[1]

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**Keywords:** Disaster Reconstruction, Japan, Population Decline, Noto Peninsula.

Japan is a country with a declining population. Regions with unfavorable conditions such as peninsulas and remote islands face particularly severe challenges from population decline and an ageing society. The Noto Peninsula, one of these disadvantaged regions, was hit by a major earthquake on New Year's Day 2024 and a torrential rain disaster in September. Many buildings in urban areas and surrounding villages were destroyed or damaged. From a spatial planning perspective, the reconstruction efforts must address these challenges, in particular how to minimize and respond effectively to population decline.

In terms of urban structure, a certain degree of functional concentration from peripheral areas to urban areas is required, taking into account the efficiency of social service provision. However, in some cases, the unique charm of the region can be found in peripheral villages, and such environments need to be preserved. The “unique charm of the region” is closely linked to the lives of local people, so careful consideration needs to be given to the aspirations of local people, as well as to the inheritance and sustainability of these values for future generations.

Regarding the urban spatial structure, one challenge is how to make effective use of vacant land created by the collapse of buildings due to earthquakes or the demolition of buildings due to flooding. It is necessary to avoid a situation where public disaster housing is built on large sites in suburbs, leaving old urban areas littered with vacant lots. To this end, it is necessary to focus on supporting disaster victims to repair their original buildings or to rebuild on their original sites. Another option would be to consolidate vacant lots into smaller units and insert public housing into smaller units.

From a housing supply perspective, it is important to note that more than half of the population is elderly, meaning that much of the housing demand is short term, around 20 years. Maintaining a large stock of unneeded housing is a challenge for both local government finances and the regional landscape.Therefore, a housing supply plan that comprehensively considers the location, structure, and the timeframe of demand is crucial. The basis for developing these plans is the intentions of the residents. It is therefore important to understand these intentions carefully.

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# Damage to Traditional Industries and Prospects for Reconstruction: A Case Study of the Joinery Industry in Taturuhama Town

A047-O-YS52

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**Keywords:** Traditional Industries, Reconstruction from Disaster, The 2024 Noto Peninsula Earthquake.

The 2024 Noto Peninsula earthquake caused extensive damage to a wide area of the Noto region, Ishikawa Prefecture. The Noto region has a variety of traditional industries based on the GIAHS Noto's Satoyama and Satoumi. However, the earthquake has made it difficult to maintain traditional industries as a profession, and local identity is being lost. Traditional industries are an important factor in promoting reconstruction, as they are also tourism resources with high cultural value, since they are based on the use of local raw materials, human resources, and traditional skills and techniques [1].

This paper focuses on the Taturuhama Town, Nanao City, Ishikawa Prefecture which is home to the traditional industry of Taturuhama joinery from the Noto region which was affected by the earthquake. Then, based on the historical background of the development of the joinery industry, this paper will clarify the damage suffered by the joinery industry due to the earthquake and the current status of the resumption of manufacturing. Recommendations are made for the reconstruction of traditional industries to facilitate the resumption of joinery manufacturing.

As a result, it was found that the joinery industry in Taturuhama was already in decline before the disaster due to changing lifestyles, and that some joineries decided to close down after the disaster. The number of joinery stores has declined from ninety in the 1950s, when joinery manufacturing was at its peak, to nine [2]. In addition, the Taturuhama Joinery Industry Cooperative Association was dissolved in May 2016. On the other hand, local residents strongly recognize Taturuhama joinery as an industry that symbolizes the community, and there are calls to promote the industry as an element of community revitalization and economic activity.

Taturuhama joineries have been losing their needs due to changing lifestyles, and this has been compounded by the damage caused by the earthquake, making it difficult for them to survive. However, it still serves as a regional identity. The earthquake questioned the state of the region, and this in turn created a momentum to re-polish what already existed in the region. Therefore, in the process of earthquake reconstruction, it is necessary to develop the social capital through the revival of traditional industries.

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# Adaptive Reuse in Post-Disaster Reconstruction: Case of Kumamoto Home-For-All

YS01-O

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**Keywords:** Home-For-All, Repurposed Facility, Community Engagement, Disaster Reconstruction, Community Resilience.

Post-disaster reconstruction is a complex, ongoing process that demands adaptable solutions to meet both immediate emergency needs and long-term community resilience. This study examines how emergency relief buildings from the 2016 Kumamoto earthquake were repurposed into permanent community facilities, supporting both social recovery and long-term reconstruction. Focusing on the Kumamoto Home-for-All Reutilization Project, this research explores adaptive reuse strategies and their implications for post-disaster reconstruction after the discontinuation of temporary housing areas.

The study employed a qualitative methodology combining site observations with extensive interviews involving architects, municipal representatives, and final users. These interviews revealed how different municipalities adopted varied approaches to the repurposing process, directly influencing the resulting design outcomes. Findings highlight that:

1. buildings can undergo substantial functional transformations through architectural adaptations
2. resident participation strengthens local identity and enhances space utilization
3. preserving and conveying disaster history remains a challenge, and
4. the same structure can support multiple recovery phases, transitioning from emergency shelter to long-term community infrastructure.

The study underscores the necessity of incorporating reuse strategies from the initial stages of post-disaster reconstruction to ensure cost efficiency, sustainability, and social acceptance. Municipalities should proactively plan for the transition from emergency to recovery functions, integrating community voices to enhance usability and effectiveness. By setting adaptive reuse principles into disaster recovery structures, policymakers and practitioners can facilitate smoother transitions, minimize material waste, and strengthen social resilience.

This research offers insights into the prolonged reconstruction timeline and the evolving role of built environments in disaster-affected communities. The findings contribute to ongoing discussions on sustainable recovery strategies, advocating for participatory planning and flexible design strategies that ensure long-term recovery and resilience.

# Adaptive Disaster Recovery and Temporary Shelter Solutions: A Comparative Study of Suzu, Japan and Chimanimani, Zimbabwe

YS06-O

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**Keywords:** Disaster Recovery, Temporary Shelter, Public Housing Policy, Digital Prefabrication, Social Vulnerability.

This study investigates the socio-economic realities faced by displaced individuals following the 2024 Noto Hanto Earthquake in Japan, with a critical comparison to the experiences of communities affected by Cyclone Idai in 2019 in Chimanimani, Zimbabwe. The research is guided by three core objectives: first, to identify key similarities and differences in the lived experiences of relocated populations, emphasizing structural and contextual challenges inherent in temporary shelter programs; second, to examine the specific impacts of these relocation processes on vulnerable groups particularly the elderly and the less affluent; and third, to evaluate the potential of innovative shelter solutions, including a 3D-printed housing prototype implemented in Suzu, as viable alternatives to conventional post-disaster housing models. The findings reveal consistent patterns across both contexts.

Despite the destruction of their homes, many displaced residents in Suzu and Chimanimani expressed a strong preference to remain near their original communities rather than endure prolonged stays in temporary shelters. This widespread reluctance to relocate highlights a recurring tension in disaster recovery policy as affected populations tend to prioritize familiarity, autonomy, and social cohesion over the assumed advantages of temporary accommodation. In Suzu, the two-year limit on shelter residency has intensified socio-economic disparities, particularly between younger and older residents. Elderly individuals face heightened uncertainty as they navigate limited options of either disaster public housing, independent reconstruction, or permanent relocation within an ambiguous policy environment. These challenges have contributed to psychological strain and social disintegration.

A similar dynamic is evident in Chimanimani, where forced relocation into timber-based temporary shelters have demonstrated critical inadequacies in thermal performance, safety, and personal adaptability, factors that disproportionately affect older and more vulnerable residents. To address these shortcomings, this study explores the viability of prefabricated and 3D-printed housing solutions. These approaches offer advantages such as rapid deployment, affordability, and customizable design, features particularly valuable in responding to the diverse needs of displaced and vulnerable populations.

By drawing on two geographically and economically contrasting case studies, the research contributes to the advancement of inclusive, adaptable, and sustainable disaster recovery models.

Ultimately, this study offers policy-relevant insights aimed at improving equity and long-term resilience in shelter provision, with implications for both developed and developing contexts.

# Policy Gaps and Implementation Challenges of Disaster-Resilient Housing in Rural Communities: A Case Study of Kupang Regency Reconstruction Post-Cyclone Seroja 2021 in Indonesia

A126-O

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**Keywords:** Disaster-Resilient Housing, Policy Gaps, Post-Disaster Reconstruction, Tropical Cyclone.

Rural communities are increasingly vulnerable to climate-related hazards, such as tropical cyclones, which can have catastrophic impacts on societal-physical systems. The housing sector is one of the most complex issues in post-disaster recovery [1]. Yet, it holds major significance, underscoring the need for disaster-resilient housing [2] to ensure effective recovery and well-being. However, the post-disaster reconstruction is wrought by challenges such as weak policies, limited mitigation capacity, and overlooked local needs.

This research examines policy gaps in implementing disaster-resilient housing in Kupang Regency, Indonesia, employing qualitative methods that include field observations and interviews with government, non-government organisations, and affected communities. The research focuses on the post-2021 Seroja Cyclone case study, particularly its impact on rural communities. Examining the case study is crucial, as the cyclone has been the strongest to hit Indonesia since 2008, with Category 1 (Australian Standard) wind speeds of 65 km/h. The cyclone had also damaged more than 50,000 houses, significant loss of lives, and infrastructure disruptions [3,4]. Kupang Regency is also particularly exposed to cyclone risks, as it had a poverty rate of 21.37% in 2024[5], with communities primarily residing in semi-permanent housing structures.

Study findings indicate that implementing disaster-resilient housing following Cyclone Seroja's challenges primarily lie in suboptimal policy implementation and weak building standardisation. Furthermore, current Indonesian regulations [6,7] prioritise habitability over applying resilience principles. The updated SNI 1727:2020 standard requires buildings to withstand Category 3 cyclone winds (approximately 187.2 km/h)[8], but in the case of Kupang, many houses could not withstand even Category 1 winds. Disaster housing assistance in Indonesia often employs a one-size-fits-all, providing standardised assistance based on damage categories and a fixed house size (36 m2), which overlooks local conditions and community needs. Relocation programs such as RISHA (Simple Healthy Instant House)[9] provide sustainable and flexible housing for severely damaged houses due to disasters. Nevertheless, the house's durability is uncertain, particularly the roof's strength. As a result, families are forced to take out loans, use second-hand materials for repairs, or delay

reconstruction. Administrative and land ownership complexities, limited local government budgets, and insufficient technical capacity further hamper resilient reconstruction efforts.

The study highlights an improvement in housing resilience following Cyclone Seroja, but underscores the systemic challenges that remain, emphasising the need for stronger standardisation, integrated coordination, and participatory approaches to scale up disaster-resilient housing reconstruction effectively.

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## Venue

Room 1 – Main Venue (Epicurean Cultural Center)

## Session Title

# Session ‘Disaster Recovery and Reconstruction 3’

## Chaired By

Saut SAGALA, Assist. Professor, Bandung Institute of Technology, Indonesia

Kalliopi SAPOUNTZAKI, Professor Emerita, Harokopion University of Athens, Greece

## Date and Time

Wednesday, October 1, 2025

14:40-16:10

# Time Series Analysis of Residential Recovery Process, Considering the Support of Visitors

A051-O

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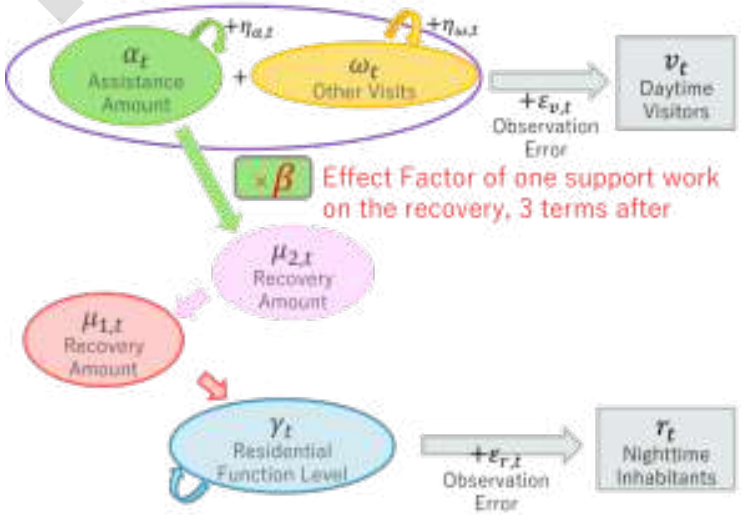
**Keywords:** Recovery Process, Support of Visitors, State-Space Model, Mobile Spatial Statistics Data.

In recent years, attention has been focused not only on the direct damage caused by disasters but also on the recovery process and the effect of external supporters. This study analyzes the residential recovery process while considering visitor support, using a state-space model and time-series data derived from mobile spatial statistics.

$$\begin{pmatrix} \alpha_{t+1} \\ \omega_{t+1} \\ \mu_{2,t+1} \\ \mu_{1,t+1} \\ \gamma_{t+1} \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ \beta & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 \end{pmatrix} \begin{pmatrix} \alpha_t \\ \omega_t \\ \mu_{2,t} \\ \mu_{1,t} \\ \gamma_t \end{pmatrix} + \begin{pmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{pmatrix} \begin{pmatrix} \eta_\alpha \\ \eta_\omega \end{pmatrix}, \quad \begin{pmatrix} \eta_\alpha \\ \eta_\omega \end{pmatrix} \sim N\left(0, \begin{pmatrix} \sigma_\alpha^2 & 0 \\ 0 & \sigma_\omega^2 \end{pmatrix}\right) \tag{1}$$

$$\begin{pmatrix} v_t \\ r_t \end{pmatrix} = \begin{pmatrix} 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} \alpha_t \\ \omega_t \\ \mu_{2,t} \\ \mu_{1,t} \\ \gamma_t \end{pmatrix} + \begin{pmatrix} \varepsilon_{v,t} \\ \varepsilon_{r,t} \end{pmatrix}, \quad \begin{pmatrix} \varepsilon_{v,t} \\ \varepsilon_{r,t} \end{pmatrix} \sim N\left(0, \begin{pmatrix} \sigma_v^2 & 0 \\ 0 & \sigma_r^2 \end{pmatrix}\right) \tag{2}$$

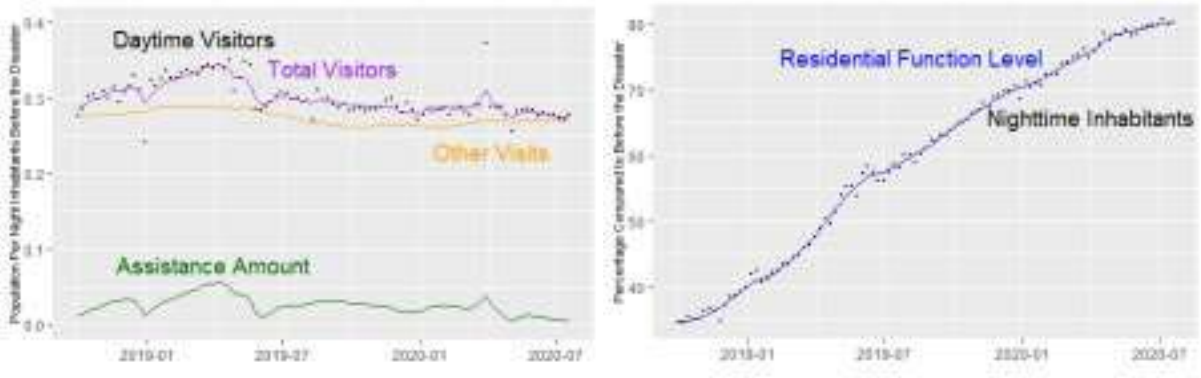
State-space model is a model to estimate the transition process of unobservable states based on observed time series data. In this study, we assume a relationship between the state variables and the observed variables as shown in Figure 1. is a variable that accounts for the delay in the effect of assistance on residential recovery. The state transition equation (Equation (1)) and the observation equation (Equation (2)) express the relationship in Figure 1.



We estimate these parameters using the maximum likelihood method and infer the state using a diffuse Kalman filter and smoothing.

The target areas are the flood-affected areas of Kurashiki City and Nagano City. We determine flood affected areas through cluster analysis of inhabitants' time-series of meshes in each municipality and analyzed the summed-up data of the affected areas. The target period is from 12 weeks to 2 years after the disaster. The time-series is based on mobile spatial statistics data, where the nighttime inhabitants are defined as the average resident population from 0:00 to 3:00, and daytime visitors as the average non-resident population from 10:00 to 15:00. Furthermore, we calculated daytime visitors as the visiting population per unit of pre-disaster nighttime residents, and the nighttime inhabitants as a percentage of their pre-disaster level.

The time lag until the effect of the assistance amount appears varies from 1 to 10 periods, and models with different numbers of were estimated. The results showed that the three-period lag model was the best in both Kurashiki and Nagano. Figure 2 shows the estimated and observed values for the state of the model in Kurashiki. The estimated value of ß, which represents the effect of support was 19.4 in Kurashiki and 20.8 in Nagano.




We analyzed a state-space model of the recovery process of residential function considering the support of visitors. It shows that one week support by 100 people has the effect of restoring the residential function of about 20 people after 3 weeks. In the future, we plan to conduct analyses in finer regions, such as on a mesh-basis.

# 40 Years After The 1986 Kalamata, Greece, Earthquake: What is Left of Lessons Learnt from the Successful Response and Reconstruction

A072-O

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**Keywords:** Disaster, Response, Reconstruction, Lessons Learnt, Kalamata.



Kalamata, a typical Greek provincial city in S.Peloponnese, was devastated by earthquakes in 1986. 20 people were killed while around 70% of the building stock in the historic and commercial center and around 42% of all masonry buildings suffered damage beyond repair or collapsed. Around 70% of schools and 50% of public buildings were at least severely damaged. With only around 35% of the buildings in the disaster area suitable to be used, thousands of people were left homeless, and social and economic life was shuttered.

Soon, the Municipality of Kalamata assumed a key role in response and reconstruction despite the institutional provisions that designated national and prefectural authorities. From day one, the private firm of planners who had prepared the new urban plan that was passed two months before, provided voluntarily on-site consultancy to the Municipality.

Days after the disaster, it was decided that the new urban plan should guide all efforts from emergency response all the way towards reconstruction. In this line, numerous innovative response practices were applied together with a comprehensive reconstruction strategy involving physical, social, and economic considerations. Practices such as the organized demolition of buildings damaged beyond repair, the organized emergency propping of buildings, the prohibition of all construction works to allow time for post-disaster planning, were employed for the first time. In line with the new urban plan, an ambitious shelter strategy in three phases (camps, reusable prefabs/containers, permanent housing) was set and implemented. More importantly, the reconstruction strategy was applied and achieved to implement the new urban plan, making Kalamata the vibrant, attractive, developed urban center it is today.

Many of those practices were habitually applied in emergencies from then onwards till today, so was the shelter strategy in three phases. What seems to have been most challenging in the decades to follow was to move away from the rehabilitation of individual buildings towards a comprehensive reconstruction involving improvement of the urban environment, social and economic development, and preservation of the historic character and morphology of the affected area. Then again, it is uncommon to find the combination of local leadership and vision, trust between local authorities and experts, early voluntary involvement of scientists, cooperation between agencies at European, national and local level, a sound pre-disaster plan that can constructively shape the future of the affected area, all in an era fostering collective change.

# Revisiting the 12 October 1856 Crete Historical Earthquake

A127-O

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**Keywords:** Historical Earthquake, Crete, Macroseismic Analysis, Macroseismic Parameters.

The location of Crete within the geodynamic landscape of South Aegean creates the conditions for the occurrence of natural phenomena. Hundreds of earthquakes are recorded each year, some of them having left their mark on the island.

One of the largest and most destructive earthquakes in the history of the island, probably of intermediate depth, occurred offshore Crete on 12 October 1856, causing significant losses not only to the whole island, as well as to neighboring areas. The earthquake struck at 02:45 in the morning, when most people were sleeping. As a result, 538 people lost their lives, while 638 were seriously injured.

This event was felt throughout the Eastern Mediterranean, as reported by the local press, with a possible exaggeration of its effects, but also to the north, at Preveza and to the west, at Malta and Naples. The available sources are derived from monastery marginal notes, photos, local testimonies, etc. It is noted that Greece in that period was under Ottoman occupation, therefore in many cases the provided information is not always clear.

Almost all the big towns in Crete suffered great damage. Heraklion, the capital of the island, suffered most damage, with only 18 houses out of 3,620 left intact, while all the public buildings sustained various degrees of damage, without collapse. Many churches and mosques were destroyed, however a large part of the 1314 wooden shops was saved. Five villages near mount Psiloritis, in the broader Heraklion area, were completely demolished.

To the west, at Chania and Rethymno, many houses, churches and mosques were also damaged, without collapse. To the east, the town of Sitia was destroyed, as well as many villages outside Ierapetra. At Rhodes, 9 villages were demolished; at Karpathos 8000 houses were very seriously damaged. The earthquake also affected the islands of Amorgos, Kastelorizo, Simi and Cyprus, further to the east.

In this paper we revisit the earthquake and its effects, focusing on local new sources of information provided by contemporary historians and reports, which, along with the existing ones, enable to reconstruct the macroseismic "picture" of the earthquake and assess its macroseismic parameters.

# Disaster Risk Reduction by Disaster Volunteers in Noto Peninsula Earthquake: Implementation Science for Three Decades of Disaster Volunteers in Japan

A018-O

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**Keywords:** Disaster Risk Reduction, Implementation Science, Disaster Volunteers, Noto Peninsula Earthquake, History of Disaster Volunteers.

The present study investigates how disaster volunteers might have contributed more fully to disaster risk reduction after the devastating earthquake that hit the Noto Peninsula (Japan) in 2024. Based on fieldwork conducted in the disaster area that began immediately following the earthquake, our research group, a non-profit disaster volunteer organization, observed and documented the official rejection of emergency volunteer activities on behalf of survivors, whereas officially registered volunteers were formally accepted by the local government. This official refusal of outside disaster volunteers seemingly due to geographical and political reasons was exceptional in the social context of Japan because disaster response with emergent volunteers had been woven into Japanese society since the 1995 Kobe earthquake which we as implementation scientists have studied for the last three decades (e.g., [1]). The present research analyzes this unique phenomenon taking into account the social, cultural, and political changes in Japanese society and attempts to understand it in light of international research on disaster volunteers (e.g., [2][3][4]). The presentation consists of: (1) our own observations and data from Noto, (2) the ethnographic overview of the implementation scientific history of three decades of disaster volunteerism in Japan, (3) theoretical analyses of the unique case in Noto, (4) the findings considering this remote area of Japanese society, as well as international trends in disaster volunteer research, and finally, (5) implications for future disaster risk reduction by disaster volunteers, including in remote areas that may be reluctant to allow access by outside groups of volunteers.



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## Venue

Room 2 (Amphitheatre of the Region)

## Session Title

# Session ‘Disaster Risk Governance 1’

## Chaired By

Guoyi HAN, Senior Research Fellow, Stockholm Environment Institute, Sweden

Michail CHALARIS, Assist. Professor, Democritus University of Thrace, Greece

## Date and Time

Wednesday, October 1, 2025

09:40-11:10

# The Nihilistic State: A New Barrier to Disaster Risk Reduction in the 21st Century

A152-O

Mark Ashley PARRY[1]

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**Keywords:** Disaster Risk Reduction, Misinformation, Nihilism, Trust.



In an increasingly interconnected world, trust in institutions such as governments, scientific organisations, and the media remains a crucial foundation for societal resilience. However, it could be argued that in recent years, this foundation has been steadily eroding. With the rise of social media, the rapid spread of both misinformation and disinformation, and deepening political polarisation, especially in the Western cultures, have accelerated what some literature refer to as “truth decay”.

As objects fact start to lose importance in the public discourse, and the misinformation outpacing and overwhelms credible information, this paper introduces the concept of the “nihilistic state”. This term describes a situation where a significant proportion of a state's population exhibits nihilistic traits, characterised by scepticism toward objective truth, the rejection of authority and institutions, and apathy toward collective social goals.

This paper explores how the emergence of nihilist states is not just a philosophical concern, but present tangible risks to disaster risk reduction efforts globally. Through detailed case studies including the decline in MMR vaccine uptake following Wakefield scandal, societal division and medical nihilism being exhibited during the COVID-19 pandemic, and the long persistent climate change denialism, this research demonstrates that nihilistic attitudes can seriously undermine public health initiatives, environmental policy, and by extension disaster preparedness and response.

The analysis of this paper argues that when trust in institutions declines or collapses, and truth itself is increasingly questioned by the public, societies become more vulnerable to preventable disasters. Efforts to reduce risks, whether it is through vaccination programmes (routine and emergency), climate mitigation and adaptation strategies, emergency responses to pandemics, or achieving the Sustainable Development Goals, fundamentally depend on a collective belief in evidence, expertise, and a shared value of supporting our fellow human being. As nihilism spreads, coordinated actions becomes harder to achieve, misinformation flourishes, and disaster resilience becomes further weakened.

This paper concludes that addressing the roots of social roots of nihilism by rebuilding trusts in our institutions, strengthening education systems, and developing critical media literacy must become a central pillar of disaster risk reduction strategies during the 21st century. Without urgent action, there is a real danger that future cries, from new pandemics to the escalating climate

impacts, will be met with coordinated action and mitigation, but instead with confusion, division, and ultimately, greater vulnerability.

# Implications of the Growing Trend Toward Outsourcing Disaster Relief Activities in Japan

YS16-O

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**Keywords:** Disaster Response, Compensated Service, NGO, Volunteer.



This study aims to identify problems that arise when disaster response, typically conducted by the public sector, is outsourced to private organisations such as NGOs as a compensated service. The study is based on fieldwork conducted in Japan following the recent Noto Peninsula earthquake of January 1, 2024. The first author worked with an NGO in an evacuation centre from 10th to 22nd June 2024 and observed actions of local government that suggested ignorance of, and disinterest in, the survivors' situations, while the NGO was restricted in performing more wide-ranging activities.

Legally, local governments have responsibility for disaster relief activities. However, in 1995, the Hanshin-Awaji earthquake, which caused massive damage and many casualties motivated a nationwide volunteer effort to help survivors. These volunteers engaged in activities which were beyond the capacity of local governments alone.

It has been 30 years since disaster voluntarism emerged in Japan, and the country has experienced many disasters during this period. In each case, volunteers converge on the affected areas, and over time, local governments have developed methods to control their activities and assign them to specific locations to meet the needs of survivors, such as cleaning up damaged houses.

This volunteer management process by local governments reached a new turning point when the Noto Peninsula earthquake occurred and caused great damage to the area on January 1st, 2024. The Noto Peninsula, surrounded by mountains and the sea, is geographically isolated, making it difficult to deliver aid. When executing disaster response, the local government outsourced tasks, such as managing evacuation centres, to an NGO group, because it lacked the resources to provide all the necessary support and was forced to rely on the NGO, which had extensive experience in helping survivors.

Our main point is that outsourcing disaster response as work conducted in return for compensation covering operational and personal costs can divide aid work into detailed tasks, requiring volunteers and their organisations to work in a business-like manner, even though supporting survivors should be a comprehensive and collaborative effort between government and NGO's. Disaster relief activities by volunteers and NGOs are essential, but the form of outsourcing might undermine their true capabilities. Therefore, this research suggests that the framework and content of outsourcing disaster relief should be carefully examined, and that disaster response and aid to survivors should be reframed as a collaboration between local jurisdictions and NGO's.

# Fading Aid, Enduring Altruism: A Decade of 'Paying it Forward' in Japan's Disasters

A039-O

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**Keywords:** Paying it Forward, Altruistic Behavior, Disaster Relief, Being-Helped Experience.

This study examines how the aspect of "paying it forward" in altruistic behavior during major disasters in Japan has changed over the past decade. We compare two survey datasets collected in Japan: the first dataset (N = 1,679) was collected in October 2014 [1], focusing on altruistic behavior following the 2011 Great East Japan Earthquake, while the second dataset (N = 400) was collected by the authors in July 2024, following the 2024 Noto Peninsula Earthquake.

This study elucidates changes in altruistic behavior in post-disaster Japanese society over the past ten years from two perspectives. First, we statistically analyzed changes in disaster experience and being-helped experience. The proportion of individuals who had experienced a disaster increased from 19.8% to 30.3% (a rise of 10.5%), whereas the proportion of those with being-helped experience decreased slightly from 7.9% to 7.0% (a decline of 0.9%). These findings indicate that, while the proportion of disaster-affected individuals in Japanese society has increased over the past decade, the likelihood of receiving assistance has decreased.

Second, we statistically examined the relationship between altruistic behavior and being-helped experience. The 2014 survey, using latent class analysis, found that being-helped experience was significantly associated with altruistic behavior [1]. Similarly, a chi-square test conducted on the 2024 dataset also revealed a significant association ($x^2(1, N = 400) = 5.53$, Cramer's V = 0.118, $p < .05$). Consistent with the findings from a decade ago [1], this result confirms that being-helped experience positively correlates with altruistic behavior.

Considering these two findings, although the number of individuals with being-helped experience has decreased over the past decade, the concept of "paying it forward" during disasters remains present in Japanese society. This suggests that focusing on being-helped experience continues to be valuable. However, in Japanese society, there has been an increasing drive for institutionalization [2] in the regulation of disaster volunteer activities. Given this social trend, further discussion is needed on practical strategies to promote networks of "paying it forward" in disaster contexts.

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# Effective Stay Duration of External Supporters After 2024 Noto Peninsula Earthquake, Based on Mobile Spatial Statistics Data

A041-O

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**Keywords:** Recovery, External Support, Stay Duration, Mobile Spatial Statistics Data, Cumulative Diagram.

This research highlights the challenges faced by external supporters due to disrupted transportation networks and aims to estimate their effective stay duration in affected areas. The study leverages mobile spatial statistics, which provide real-time population distribution across Japan in 500m grid units. This data allows for the estimation of external supporters' activities even in disaster conditions where direct measurements are difficult. However, it is crucial to differentiate between effective stayers (those actively engaged in recovery work) and movers (those traveling through the area). The research proposes a method to extract effective stay durations by aggregating population data into continuous zones and employing cumulative diagrams from traffic engineering to separate total stay time into effective stay time and travel time.

The target areas for this study include six municipalities significantly impacted by the earthquake: Wajima, Suzu, Nanao, Noto, Anamizu, and Shika. The analysis period spans from January 15, 2024, to December 27, 2024, excluding the unstable data immediately following the disaster. The researchers classify external supporters into two categories: local stayers, who remain in the disaster area throughout the day, and round-trip movers, who travel to and from the area. The cumulative diagrams allow for the separation of effective stay time and travel time from total stay time. The results indicate that areas with higher effective stay time correlate with support activities, highlighting spatial disparities.

The findings show that the effective stay time of external supporters tended to increase in the weeks following the disaster, with notable differences between regions. Factors such as the reconstruction of transportation infrastructure significantly influenced the variation in effective stay times across different municipalities. In conclusion, the paper presents a novel approach to calculating the effective stay duration of external supporters using mobile spatial statistics. The results emphasize the importance of improving transportation networks to enhance the efficiency of external support during disaster recovery efforts. Future research should consider actual infrastructure recovery conditions for more comprehensive analyses.

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# Individual and Household Interactions with Disaster Management Institutions: Exploring Behavioral Complexity and Cascading Impacts for Enhanced Disaster Risk Reduction

A128-O

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**Keywords:** Disaster Risk Reduction, Socio-Economic Impacts, Individual and Household Behaviors, Behavioral Cascading Effects.

Over the past few decades, the growing frequency of both natural and human-induced disasters has significantly impacted the development and sustainability of urban cities through multiple ways, such as physical damages, business interruptions and other indirect economic consequences. Effective response requires coordinated collaborations among public institutions, businesses as well as civil society. In these scenarios, individuals and households play the role not only as end-receivers of disaster impacts, but also as autonomous decision-makers across the disaster management cycle (including prevention, response, and recovery etc.). Therefore, investigating the behaviors of micro-level agents (i.e., individual and households) and their behavioral impacts are essential. However, existing studies predominantly examinates discrete types of behaviors under specific hazard scenarios, such as evacuation [1], insurance purchasing [2], etc. Insufficient attention has been paid to the complexity of individual and household behaviors and their cascading effects. For instance, transportation disruptions cannot only lead to increasing travel times and expenditures for individuals, but also result in decreased available time and budget for other individual activities, decline in productivities and mitigation etc. Furthermore, the “Safe Development Paradox” [3] reveals that over-reliance on authorities’ measures can inadvertently suppress individual adaptive capacities under disasters, potentially yielding counterproductive outcomes. To address this, the interactions between micro-level agents and disaster management institutions needs to be taken into consideration for disaster impacts investigation and disaster risk reduction (DRR). In this light, this study first examines the interactions between micro-level agents and disaster management institutions based on literature review. Then, this study illustrates how these interactions shape disaster impacts. Based on this, methodological improvement measures for explicit disaster impacts assessment and DRR simulations are proposed. The findings can contribute to the establishment of a theoretical framework for optimizing DRR strategy through integrated top-down and bottom-up interaction analysis.

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# Implementation Science for Disaster Risk Management – A Critical Review

A173-O

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**Keywords:** Implementation Science, Disaster Risk Management.

One of the most critical issues in disaster risk reduction (DRR) research is the gap between what is known about effective disaster reduction strategies and what is provided to and experienced by beneficiaries or end users in real life settings. While disaster risk reduction studies yield a growing supply of evidence-based preparedness countermeasures, there is little evidence that such countermeasures or preventive actions are either adopted or successfully implemented in social settings in a timely way. Indeed, innovative disaster preventive countermeasures are seldom successfully implemented. The implementation gap prevents us to create resilient communities and cities, but damage and death tolls are accelerating both in developed and developing countries. Therefore, because of poor implementation mechanism, the social and economic costs of disaster are increasing, whereas we science and technology innovation offer us to have several new and potentially good disaster preventive technologies and countermeasures. Hence, ensuring that effective and innovative interventions are implemented in diverse settings and populations has been identified as a priority in DRR discourse.

The gap between countermeasures that is known to be effective and prevention that is delivered reflects, in large measure, a paucity of evidence about implementation. Most information about implementation processes relies on anecdotal evidence, case studies, or highly controlled experiments that have limited external validity and yield few practical implications. A true science of implementation is just emerging. Because of the pressing need to accelerate our understanding of successful implementation, concerted efforts are required to advance implementation science in DRR. This study seeks to advance implementation science in DRR by over viewing the emergence of implementation as an issue for research, by addressing key issues of language and conceptualization, by presenting a skeleton framework for the study of implementation processes, and by identifying the implications for research and training in this emerging field.

## Venue

Room 2 (Amphitheatre of the Region)

## Session Title

# Session ‘Disaster Risk Governance 2’

## Chaired By

Funda ATUN, Assoc. Professor, University of Twente, Netherlands

Stefan HOCHRAINER-STIGLER, Senior Research Scholar, International Institute for Applied Systems Analysis, Austria

## Date and Time

Wednesday, October 1, 2025

11:30-13:00

# Growing Imbalance Between Supply and Demand for Flood Regulation Service in the Asian Water Tower and its Downstream Region

A037-O

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**Keywords:** Asian Water Tower, Flood Regulation Service, Supply-Demand Dynamics, Climate Change, Human Activity.

Quantifying the supply-demand dynamics of the flood regulation service (FRS) is crucial for effective flood risk management. However, current methods cannot adequately capture high-altitude hydrological processes, leading to flawed assessments of climate change impacts on FRS in such regions. Here, we improve the methodology for estimating the supply-demand dynamics of FRS and quantify this relationship from 1990 to 2020 within the Asian Water Tower (AWT) and its downstream region. By integrating climate model data with bias correction, we estimate the supply-demand ratio (SDR) of FRS during 2020–2050 on multiple scales. Our findings show that the supply-demand imbalance of FRS in the AWT and its downstream region will persist and intensify. Specifically, more than 44% of the region experienced a significant decline in the SDR during 1990–2020. It is projected that 65.8±2.1% of the region will experience a significant decline in the SDR during 2020–2050 (SSP5-8.5 scenario). Climate and socioeconomic changes have jointly exacerbated the imbalance in FRS, with relative contributions of 58.4% and 41.6%, respectively, and such imbalance further amplifies flood risk. We propose addressing the FRS imbalance from both the supply and demand sides and strengthening cooperation among upstream and downstream regions and internationally within the Indus and Ganges-Brahmaputra basins.

# Governing DRR and Community Resilience in the Lower Koshi Basin: A Transboundary River Basin Approach for India and Nepal

YS47-O

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**Keywords:** Disaster Risk Reduction (DRR) Governance, Transboundary River Basin, Community Resilience, Lower Koshi Basin (Nepal–India).



The Lower Koshi Basin (LKB), spanning Nepal and Bihar, India, is a transboundary region prone to recurrent floods, droughts, and other climate-induced disasters. It qualifies as a remote area due to its geographic isolation, limited infrastructure, and high financial and social vulnerability. Frequent floods and weak early warning systems exacerbate risks, while poor connectivity and inadequate DRR funding leave communities reliant on traditional coping mechanisms and informal networks for resilience. Effective Disaster Risk Reduction (DRR) governance is essential for building resilience, yet challenges such as institutional fragmentation, weak coordination mechanisms, financial constraints, and gaps in early warning systems hinder risk reduction efforts. This study provides a comparative analysis of DRR governance in Nepal and India, focusing on government perceptions, policy effectiveness, and community resilience strategies.

Using a multi-method approach, this research integrates the Analytic Hierarchy Process (AHP) to evaluate DRR priorities among government officials, Monte Carlo simulations to assess financial and risk uncertainties, and focus group discussions (FGDs) to capture community-level perspectives. Additionally, GIS data is incorporated to analyze spatial risk patterns, particularly for drought and flood-prone areas.

Key research questions include:

1. How do government officials perceive the effectiveness of DRR measures in LKB?
2. How do local and subnational governments collaborate on DRR governance?
3. What challenges do communities face in DRR implementation?
4. What trends emerge from AHP, Monte Carlo, and FGD analyses?

Initial findings indicate that while Nepal follows a decentralised DRR governance model, challenges in financial resource allocation and policy enforcement persist. Conversely, Bihar's centralised governance approach ensures structured resource distribution but limits community participation in DRR decision-making. AHP analysis highlights early warning systems, flood infrastructure, and financial preparedness as top government priorities, while Monte Carlo simulations reveal high financial volatility in DRR funding allocation. FGDs expose a stark contrast between government strategies and community experiences, particularly regarding early warning dissemination, livelihood protection, and infrastructure inadequacies.

The study identifies gaps in governance, coordination, and financial sustainability and proposes policy recommendations to enhance transboundary DRR governance. Strengthening institutional cooperation, integrating localized risk assessments, and expanding inclusive governance

mechanisms can improve resilience in the Lower Koshi Basin. This research contributes to evidence-based policy reforms by aligning government strategies with community needs, ensuring a more adaptive and inclusive DRR framework for transboundary river basins.

# Strengthening Cross-Border Flood Risk Management in the Axios/Vardar River Basin through the FLOODSHIELD Project

A135-O

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**Keywords:** Flood Risk Management, Early Warning System, Decision Support System, Real-Time Flood Forecasts, Climate Adaptation.

The project with the acronym “FLOODSHIELD” was co-financed by the European Union within the framework of the Interreg-IPA CBC Greece- North Macedonia program, with the main objective of cross-border flood risk management in the shared basin of the Axios/Vardar River, Greece and North Macedonia. This basin has an area of 22,250 km2 and is characterized by changing climatic conditions that create the appropriate conditions for causing flood risk in the specific area. The main objective of the project is to strengthen cross-border cooperation through integrated joint governance, the use of technological tools and participatory action of citizens.

During the implementation of the project, a Joint Flood Risk Management Group (JFRM Group) was created, which contributed to the cooperation between national, regional, local authorities, civil protection but also to the promotion of the special role of voluntary organizations. In addition, an Early Flood Prediction Information System (EFPIS) was created, which receives and processes meteorological, hydrological and hydraulic models, to provide early forecasting and warning of extreme flood phenomena through a common platform. For this purpose, telemetric monitoring stations were installed along the Axios River, which feed the platform with meteorological and hydrological data at regular intervals, improving the accuracy of the results.

As part of the project, a Cross-Border Flood Management Strategy was implemented, which included the definition of roles of the involved actors, the study of evacuation and removal plans for neighboring settlements and the allocation of resources. This strategy was reinforced by the creation of a real-time Incident Management & Cross – Border Collaboration Platform (IMCBC). It was enriched with innovative tools, such as Flood Vulnerability Indicators (FVI) and accessibility models, and for prioritizing high-risk areas, such as the «Elli» Dam area, in the Kilkis Region.

The project conclusions confirm the feasibility of transnational collaborations for flood management by using technology with a view to expand monitoring networks in the future. FLOODSHIELD sets a management model for transboundary basins, which is based on the EU Directives (2000/60/EC, 2007/60/EC) on water and floods and strengthening resilience to flood risk.

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# Assembling Pathways Towards Collaborative Volcanic Challenge Management in Taranaki, Aotearoa New Zealand

YS71-O

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**Keywords:** Community-Science Collaboration, Volcanic Risk Assessment, Indigenous Knowledge, Mātauranga Māori.



Understanding disaster risk is a key priority of the Sendai Framework for Disaster Risk Reduction, which recognises the value of Indigenous and local knowledge in risk assessment and in shaping inclusive, effective resilience strategies. However, there remains a lack of methodologies that meaningfully weave diverse knowledge systems in ways that support power sharing, accountability, and collaborative knowledge creation.

Aotearoa New Zealand is a small, tectonically active island nation, born of and shaped by past and future volcanic activity. Māori, the Indigenous Peoples, hold deep knowledge of co-existing with volcanic landscapes. The country also has a well-established volcanic science research community and is founded on a treaty between Indigenous and colonising powers. Together, these foundations offer opportunities to co-create innovative, locally grounded pathways for reducing volcanic risk.

This doctoral research explores the interface between mātauranga (Māori knowledge) and volcanic risk science, asking: How can mātauranga and risk science inform the assembly of pathways for managing future volcanic challenges in Taranaki, Aotearoa? Focusing on Taranaki (on the west coast of the North Island), where there is a 30–50% chance of eruption in the next 50 years, the research mobilises Indigenous and interface methodologies through interviews, wānanga (a Māori practice of knowledge-sharing and discussion), and lived experience working between knowledge systems. Findings identify both tensions and opportunities at the interface of mātauranga and volcanic risk science. In Aotearoa, disaster risk remains entangled with the enduring impacts of colonisation, which exacerbate vulnerabilities, particularly for Indigenous communities in island and remote contexts. Mainstream DRR approaches including methodologies, engagement practices, and technical language often create barriers when alternative worldviews are not recognised.

The research argues that strong relationships must be built and maintained before effective pathways can be co-developed. Understanding disaster risk must begin with understanding place, history, and power. Indigenous knowledge systems offer adaptive, relational, and place-based insights that can inform more inclusive and culturally grounded risk assessment and governance. The research also emphasises the importance of whakapapa (genealogy) and whanaungatanga (relational connection) in shaping understandings of co-existence with volcanoes. It calls for strategic action to uphold Indigenous autonomy and self-determination in decision-making, both before and when ancestral mountains awaken again.

# Disaster Management Practices in the Bahamas: A Critical Analysis of the Disaster Risk Management Act and Policy Framework

YS42-O

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**Keywords:** Natural Hazards, Policy, The Bahamas, Legislation, Disaster Risk Reduction (DRR).

The passing and enactment of The Bahamas' Disaster Risk Management Act, 2022 (DRM Act, 2022) [1], marked a significant moment in the Caribbean regions' advancement in comprehensive disaster risk management. Mirroring global best practices while addressing the country's unique vulnerabilities in hazard and geographical landscape, the DRM Act establishes an integrated framework that promotes risk reduction through all phases of the disaster management cycle—mitigation, preparedness, response, recovery, and rehabilitation. This paper provides a critical analysis of the Act's objectives, institutional arrangements, policy instruments, and implementation mechanisms. Through qualitative methods, the research paper assesses both the strengths and limitations of the legislative framework and its implementation.

Considering the importance of DRR approaches, the findings reveal that the Act's emphasis on proactive and comprehensive approach has progressed from the previous legislation and policies in place, as it focuses more on establishing multi-sectoral collaboration, dedicated funds, and national standards and plans with specific guidelines, which now positions The Bahamas as a regional leader in disaster governance. Key innovations include the focus on natural hazards, the creation the Disaster Risk Management Authority, a state-owned entity that can overcome some of the challenges of governmental bureaucracy and red tape, the Inter-Ministerial Committee which allows key, high-level decisions makers to be involved in critical decisions, the Disaster Emergency Fund and Disaster Prevention Fund, considerations for the Family Islands and Local Government, and the integration of climate change considerations across all planning instruments. However, challenges persist, notably regarding the centralized decision-making and operationalisation of the policy instruments and mandates, the coordination between national, local, and international entities, and the securing of sustainable funding streams.

Through critical reflection, this study highlights the need for continuous capacity-building, more decentralisation of key disaster management mechanism, improved implementation, and greater financial autonomy for national and local disaster management activities. Recommendations are made for strengthening inter-ministerial and inter-agency collaboration, creating and enhancing participatory mechanisms for vulnerable and at-risk communities, and aligning DRR policies throughout national development initiatives. Ultimately, while the DRM Act (2022) [1] lays a strong legislative foundation, its success will depend on sustained political commitment and meaningful involvement of all sectors of Bahamian society in fostering resilience.

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# Towards All-of-Society Disaster Risk Reduction in Greece: Institutional Innovations and Community Empowerment in the Age of Climate Crisis

A149-O

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**Keywords:** Socially Embedded Risk Governance, Mediterranean Risk Policy Convergence, Transboundary Learning for Disaster Preparedness, Training Ecosystems for Disaster Risk Reduction.



As Greece progressively faces the escalating impacts of climate-induced disasters (devastating wildfires, flash floods, prolonged heatwaves, storms), the imperative for concluding an integrated, all-of-society approach to Disaster Risk Reduction has never been more vibrant. This paper offers a critical overview of ongoing national efforts while underscoring key areas where further investment, coordination, and innovation are urgently needed to strengthen preparedness, inclusivity, and resilience.

Greece has undeniably undertaken important steps in shifting from a reactive civil protection paradigm to one more rooted in proactive risk governance. Legislative reforms, the creation of the Ministry for Climate Crisis and Civil Protection, and the expansion of the 112 alert system signal political commitment to DRR. Nevertheless, significant structural and operational gaps persist, particularly in ensuring that preparedness reaches fittingly all layers of society.

This paper highlights the emerging importance of inclusive governance, decentralised coordination, behavioural insights, and psychosocial resilience-building. It draws from case studies of recent disasters, EU-funded initiatives, community-based programs, and volunteer mobilisation. However, these promising practices still require greater institutional integration, sustained funding, and formal recognition within a coherent national strategy.

Several strategic propositions are essential to elevate and systematise all-of-society DRR efforts in Greece:

- Establish Quantifiable Impact Indicators: The development of national KPIs and behavioural uptake metrics is necessary to evaluate and refine awareness campaigns, preparedness drills, and risk communication strategies.
- Institutionalise Memory and Learning Mechanisms: A national repository of after- action reviews, best practices, and case studies would enhance long-term learning and adaptive capacity.
- Promote Mediterranean-Level Comparative Learning: Comparing Greece with other countries facing similar regional hazards would offer valuable insights into scalable practices, community engagement models, and cross-sectoral policy design. Greece should position itself as both a learner and contributor within this Mediterranean risk governance ecosystem.
- Integrate Gender and Social Equity Dimensions: It is essential to more intentionally integrate gender-responsive strategies, addressing the differentiated needs and

contributions of women and other marginalized groups in risk communication, preparedness planning, and post-disaster recovery processes.

By embedding these priorities into national and local DRR frameworks, Greece can move beyond fragmented initiatives and toward a sustainable, inclusive, and resilient future. This intervention aims to open a constructive dialogue around these necessary steps, not as critiques, but as building blocks toward a more cohesive and equitable DRR system, capable of meeting the complex challenges of the climate crisis.

## Venue

Room 2 (Amphitheatre of the Region)

## Session Title

# Session ‘Disaster Risk Governance 3’

## Chaired By

Philippe QUEVAUVILLER, DG Home Affairs, European Commission, Belgium

Kostas KALABOKIDIS, Professor, University of the Aegean, Greece

## Date and Time

Wednesday, October 1, 2025

14:40-16:10

# Promotion of Community-Based Disaster Management by Combining DRR with Decarbonization and Social Welfare Measures

A078-O

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**Keywords:** Energy Self-Reliance, Disaster Risk Reduction (DRR), Decarbonization, Kuroshio Town, Japan.

For small local communities and governments, becoming “independent” or “self-reliant” in terms of energy - off-grid from large power grids - is expected to have a multi-layered effect of “killing several birds with one stone”. On a day-to-day basis, this measure contributes to the promotion of renewable energy use and to the promotion of social welfare by providing an alternative transportation, such as EVs, for discontinued public transportation, for example. On top of that, in the event of a disaster, it can improve the living environment by securing electricity at evacuation shelters, secure governmental, commercial, and medical system, and prevent informational isolation. In this presentation, the case of Kuroshio Town in Japan, a small town with about 10 thousand inhabitants, located at the seacoast of the Pacific, with very high risk of earthquake and tsunami, is reported. Kuroshio Town has started an interdisciplinary initiative by combining DRR with decarbonization and social welfare policies to fight against the estimated huge direct damage of coming disasters and to cope with the expected indirect impact resulted from serious “isolation” from the surrounding community.

# Climate-Driven Wildfire Governance: Enhancing Community Resilience Through Integrated Risk Management Strategies

A163-O

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**Keywords:** Wildfire Governance, Climate Resilience, Integrated Risk Management, Disaster Risk Reduction.

Climate change has significantly increased the frequency, severity, and unpredictability of wildfires, particularly in Mediterranean regions such as southwestern Türkiye. In this study, we investigate how integrated risk management strategies can strengthen community resilience against climate-driven wildfire hazards, focusing on the case study of the Isparta-Burdur region.

The research applies a mixed-methods approach, combining geospatial risk mapping using remote sensing data (Sentinel-2 imagery) with stakeholder analysis through surveys and semi-structured interviews involving local authorities, fire brigades, NGOs, and rural communities. The study evaluates current governance frameworks for wildfire risk management, identifies gaps in coordination and resource allocation, and proposes an integrated governance model emphasizing proactive community engagement, multi-level collaboration, and nature-based solutions.

Preliminary results highlight that limited community awareness, fragmented institutional response mechanisms, and insufficient integration of climate projections into local risk planning exacerbate wildfire vulnerabilities. The proposed governance framework promotes participatory risk assessments, early warning systems linked with local capacities, and the incorporation of traditional ecological knowledge (TEK) into modern fire management strategies.

Ultimately, this study underlines the importance of localized and integrated governance approaches in enhancing resilience against wildfires, demonstrating how community-driven strategies can serve as adaptable models for regions globally that are increasingly threatened by climate-induced hazards.

# Literature Review on the Role and Potential of Religious Organizations in Disaster Management in Japan

A044-O

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**Keywords:** Disaster Management, Religious Organization, Disaster Risk Reduction.



Improving disaster management has become increasingly important for disaster-prone countries such as Japan. However, local government-led disaster response mechanisms often show limitations in resources and efficiency during large-scale and wide-area mega-disasters [1]. Regarding this issue, the Japanese government has increasingly emphasized the importance of community-based disaster risk reduction in recent years, encouraging the participation of citizens, volunteers, private enterprise, and non-profit organizations (NPOs) in disaster preparedness and response, while promoting self-reliance and mutual assistance instead of exclusively relying on the government. Even in a secular country like Japan, religious organizations, as well as NPOs, are considered to have great potential in disaster management. Over the past 30 years, Japan has experienced several major earthquakes and tsunamis, during which religious organizations made significant contributions to disaster response and recovery, although these contributions have often been underestimated. As deeply rooted and trusted institutions in their communities, these organizations have repeatedly demonstrated the ability to fill implementation gaps, particularly regarding underserved, culturally diverse, or remote areas.

Unlike previous studies that typically focus on isolated cases or single events, this study aims to systematically explore the evolving roles and contributions of religious organizations in Japan's disaster management across all disaster phases, from preparedness and emergency response to long-term recovery and reconstruction. Through a chronological literature review covering the period from 1995 to 2024, this study integrates a wide range of academic studies and reports to examine how religious organizations' involvement has evolved over time.

Findings indicate that religious organizations have played diverse roles during disaster response and recovery phases, including mobilizing volunteers, providing shelter and supplies, supporting emotional recovery, strengthening community ties, and facilitating community reconstruction and cultural revitalization. With a great potential to contribute to disaster management, religions organizations also play a role in disaster preparedness, such as hosting training drills and educational workshops. However, their integration into formal disaster management remains limited, especially in preparedness planning, coordination with authorities, and inclusion of minority faiths, highlighting opportunities for deeper collaboration and more inclusive disaster management. Moreover, this study highlights the adaptability and dynamic roles of religious organizations at stakeholders in disaster management. The findings carry important implications for disaster policy and practice. Providing a foundation for policy integration and future

collaboration in disaster risk reduction, this study suggests that religious organizations should be strategically engaged as trusted, community-embedded partners, especially where accessibility to aid, services, and information is limited.

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# Local Public Authorities' Disaster Risk Reduction Policies in Gökçeada-Türkiye

A110-O

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**Keywords:** Disaster Risk Reduction, Risk Assessment, Local Authorities, Gökçeada.



Recent events have profoundly influenced the human environment, particularly through crises and disasters caused by social and natural hazards. Nature-induced calamities are becoming increasingly frequent. In 2023, the Centre for Research on the Epidemiology of Disasters (CRED) reported 399 catastrophic events, resulting in over 86,000 deaths and impacting more than 93 million people globally, with economic repercussions reaching billions. This is a stark reminder of nature's power and our vulnerability within it. Disasters profoundly impact cities, urban centers, and islands worldwide. Gökçeada, an island city in the Çanakkale Province of Türkiye, has faced numerous challenges from disasters over the decades. To address these issues, local public authorities are actively implementing prevention and mitigation strategies on the island. Additionally, they carry out disaster risk assessments at the local level while considering global trends and flows.

This study aims to evaluate how local public authorities conduct disaster risk assessments for Gökçeada, the largest island in Türkiye. The study employs qualitative document analysis to evaluate local authorities' disaster risk assessment policies in Gökçeada. To accomplish this, the Risk Reduction Plan for Çanakkale Province, prepared by the local Emergency and Disaster Management Authority (AFAD), has been analyzed. Following the document analysis, an online focus group interview was conducted with three local disaster managers to gain insights into their methodology for preparing the island's disaster risk assessment.

The results indicate that the primary disaster risks on the island are earthquakes, heavy rainfall, and flash floods. Local disaster management authorities have developed a risk assessment plan by analyzing and documenting data on disasters from the past five hundred years. To address these risks, local authorities emphasize community-based disaster risk reduction and aim to integrate their strategies into the Sendai Framework for Disaster Risk Reduction. Additionally, local authorities highlighted the formidable challenges they face in disaster risk reduction and management, including an alarming surge in population, unpredictable and severe weather phenomena, and scorching temperature extremes.

Local disaster management authorities should prepare disaster risk reduction policies for the island, focusing on community-based approaches and local citizens' participation in the disaster risk assessment process.

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# The Town of Samos Advances Community Preparedness and Resilience with UNESCO-IOC Tsunami Ready Recognition Programme

A054-O

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**Keywords:** Tsunami, Resilience, Preparedness, Tsunami Ready.

The UNESCO-IOC Tsunami Ready Recognition Program (TRRP) aims to enhance preparedness in coastal communities facing tsunami risk and to reduce loss of life and property through a collaborative effort. This voluntary and performance-based community recognition program is grounded in active collaboration between citizens and local and national emergency and disaster risk managers. The program's guidelines document is a basic starting resource for tsunami-prone communities and is available in several languages for wider dissemination [1]. The 12 key indicators required for the recognition are designed to establish a consistent standard for tsunami risk assessment, preparedness, and response. Accordingly, these indicators are categorized into three critical action areas: Assessment, Preparedness, and Response. Communities that successfully meet all these criteria demonstrate their work in strengthening their tsunami preparedness, primarily to safeguard lives, and are recognized as “Tsunami Ready” by UNESCO-IOC. This recognition must be re-evaluated every four years.

On October 30, 2020, a magnitude 7.0 earthquake struck the island of Samos in Greece and Türkiye's Izmir region, triggering a tsunami that swept across the Aegean Sea, and causing over 100 fatalities and severe injuries, highlighting the region's vulnerability to seismic and tsunami hazards. The CoastWAVE project, coordinated by UNESCO-IOC and funded by DG-ECHO, was launched shortly after the disaster. The initiative aimed to enhance community preparedness in the NEAM region by implementing the TRRP at selected sites.

In Greece, the TRRP was implemented in the town of Samos through the CoastWAVE project, led by the National Observatory of Athens. The project team collaborated with the Municipality of Eastern Samos and other local stakeholders to develop hazard maps and preparedness protocols. As a result, local authorities, emergency agencies, and other stakeholders had the opportunity to work together closely to co-design community preparedness and response products. The project strengthened the partnership among scientific organizations, emergency management bodies, and local communities, ensuring comprehensive preparedness and risk reduction measures. The Samos

initiative showcased how blending educational programs with stakeholder involvement and preparedness builds coastal resilience, leading to the town of Samos' status as Greece's first recognized Tsunami Ready community under UNESCO-IOC standards.

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# Integrated Disaster Risk Management: A Participatory Implementation Perspective

A174-O

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**Keywords:** Integrated Disaster Risk Management, Definition and Structure, Field Studies, Participatory Implementation.

Integrated disaster risk management has become a commonplace principle in disaster risk reduction discourse. However, a great deal has not been known or agreed on about what should be integrated, how it should be integrated, and why? In examining the available literature (although there are very few studies) including scientific papers, reports, conference papers and policy briefs, it is evident that the IDRM approach emphasizes the integration of exposure and vulnerability with hazards to define and manage disasters, previously associated with hazards. Despite the fact that IDRM advocates integrating exposure and vulnerability when defining disaster risk, the very approach considers only one risk at a time. This paper argues that in reality, individuals live in multiple risk situations. Risk perception and risk management decisions are often based on how to manage multiple risks at the same time. Therefore, a factor that seems to be a component of vulnerability may be viewed by stakeholders or disaster victims as a risk in and of itself. The paper argues that the IDRM has so far focused on the integration of the different components and elements of vulnerability and exposure, but little attention has been paid to the integration of various risks, which is vital for pragmatic and realistic disaster risk reduction strategies. Additionally, this study argues that the nature and types of risk often depend on context and are human-centric. As a result, the integration of the risks, the location of the projects, and what the priorities are for the planning works should be developed from the bottom up and community-based. This study concludes that integrated disaster risk management should focus on integrating multiple risks and their management factors from a community-centric perspective.

# Poster Presentations

# Willingness to Pay for Temporary Shelter at Private Facilities by Stranded Persons during Disasters

A025-P

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**Keywords:** Stranded Persons, Temporary Shelter, Willingness to Pay, Earthquake.

In urban areas of Japan, a remarkably high proportion of people rely on railways for transportation. Consequently, when railway services are suspended due to an earthquake, a large number of stranded persons are generated, becoming a significant social issue. Some private facilities located near train stations have entered into agreements with local governments to serve as temporary shelters for these stranded persons during disasters. However, in densely populated areas such as Tokyo, the availability of such temporary shelters remains insufficient, and challenges persist in leveraging private-sector facilities. In order to encourage greater cooperation from private companies in addressing the issue of stranded persons during disasters, visualizing the potential impact of such measures may serve as an effective solution.

The purpose of this study is to evaluate the impact of private temporary shelters accommodating stranded persons for an overnight stay during disasters.

The methodology involves assessing the willingness to pay (WTP) for such shelter use through a web-based survey. The survey targeted Japanese residents aged 20 and over, and responses were collected from a total of 5,040 participants. Six scenarios were prepared by combining two climate conditions— mild and severe winter—and three types of shelter environments. For each scenario, responses were obtained from 840 individuals.

Based on the analysis, differences in WTP were evaluated in relation to age, income level, climate conditions, and shelter environment. Specifically, in the scenario with mild climate conditions and a basic shelter environment, the average WTP was approximately 10,000 yen (about 67 USD). This amount is comparable to the average cost of a one-night stay at a hotel in Tokyo, suggesting that the expected value placed on temporary shelter during disasters by stranded persons is considerably high. Assuming that 1,000 people stay in temporary shelters for three days, it can be estimated that this initiative has a value of approximately 30 million yen (about 200,000 USD).

# Development of a Monograph-Style Textbook in Disaster Pedagogy

A038-P

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**Keywords:** Postgraduate Disaster Education, Disaster Risk Curriculum Framework, Training and Drill Model, China.



Strengthening disaster risk prevention and education for Disaster Risk Reduction (DRR), enhancing public awareness of disaster risks, serves as a key measure for advancing comprehensive disaster risk prevention capabilities. As a populous nation with frequent disasters and Chinese-style modernization, China's compilation of a practical and professional monograph-style textbook holds significant value in filling academic gaps within the field of disaster risk disciplines. This specialized textbook, designed for graduate-level instruction, integrates scientific research with pedagogical exploration while combining disaster theories with educational practice, thereby establishing the framework and core content system for Disaster Pedagogy.

The textbook is organized into four thematic sections, comprising twelve chapters. Part I presents theoretical foundations of disaster education, analyzing global textbook development trends from international, national, and individual perspectives to clarify the textbook's positioning and functions. Grounded in educational, psychological, and geographical theories, it constructs the disciplinary framework of Disaster Pedagogy, defining research objectives, tasks, and proposing the core function of disaster education. Part II focuses on research priorities and curriculum systems for Disaster Pedagogy, establishing: 1) a categorical system for disaster ethics education; 2) a university-level disaster education system and an undergraduate-postgraduate curriculum models; 3) a disaster education curriculum framework for senior high, junior high, and primary school levels; 4) a "6+1" training system targeting six professional groups (schoolteachers, community workers, volunteers, etc.); and 5) disaster emergency drill protocols for individual and group preparedness. Part III addresses implementation safeguards for disaster education, establishing a "multimedia, multi-stakeholder, multi-objective" publicity system and the organizational and management framework of disaster education. Part IV presents regional case studies, comprising "Comparative Analysis of International Disaster Education Cases" and "Empirical Investigation of Disaster Education Practices in China". Disaster Pedagogy is both an emerging academic discipline and a shared human cause in DRR.

# Assessing Coastal Vulnerability in Visakhapatnam and Uppada Village, India: A Geospatial Approach

YS50-P

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**Keywords:** Coastal Vulnerability, Digital Shoreline Analysis System (DSAS), Sea Level Rise; Shoreline Analysis, Vulnerability Maps.

Coastal regions are increasingly at risk due to climate change, resulting in sea level rise, shoreline erosion, and increasing human activities worldwide. This study evaluates the coastal vulnerability of Visakhapatnam and Uppada Village along the eastern coastline of India using a geospatial approach. Multi-temporal satellite data from 1990 to 2024 were analyzed to assess key vulnerability indicators, including shoreline change, coastal slope, land use/land cover (LU/LC), relative sea level, and mean tidal range. The Digital Shoreline Analysis System (DSAS) was employed to analyze shoreline changes, while GIS techniques were used to develop coastal vulnerability maps. The findings showcase significant shoreline erosion in both study areas, with Visakhapatnam displaying localised variations due to its headland-bay geomorphology and urban expansion. The highest recorded erosion rate in Visakhapatnam was - 13.1 m/year, with corresponding accretion rates of 21.1 m/year. In contrast, Uppada exhibited continuous erosion with an average shoreline retreat of -3.95 m/year, which demonstrates no significant accretion. The average shoreline loss from 1990 to 2024 was 64 m in Visakhapatnam and 90 m in Uppada. Notably, the vulnerability of Uppada is intensified by the absence of natural protective barriers such as mangroves or dunes, making it highly susceptible to erosion and flooding. The study emphasizes the urgent need for targeted coastal management strategies to mitigate vulnerability in these regions.

The research highlights the importance of integrating geospatial technologies in disaster risk assessment and management to inform policy decisions. Sustainable interventions are essential to safeguarding coastal communities through the implementation of nature-based solutions and improved urban planning. These findings contribute to the broader discourse on climate resilience and adaptive management strategies for coastal environments.

# Technological Accident Preparedness in Dense Urban Environments: A Civil Protection Exercise in Perama, Greece by a Second-Degree State Body

A071-P

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**Keywords:** Technological Accidents, SEVESO Directive, Civil Protection Exercise, Inter-Agency Coordination, Urban Risk Governance.



Technological accidents involving petroleum and chemical substances in urban-industrial port areas pose complex risks due to population density, proximity to critical infrastructure, and cascading hazard potential. In response, the Independent Directorate of Civil Protection of the Region of Attica—functioning as a Second-Degree State Body—designed and conducted a tabletop civil protection exercise titled 'Ktissivios P&N' on April 3, 2025, in collaboration with national and local stakeholders [1].

The exercise aimed to test and improve the implementation of the Special External Emergency Plan (Ειδικό ΣΑΤΑΜΕ) for the SEVESO upper-tier installation CORAL AE in Perama, a densely populated municipality within the port complex of Piraeus [3]. The scenario involved a cascading failure due to soil subsidence beneath Tank T-4, containing over 5,000 tons of unleaded gasoline. The rupture led to pooling and ignition, with thermal radiation causing fire propagation to adjacent tanks (T-2 and T-5), triggering a multi-agency coordinated response.

The tabletop format enabled over 40 agencies—including fire and police services, port authority, municipal departments, and health, energy, and environmental bodies—to test their roles, interoperability, and decision-making. Over 90% of participants assessed the coordination of the exercise as at least successful, with 47.7% specifically rating it as excellent—demonstrating the effectiveness of the multi-agency response framework. The scenario itself was considered fully realistic by 72.1% of respondents, confirming its high operational relevance. A large majority of participants confirmed the practical relevance of the exercise's content, with 59.1% specifically stating that the skills exercised were absolutely essential for their official duties. Moreover, 56.8% of respondents reported a clear improvement in inter-agency collaboration, underlining the exercise's added value in strengthening coordination, mutual understanding, and operational synergy across institutional actors.

Evaluation results also revealed areas for development: improved communication tools (e.g., secure interoperable radios, satellite phones), stronger focus on evacuating vulnerable groups,

and clearer designation of non-operational actors' tasks. Participants emphasized the need for annual exercises, potentially extended to additional SEVESO sites.

The exercise operationalized assumptions from the national Herakleitos Plan [2] and the corresponding Special SATAME plan for the CORAL AE facility in Perama [3], demonstrating the importance of structured, multilevel planning and adaptive governance. The 'Ktissivios' case highlights the value of coordinated preparedness and institutional learning in addressing complex technological risks within spatially constrained urban environments.

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# Volcanic Disaster Education for Mt. Fuji Eruptions

A141-P

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**Keywords:** Volcanic Disaster Education, Evacuation Operations, Educational Curriculum, Warning Information System, Mt. Fuji.

In preparation for a possible eruption of Mt. Fuji, it is urgent that volcanic disaster education be provided in the surrounding areas. Because Mt. Fuji is so large, evacuation operations will differ depending on the location of the crater and the extent of the eruption. A system of advance warning information has already been established to deal with complex operations, but it has never been announced, and there is a need for social response, awareness-raising, and education. In addition, they are also required to deal with tourists as well as local residents. A manual is currently being prepared to educate and deal with the large number of tourists who visit the area, as well as climbers. In this presentation, we will report on the current state of information systems and disaster education for Mt. Fuji eruptions. In particular, we will present the educational tools that are currently being developed and their effectiveness, with a focus on educational curricula for understanding and acting on complex warning information systems. We will then discuss the current measures and future issues for Mt. Fuji eruptions that could have an international impact.

# Public Health Preparedness and Response Plan for Natural Disaster Management: Implementation by Attica Region's Hygiene Control and Environmental Hygiene Directorates

A144-P

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**Keywords:** Public Health, Natural Disaster, Preparedness, Response, Contingency Plan.



Beyond their immediate impacts, natural disasters can lead to prolonged public health challenges. These include displacement of affected populations into unsuitable shelters, unsafe and inadequate water supplies and hygiene conditions, and proliferation of disease vectors-factors contributing to an increase in infectious diseases [1]. In Greece, the Directorates of Hygiene Control and Environmental Hygiene (DYEPY), operating under Regional Directorates of Public Health and Social Care, are responsible for managing these health impacts [2]. They must develop and maintain preparedness and response capacities for both routine and emergency events, necessitating all-hazards planning, capacity-building through continuous training and exercising, resource allocation, established coordination and communication mechanisms. To enhance DYEPY's capacities for effectively managing the immediate impact and aftermath of natural disasters in the Attica region, this study describes the: 1) development of a regional public health preparedness and response plan; 2) outcomes from plan implementation during real-life natural disasters.

As the designated coordinator for natural disaster management, a Public Health Supervisor from the DYEPY of Western Attica led plan development. The process drew on an extensive literature review and personal insights from responding to major disasters, including the 1999 Parnitha earthquake and the 2017 Mandra flood [3, 4]. Critical response steps were identified, corrective practices developed, and procedural guidelines established. Detailed checklists were created for emergency shelters, immediate housing facilities (including hotels and ships), and protocols for monitoring drinking water (chlorine, pH) and food safety controls. Standardised reporting forms and protocols for unsafe food disposal were integrated into the plan. A multi-sectoral stakeholder directory included contact details of DYEPY personnel, municipalities, civil protection authorities, water supply entities, and maintenance teams. The plan requires annual testing and updating of the contact list, with additional revisions as internal departmental changes occur.

The plan was implemented by the Attica Region's DYEPY during the 2021 Western Attica and 2024 Eastern Attica wildfires, with notable improvements in response [5, 6]. The common

communication and reporting framework among response stakeholders facilitated more harmonised organisation of immediate actions. Additional improvements included: more efficient health inspections; prompt identification of public health risks; more rapid mitigation of adverse effects; and enhanced collaboration between public health directorates and local municipalities.

This study underscores the critical importance of preparedness and coordinated responses to natural disasters. Establishing water and food safety procedures and comprehensive emergency management plans enables public health authorities to improve immediate outcomes, facilitate replicable inter agency coordination, inform policy, and bolster community resilience.

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# Flood Evacuation Training for Residents Focusing on Pre-Disaster Monitoring and Decision-Making Based on Climate Projections: An Application in Memuro, Hokkaido

A148-P

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**Keywords:** Evacuation Drills, Climate Projections, Flood Disaster Scenarios, Pre-Disaster Monitoring, Resident Evacuation Decision-Making.

The Sendai Framework for Disaster Risk Reduction 2015–2030, adopted with the participation of government delegations from 185 countries [1], identifies the significant reduction of disaster-related mortality and the improvement of access to disaster risk information as key global targets. To achieve these targets, priorities for action such as enhancing the understanding of disaster risk and strengthening preparedness for effective disaster response have been established, with training positioned as an important activity [2].

Flood risk information is typically provided in the form of hazard maps indicating the maximum inundation depth and is widely used in evacuation drills conducted by municipalities and residents. However, these hazard maps mainly focus on static inundation potential and do not adequately reflect temporal changes. In actual flood events, it is crucial to recognize the increasing danger over time based on observation, prediction, and early warnings before flooding, and to make appropriate pre-disaster decisions and take actions, particularly evacuation. In training, it is also important to foster understanding of disaster risks that involve temporal dynamics—such as the fact that even with the same inundation depth, faster flooding increases evacuation difficulty and danger—and to strengthen preparedness through updating hypotheses based on decision-making and response processes.

Furthermore, a review of experiences from the August 2016 flood with residents of Memuro Town indicated challenges in appropriate situational understanding and response when facing unexpected disasters, as well as the necessity for residents to proactively monitor conditions, collect information, and make their own evacuation decisions.

This study plans evacuation training for residents in Memuro Town, aiming to enhance understanding and preparedness for future heavy rainfall and flood risks. Using climate projections obtained from large-ensemble climate experiments, which are also utilized in flood management planning in Japan [3], we selected significant heavy rainfall events critical to the region's flood risk and developed flood scenarios for both before and after inundation to use as situational settings during training [4].

The training format will introduce an innovative approach that replicates actual disaster processes. Instead of pre-announcing evacuation times as in conventional drills, real-time observational,

predictive, and evacuation information will be provided through communication methods actually used in the community, requiring residents to make their own evacuation decisions based on the information received and to act accordingly.

In addition, during the training, surveys on residents' information gathering, decision-making processes, and evacuation actions will be conducted to analyze trends and identify challenges.

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# PARATUS Project Forensic Analysis Application on the 2011 Tohoku Earthquake and Tsunami

A156-P

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**Keywords:** Forensic Analysis, PARATUS Project, Tohoku Earthquake and Tsunami, Interactive Poster.



Integrating knowledge and insights gained from past events is a highly effective way to enhance our ability to anticipate the potential consequences of multi-hazard risk events in the future. The dynamic risk conditions based on the economic, social, and environmental conditions necessitate a critical reassessment of the past events and future trends. Within the framework of the PARATUS project, a forensic analytical approach was developed, drawing upon three established methodologies: Forensic Investigations of Disasters (FORIN), Post Event Review Capability (PERC), and Detecting Disaster Root Causes (DKKV). This integrated approach is applied to a series of carefully selected case studies of past disaster events, enabling a comprehensive examination of the intricate and context-specific impacts of disasters, and one of these disaster events is Tohoku Earthquake and Tsunami, 2011.

The Tohoku earthquake and tsunami multi-hazard event of March 11, 2011, represents one of the most economically destructive disasters in modern history, with losses estimated at 235 billion USD. This catastrophic event triggered by a 9.0 magnitude earthquake and followed by tsunami waves exceeding 40 meters, impacted a significant portion of Japan's coastline. This study utilizes the PARATUS forensic analysis framework to examine data collected from scientific literature, institutional reports, and expert evaluations to assess the multifaceted impacts of the disaster. We explore the short- and long-term effects across various dimensions, including physical, environmental, socio-cultural, economic, and institutional sectors. Furthermore, we will share insights on the underlying causes of the event, such as tectonic subduction, and the cascading hazards it triggered, including the tsunami and the nuclear reactor failure at Fukushima Daiichi.

The research provides a comprehensive assessment of various facets of the event, focusing on the concept of "building back better" through enhanced disaster resilience, capacity building, and improved preparedness. Key findings include Japan's approach to bolstering community-level preparedness, refining warning systems to deliver timely information to remote areas, and integrating sustainable recovery strategies for post-disaster recovery. The findings offer a comprehensive understanding of the complexity of multi-hazard events and provide valuable insights for disaster risk management and mitigation strategies in the future.

We will present the findings in an interactive poster format, where each discussant can agree or disagree with the findings and contribute to the formation of the poster further.

# The Gender Role Survey in the Reconstruction Process to the Noto Peninsula Earthquake in Ishikawa Prefecture, Japan

A161-P

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**Keywords:** questionaire survey,field epidemiology, gender and cultural anthropology, Noto peninsula.

This questionnaire was conducted research who victims of earthquake and torrential rain damage in the Noto Peninsula, Ishikawa prefecture in Japan, 2024.

This summary discusses about the gender role to daily life and recovery process from the earthquake Noto Peninsula where focus on Wajima city and Noto town and Suzu City in Ishikawa Prefecture in Japan. Respondents were divided by age about 10% in their 10s to 20s, 30% in their 30s to 40s, 30% in their 50s to 60s, and 30% in their 70s to 80s approximal 1,000 women in Noto Peninsula.

As a result, the most common responses were that “The main gender roles of women were cooking and cleaning in them house and community activity and Men’s was do the heavy lifting”, “They were participated in the information and decision-making process, but it was difficult to express to them opinion. “ and

“We were participated to the information and decision-making process, but it was very difficult or impossible to express to them opinions aim community peoples and “Many respondents answered that it was the male elders who made decisions”.

These considerations suggest although there were fixed cultural practices such as division of gender roles between men and women, and more Who decision-making and executive roles by age group even before the earthquake, in the Noto Peninsula of Ishikawa Prefecture,

However, everyone was able to help each other regardless of gender and age group during the emergency and recovery activities after the Noto Peninsula earthquake, 2024.

Some respondents were also mentioned about it was happened to earthquake triggered a re-evaluation of family relationships, and that husbands and men became more supportive to their families, indicating to cultural gender roles shape the community in Noto peninsula.

In conclusion, the gender roles were evident terms of life in the earthquake recovery process and support activities in the Noto Peninsula. However, the community was formed by the unique culture of Noto Peninsula Japan.

# Cultures of Risk: Exploring Resident Water-Related Disaster Preparedness in a Multi-Country Context

A165-P

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**Keywords:** Disaster Preparedness, Disaster Resilience, Culture Of Disaster, Water-Related Hazard.

This presentation delves into the complexities of flood preparedness across three distinct contexts: Italy, Japan, and the Netherlands. In southern Japan's Kyushu region, water-related disasters are a regular occurrence, deeply embedded in the area's climate patterns. Italy, in contrast, has witnessed an increase in catastrophic events tied to climate change, particularly in mountainous and hilly regions prone to landslides. The Netherlands, often referred to as the "Low Lands" or "Pays-Bas" due to its position below sea level, has a long history of managing river overflows and flooding.

Each of these scenarios—spanning both mainland, coastal and island environments—has given rise to unique narratives of disaster preparedness. These narratives are shaped by a combination of lived experiences with water-related disasters and the collective memory of past events within communities.

This presentation highlights the local dimensions of water-related disaster risk perception in these three regions, emphasizing how environmental and cultural factors contribute to distinct understandings of risk and preparedness.

The study employs an original multi-factor survey methodology, participant observations and in-depth interviews, to explore the nuanced realities and beliefs of communities exposed to water-related disaster risk.

This presentation will highlight on two areas of reflection: understanding the complexities of multi-hazard scenarios in Disaster Risk Reduction (DRR) and exploring if and how they can be addressed through qualitative research methods, such as structured surveys. Additionally, it will include an open discussion on the strengths and limitations of conducting multi-country research in DRR.

# ResiliART: Using Art to Foster Resilient Communities and Infrastructures

A166-P

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**Keywords:** Science Communication, Art, Community Resilience, Understanding Risk.

This poster presents the ResiliART project, an initiative designed to explore solutions for building disaster-resilient communities by emphasizing science communication and understanding disaster risks among vulnerable groups. The project draws its strength from the diverse expertise and network of the IDRiM Women in Disaster Risk Practice and Science Committee.

The ResiliART project is founded on the principle that understanding and leveraging local infrastructure—characterized by its resilience and alignment with the social needs of its users—is vital for fostering community resilience. Social infrastructure plays a dual role: as a tangible asset and as a symbol of societal aspirations and vulnerabilities. It embodies the impacts of disasters, such as the loss of infrastructure due to events like fires, while also representing communal safe spaces in both the collective memory and imagination, such as churches or schools as places of shelter and support.

To delve into these relationships, the project engages vulnerable groups in artistic expressions of their perceptions of current risks, as well as their hopes and concerns for the future. This creative process illuminates the interconnectedness of infrastructure and the emotional and social experiences of its users.

By utilizing art as a vehicle for dialogue, the project fosters discussions about resilient infrastructure. Activities span multiple countries, including Italy, Japan, and the Netherlands, highlighting both local and global perspectives on disaster resilience and community engagement.

# Improvisation Across Geographies: How Isolation Shapes Transitional Shelter Practices

A176-P

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**Keywords:** Transitional Shelter, Disaster Recovery, Spatial Improvisation, Geography, Isolation.

Transitional sheltering represents a crucial yet under-explored phase in post-disaster recovery. While research has often highlighted the interplay between design and user improvisation [1–2], the role of geography and isolation in shaping these practices remains insufficiently addressed.

This study examines how remoteness — particularly in insular and peripheral contexts — influences spatial improvisation within transitional settlements. Drawing from comparative case studies in Turkey (1999 earthquake), Japan (2011 tsunami), Jordan (Za'atari refugee camp), and Greece (Athens 1999, Arkalochori 2021), the analysis interprets visual traces (additions, material substitutions, clustering patterns) to reveal how communities adapt to their environments under conditions of limited resources and logistical constraints.

Findings indicate that in remote or insular areas, improvisations tend to rely on local materials, small-scale collective solutions, and adaptive use of available resources. Conversely, in urban or accessible contexts, improvisations often evolve into more permanent investments, altering spatial structures and extending settlement duration.

By reframing transitional sheltering through the lens of geography, this work highlights how isolation acts as a formative factor in resilience-building. It argues that disaster risk reduction policies for islands and remote areas must integrate geographical and cultural specificities, ensuring flexible frameworks that anticipate both constraints and opportunities of place.

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# Applying Resilience to Policies and Planning: Evidence from The Municipality of Athens, Greece

A178-P

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**Keywords:** Resilience, Resilient Strategies, Crisis, Athens, Disaster Resilience, Urban Development.



Resilience is considered essential for the development and well-being of society, especially in today's era of rapid urbanization and climate crisis. The term is defined and applied differently across scientific fields, schools of thought, and policy contexts. This diversity creates confusion and operational challenges, but also offers flexibility, enabling resilience to serve as an umbrella concept across disciplines and policy areas.

This research examines the concepts of Urban Resilience and Disaster Resilience and seeks to clarify their interrelationship. This is particularly relevant presently as the combination of climate change on the one hand and rapid urbanization and urban pressures on the other already have caused significant negative impacts on urban environments and populations, particularly in big cities. At the centre of this research is the city of Athens, the first Greek city to participate in the "100 Resilient Cities" Rockefeller foundation initiative.

We analysed the use and application of resilience in the policies and planning in the context of adaptation to climate change. We examined resilience policies as they unfold throughout the entire cycle from policy formulation to implementation and back again. Particular attention was given to assessment methods and measurement tools as the basis for evaluating policy effectiveness. Among the relevant policies, the *Athens 2030 Resilience Strategy* was central and examined in detail regarding its methodology, the planning tools it introduced, and its implementation and monitoring.

Results indicate that Athens's participation in the international initiative "100 Resilient Cities" introduced and established resilience in the public debate and paved the way for the city to move further towards getting prepared for climate change challenges. "Resilience" was used both as a conceptual and as a practical tool. Initially, the notion was employed to indicate solutions to challenges the city was facing at that time, especially impacts of the socioeconomic crisis, and also future challenges, such as climate change. Through policy implementation regarding both urban development and disaster risk management, "resilience" was transformed from an inherent property of a system to a technique of reorganization of the physical environment and the social space.

# Special Sessions

# How can Government Entities Best Plan for Response to Potential Precursors Linked to Low Probability, High Risk Hazards?

SpSe-01-IP (in-person)

Room 4 (Municipal Board Meeting Room)

Monday, 29 September 2025

09:40-11:10

## Chair

**James D. GOLTZ**, University of California, Berkeley (Seismological), United States of America

**Nikos KALLIGERIS**, National Observatory of Athens, Greece

## Rationale and Introduction to the Topic of the Session

Scientists and policy makers struggle with how best to respond to potential hazard precursors (e.g., seismic swarms, possible volcanic activity, weather uncertainties, etc.) and at what point to act on the probability that precursors may be followed by major hazard events. These phenomena present major dilemmas for governments that must decide whether to act in low probability, high consequence situations where lives are at steak and hazard likelihood is uncertain.

## Format of the Session

Oral presentations followed by discussion.

A brief introduction to the topic by the conveners and small number of presentations on situations relevant to the session theme, followed by discussion with attendees.

## Panellists and Presentations

- James D. GOLTZ, Berkeley Seismological Laboratory, University of California, Berkeley, USA. Title of presentation: “Operational Earthquake Forecasting in Japan: The Dilemma for Small Municipalities and Remote Locations”
- Genta NAKANO, Disaster Prevention Research Institute, Kyoto University, Japan
- Mauro COLTELLI, Instituto Nazionale di Geofisica e Vulcanologia, Italy
- Costas SYNOLAKIS, Academy of Athens, Greece
- Evangelos AGGELOPOULOS, General Secretariat for Civil Protection, Greece
- Nikos KALLIGERIS, Institute of Geodynamics, National Observatory of Athens, Greece

# "Special Earthquake Warning Information" in the Nankai Region of Japan: Planning for a Low Probability/High Consequence Event

A063

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**Keywords:** Special Earthquake Warning, Nankai, Japan, Earthquake Forecasting.

Japan has a lengthy history of attempts to anticipate the location of the next major earthquake to strike the nation and attempts have continued over the last 125 years despite numerous failures. The most notable of these failures is the Tokai Prediction which was set in motion in the late 1970's and, as of this writing, has not occurred. Meanwhile, as skeptics of earthquake prediction in Japan have noted, major earthquakes have occurred in locations considered less likely to produce major events. More recently, following the Great East Japan Earthquake and Tsunami of 2011, attention has become focused on the southern sections of the subduction zone that triggered the massive Tohoku earthquake. An operational earthquake forecasting system was set in motion in 2018 that seeks to identify possible precursory seismic activity a few days before a major tsunami-genic earthquake strikes an area stretching along the Pacific Ocean from Nagoya to Kyushu affecting 29 prefectures and 707 municipalities. Planning has been particularly challenging for small coastal towns on Shikoku Island that have major tsunami potential as well as high intensity shaking hazards from a major earthquake in this region. This presentation will explain the scientific rationale for establishing the forecasting system and review local government efforts to plan for receipt of a special earthquake warning message.

# Mobile Public Alert and Warning in Islands and Remote Areas

SpSe-02-IP (in-person)

Room 4 (Municipal Board Meeting Room)

Monday, 29 September 2025

11:30-13:00

## Chairs

**Hamilton BEAN**, University of Colorado Denver, United States of America

## Rationale and Introduction to the Topic of the Session

Mobile public alert and warning systems are critical for safeguarding communities during disasters, particularly in islands and remote areas where geographic isolation, infrastructure limitations, and unique cultural contexts present distinct challenges. This panel brings together scholars and practitioners from the USA, Greece, South Africa, and Japan to explore the complexities and innovations in mobile public alert and warning systems tailored to these environments. Islands and remote regions are often at heightened risk from natural hazards such as tsunamis, earthquakes, hurricanes, and volcanic eruptions, and ensuring timely, effective communication is essential to saving lives and reducing damage. However, these regions frequently face issues such as limited cellular coverage, technological disparities, and difficulties in message dissemination across diverse linguistic and cultural groups. Drawing on cross-national research and practical experiences, panellists will discuss strategies for optimizing system and message design, leveraging technological advancements, and addressing barriers to effective communication.

The session will highlight case studies from each represented country, examining how local knowledge, community engagement, and adaptive technologies contribute to more resilient alert systems. Additionally, the panel will address policy implications, including the role of international cooperation in enhancing alert capabilities and ensuring inclusivity and accessibility. By fostering a comparative dialogue, this session aims to generate actionable insights and recommendations for improving mobile public alert and warning systems in islands and remote areas worldwide. This panel is essential for scholars, practitioners, policymakers, and technologists who seek to enhance disaster preparedness and response through effective communication strategies tailored to the unique needs of isolated and vulnerable populations.

## Format of the Session

Panel discussion.

Each presenter will discuss their perspective as per the session rationale, highlighting cases or examples from their home country. Individual papers will not be presented. The intent is to use the exchange to produce a “Thematic Summary” for publication in the conference special issue of IDRiM Journal.

### PANELLISTS

- Marinos CHARALAMPAKIS, Hellenic National Tsunami Warning Center, Greece
- Ana Maria CRUZ, Norwegian University of Science and Technology (NTNU), Norway
- Miranda DANDOULAKI, Disaster management specialist, Greece.
- Kensuke TAKENOUCHI, Kagawa University, Japan.

# Publish with IDRiM Journal

SpSe-03-IP (in-person)

Room 3 (Municipal Amphitheatre)

Monday, 29 September 2025

16:30-17:30

## Chairs

**Hamilton BEAN**, University of Colorado Denver, United States of America

**Ana Maria CRUZ**, Norwegian University of Science and Technology (NTNU), Norway

## Rationale and Introduction to the Topic of the Session

This conference session on publishing with the Integrated Disaster Risk Management (IDRiM) Journal will be highly valuable for attendees (scholars, practitioners, and policymakers engaged in disaster risk reduction and management). The session will offer insights into the journal's scope, submission process, and expectations for scholarly contributions, helping potential authors understand how to craft impactful and publishable research.

The session will clarify the types of interdisciplinary research that align with IDRiM Journal's mission, including studies on implementation science, risk assessment, disaster preparedness, response, recovery, and resilience building. Understanding the journal's thematic focus will enable contributors to align their research projects more effectively with publication standards. Attendees will benefit from learning about the peer-review process, including common reasons for manuscript rejection and strategies to strengthen submissions. Guidance from editors and/or authors on developing methodologies, articulating key findings, and emphasizing practical implications will demystify the publishing process and enhance the quality of future submissions.

The session will address emerging trends and gaps in disaster risk management research, helping attendees identify timely topics for investigation. Discussion on ethical considerations (especially the use of AI), data presentation, and cross-disciplinary collaboration will further equip researchers with best practices for scholarly writing. Finally, the session will offer networking opportunities, connecting participants with experienced authors, editors, and reviewers. These connections could foster mentorship, collaboration, and future contributions to the IDRiM Journal and the broader disaster risk management community.

## Format of the Session

Oral presentations followed by Q&As.

The session will be led by IDRiM Journal editor (Hamilton BEAN) and editor-in-chief (Ana Maria CRUZ). The roughly ~30 minute presentation will be followed by audience Q&A.

# Navigating Natech Risk Management Challenges in Remote and Island Communities

SpSe-04-IP (in-person)

Room 3 (Municipal Amphitheatre)

Tuesday, 30 September 2025

16:30-18:00

## Chairs

**Kyriaki GKOKTSI**, European Commission Joint Research Centre (JRC), EU

**Ana Maria CRUZ**, Norwegian University of Science and Technology (NTNU), Norway

(The Session was organized by Elisabeth KRAUSMANN, Principal Scientist, European Commission, Joint Research Centre, EU)

## Rationale and Introduction to the Topic of the Session

Remote and island communities face unique challenges in managing disaster risks due to their geographic isolation, limited infrastructure and dependences on external resources. These challenges are further compounded by the growing threat of natural hazard-triggered technological (or Natech) accidents, where natural hazards, for example storm surge, earthquakes, landslides, or floods, trigger damage and subsequent hazardous material releases in industrial facilities, critical infrastructure or defence assets. Examples of such entities at risk are the chemical process industry, fuel pipeline networks, or ammunitions and explosives depots. The consequences of such events can be catastrophic, leading to potentially long-term impacts on community health and well-being, environmental degradation, service disruptions, and economic losses. Climate change further intensifies these threats by increasing the frequency and severity of extreme weather events.

This session aims to explore the complexities of Natech risk management in remote and island settings, focusing on strategies to enhance emergency preparedness and response, and on increasing resilience. Experts and practitioners will provide an understanding of the challenges of Natech emergency management and the importance of preparedness, discuss case study examples, and propose solutions to address Natech emergency management challenges.

Ultimately, this session aims to contribute to the broader goal of advancing disaster risk reduction in remote and island areas by addressing the specific challenges posed by Natech risks. Through dialogue and knowledge-sharing, it seeks to inspire solutions that protect communities, ecosystems, and economies from the growing threat of cascading disasters.

## Format of the Session

Oral presentations followed by Q&As.

The session will feature 4 speakers with experience in Natech risk/emergency management from different stakeholder groups and will conclude with a discussion in which speakers take questions from the audience and session moderators.

### PRESENTATIONS

- Natech emergency management challenges: an overview (Kyriaki GKOKTSI, European Commission Joint Research Centre (JRC), EU)
- Natech response and recovery in isolated areas: the case of the Shika NPP (Ana Maria CRUZ NARANJO, Norwegian University of Science and Technology (NTNU), Norway)
- Operational response to Natech accidents – Lessons from the full-scale FORMATEX exercise 2023 (Hannes KERN, Industrial Risk and Safety Solutions, Austria)
- Operationalizing resilience engineering for Natech risk management, Ivonne HERRERA (Norwegian University of Science and Technology (NTNU), Norway)

# Natech Emergency Management Challenges: An Overview

A016

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**Keywords:** Natech, Emergency Management, Challenges, Recommendations.



The development of emergency procedures and plans is of paramount importance to effectively address Natural hazard-triggered technological (Natech) accidents in industrial or military facilities. Such plans entail measures and actions to combat and control fires, explosions, and toxic dispersion events; contain released hazardous material and mitigate their consequences to human health and the environment; warn, shelter, and evacuate potentially affected personnel and population.

Past Natech accidents confirm that Natech emergency management can be adversely affected by several factors due to the complexity and multi-hazard nature of such events. These factors originate from natural hazard impacts over potentially large geographical areas that could [1]:

- trigger multiple Natech accidents simultaneously;
- damage or disrupt the functionality of safety barriers, control systems, and critical utility networks (water, power, telecommunication);
- create secondary hazards due to chemical reactions of hazardous substances in contact with water;
- create a competition for emergency resources (personnel and equipment) to deal with both natural and technological disasters simultaneously; or
- render civil protection measures (sheltering and evacuation) and transport infrastructure inaccessible, inadequate, or inappropriate for use.

When Natech accidents occur in islands and remote locations, additional emergency management challenges could arise due to:

- potentially higher exposure of hazardous facilities to natural hazards (e.g., islands prone to floods or tsunamis, mountainous regions subject to landslides);
- limitations in available back-up utility networks and services;
- potential scarcity of emergency resources and dependence on external assistance;
- geographical constraints that could limit the availability of and accessibility to safe shelters and evacuation routes;
- adverse consequences to potentially protected and fragile ecosystems.

In this presentation, an overview of the above Natech emergency management challenges is provided, followed by recommendations on how to overcome them. It presents the necessary information for the development of Natech emergency plans, which should conservatively consider all possible contributing factors based on worst-case scenarios. To support these activities, the

role of the European Commission Joint Research Centre is presented, which focuses on the following initiatives:

1. forensic analysis of past Natech accidents and lessons learned through systematic collection and reporting of data in the eNatech database [2];
2. Natech risk analysis using the RAPID-N tool [3,4];
3. contribution to risk governance and guidance through collaboration with international partners and publications [5, 6, 7]; and
4. liaison with stakeholders and capacity building though training exercises and Natech risk analysis support.

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# Shaping Scenarios for Full Scale Exercises in the Context of Natech Events – Learnings from the Full Scale Exercise FORMATEX23

A086

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**Keywords:** Natech, Scenario Building, Emergency Planning, Risk Analysis, Exercises.



Natural hazard-triggered technological accidents (Natech events) pose complex and multifaceted risks, challenging conventional approaches in risk assessment and emergency preparedness. Scenario development for such events is essential for contingency planning and training but is hindered by uncertainty, data limitations, and the need for interdisciplinary coordination.

The presentation discusses the key challenges in shaping realistic and actionable Natech scenarios for emergency planning and exercises. It reflects on the different perspectives between operators and authorities when defining acceptable risk levels and outlines the value of safety reports under the Seveso III Directive as source for scenario building. Safety reports must integrate natural hazards into major accident scenarios, but operators often face strategic dilemmas when balancing transparency and regulatory repercussions.

The scenario-building process is dissected into several stages: site selection, hazard assessment (both natural and technological), effect prediction, and response strategy development. The presentation contrasts probabilistic and deterministic approaches, emphasizing the limitations of both in dealing with low-probability, high-impact events, particularly under conditions of climate change and systemic instability.

The European full scale exercise FORMATEX23 conducted in Austria in September 2023, provided an opportunity to test scenario building concepts in practice and offered learning opportunities for national and international emergency response teams. The exercise revealed key challenges in cross-sector communication, stakeholder alignment, and response scalability. It demonstrated that while technical drills are essential, real-world complexity often exceeds what is considered in predefined scripts. Scenario realism, stakeholder engagement, and adaptive planning emerged as decisive factors in improving preparedness.

The findings emphasize the need for integrated approaches and strategic foresight to complement existing planning frameworks and foster shared risk understanding among all stakeholders. In conclusion, scenario design for Natech events must evolve beyond traditional risk models to embrace complexity, promote transdisciplinary collaboration, and ensure operational relevance, as illustrated through lessons learned from FORMATEX23.

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# DRM and CCA in Island Contexts: IIASA and Partners' Insight and Engagement for a Future-oriented Agenda

SpSe-05-IP (in-person)

Room 4 (Municipal Board Meeting Room)

Tuesday, 30 September 2025

11:30-13:00

## Chairs

**Reinhard MECHLER**, International Institute for Applied Systems Analysis, Austria

**Stefan HOCHRAINER-STIGLER**, International Institute for Applied Systems Analysis, Austria

**Muneta YOKOMATSU**, International Institute for Applied Systems Analysis, Austria

## Rationale and Introduction to the Topic of the Session

Over the decades, island nations have been important foci for disaster and climate research and have been important players in policy debates around disaster risk management, insurance, and Loss & Damage policy. IIASA has long-standing research collaboration, co-generation, and training expertise in this space, including in Greece. It has published its findings not only in scientific journals but also through platforms, such as the IPCC and UNGAR, and engaged in direct discussions with policy practitioners. Other partners, such as the Risk and Disaster Management and the ENA Institute, are directly engaged in applied research in this space in Greece.

This conference is a vital opportunity to share IIASA's and partners' experience and identify issues for further research to strengthen practical efforts moving forward. In this session, we will first present several methodologies and case studies used to analyse disaster and climate risk management issues in island nations. Greek disaster and climate risk management experts will discuss the challenges faced by the Greek islands. Finally, we will revisit the analytical frameworks, methods, and models in terms of how they can help address key challenges and outline a research agenda for future efforts.

Key Discussion Points:

1. Justice in Wildfire Management: We will examine how marginalized communities disproportionately face wildfire impacts and discuss the need for equitable resource allocation, access to information, and inclusion in decision-making processes.
2. Nature-Based Solutions: The session will highlight how NbS—such as reforestation and sustainable land management—can enhance ecosystem resilience while mitigating wildfire risks. These solutions provide environmental benefits and promote social equity.
3. Stakeholder Engagement: Effective wildfire risk management requires the participation of diverse stakeholders, including local communities, indigenous

peoples, and government agencies. We will explore best practices for inclusive dialogue and co-development of strategies that ensure all voices are heard.

4. Case Studies: Real-world examples will illustrate successful integration of justice, NbS, and stakeholder engagement in wildfire management, showcasing innovative approaches that enhance community resilience and promote equitable outcomes.

### Format of the Session

Panel discussion.

First, the session organizer introduces the session's theme. Then, three panellists from IIASA and three from Greece give brief presentations, oral reports, or raise issues. The organizer facilitates the discussion, and the panellists share their opinions on the points being clarified. Audience participants also join the discussion.

### Panellists

- Stefan HOCHRAINER-STIGLER, International Institute for Applied Systems Analysis, Austria
- Reinhard MECHLER, International Institute for Applied Systems Analysis, Austria
- Kalliopi SAPOUNTZAKI, Professor, Harokopio University, Greece
- Ioannis SPILANIS, Prof. Emeritus, the University of the Aegean, Greece
- Muneta YOKOMATSU, International Institute for Applied Systems Analysis, Austria

# Risk Governance of Earth Environmental Systems in Global Ecological Transition Zones

SpSe-06-IP (in-person)

Room 3 (Municipal Amphitheatre)

Wednesday, 1 October 2025

11:30-13:00

## Chairs

**Peijun SHI**, Professor, Beijing Normal University, China

**Chunyang HE**, Professor, Beijing Normal University, China

## Rationale and Introduction to the Topic of the Session

Ecotones—transitional zones between distinct ecosystems (e.g., forest-grassland interfaces, coastal areas, and mountain-plain boundaries)—are critical yet vulnerable hotspots where climate change and human activities interact to amplify systemic risks, including biodiversity loss, cascading disasters, and socio-ecological imbalances.

The session focuses on advancing interdisciplinary research and policy innovations to address the complex risk dynamics of ecotone earth environmental systems. The following issues will be discussed:

1. Risk mechanisms: the thresholds and tipping points in ecotones under compound stressors (e.g., climate extremes and land-use changes) and model cascading effects of cross-boundary hazards, such as drought-wildfire-biological invasion chains.
2. Resilience strategies: case studies about synergies between traditional ecological knowledge and modern engineering, alongside transboundary governance models and nature-based solutions, and
3. Policy integration: standardization of ecological restoration technologies in line with carbon neutrality goals.

## Format of the Session

General parallel session.

## Presenters

- Prof. Peijun SHI, Beijing Normal University, China
- Prof. Chunyang HE, Beijing Normal University, China
- Dr. Gangfeng ZHANG, Beijing Normal University, China
- Mr. Zhe LIU, Beijing Normal University, China
- Mr. Yuefeng JIANG, Beijing Normal University, China
- Ms. Yiwen WANG, Beijing Normal University, China

# Resilient Power Supply and Demand Systems for Isolated Regions

SpSe-07-IP (in-person)

Room 2 (Amphitheatre of the Region)

Tuesday, 30 September 2025

16:30-18:00

## Chairs

**Tsuyoshi UENO**, Senior Research Scientist, R&D Manager, Central Research Institute of Electric Power Industry, Japan

**Yoshio KAJITANI**, Professor, Kagawa University, Japan

## Rationale and Introduction to the Topic of the Session

We will introduce the recent advancements of power demand forecasting during a disaster in Japan, targeting at applying this forecasting technique to design a power microgrid. As many know, the 2024 Noto peninsula earthquake in Japan generated many isolated regions, of which recovery was prolonged due to the difficulty in restoration of roads and other infrastructure especially in aging and sparsely populated areas. This example illustrates the future of not only many Japanese countryside, but also other similar population-declining regions in the world. A distributed infrastructure system such as the microgrid has a large potential of reducing the risk coming from regional isolation during a disaster. In this session, the interdisciplinary team, composed of energy and disaster professionals in Japan, will introduce an integrated approach to designing the necessary power supply by microgrids from the standpoint of electricity demand estimation during a disaster.

## Format of the Session

Oral presentations followed by Q&As.

## Presentations

- Estimation of Regional Electricity Demand Curves for Disaster-Resilient Local Grid Operations, Tsuyoshi UENO, Senior Research Scientist, R&D Manager, Central Research Institute of Electric Power Industry, Japan
- Building-usage database construction by LTSM for accurate evacuee and business impact forecasting during disaster, Yoshio KAJITANI, Professor, Kagawa University, Japan
- Modeling business sector resilience against energy supply disruptions and constraints, Ayumi YUYAMA, Research Scientist, Central Research Institute of Electric Power Industry, Japan
- Estimation of the power consumption of air conditioners in various evacuation shelters, Ayako YASUOKA, Research Scientist, Central Research Institute of Electric Power Industry, Japan

- A study on quantitative evaluation of the resilience of Japanese residential houses, Masahito TAKAHASHI, Senior Research Scientist, Central Research Institute of Electric Power Industry, Japan

# Estimation of Regional Electricity Demand Curves for Disaster-Resilient Local Grid Operations

A014

Tsuyoshi UENO[1], Ayumi YUYAMA[1], Ayako YASUOKA[1], Shohei YASUDA[1], Yoshihiro KABEYAMA[2] and Yoshio KAJITANI[2]

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[2] *Kagawa University (Japan)*

**Keywords:** Electricity Demand Estimation, Local Grid, Disaster-Resilient Energy System.



In the future, regional electricity grids—systems that supply electricity to specific local areas rather than broad regions—may increasingly incorporate large amounts of renewable energy sources, such as solar power. If such regional grids are operated as local production-for-local-consumption systems (in which all generated electricity is consumed within the region) or as off-grid systems (completely separated from larger interconnected grids), it becomes essential to accurately estimate the electricity demand curves of the residential, commercial, and industrial sectors within the region.

In particular, when considering electricity supply strategies during disasters, it is critical to develop supply plans that account for demand fluctuations based on the severity of the disaster and the prioritization of essential consumers.

In this presentation, we introduce several ongoing efforts to estimate regional electricity demand under both normal conditions and disaster scenarios.

First, we present a power demand simulation tool developed by the authors. Then, we describe a series of studies, including:

- a demand estimation method that incorporates the operational status of business facilities after disasters such as earthquakes and floods, and
- a method for estimating electricity demand in evacuation shelters.

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# A Study on Quantitative Evaluation of the Resilience of Japanese Residential Houses

A053

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**Keywords:** Energy Resilience, Distributed Resource, Battery Storage, Electrified House, Climate Change Mitigation.

The typhoon No.15 in 2019 and the Hokkaido Eastern Iburi Earthquake in 2018 caused damage to the power infrastructure, resulting in large-scale blackouts that had a significant impact on the lives and economic activities of local residents. With the increasing severity of natural disasters, the importance of resilience in the energy sector is growing in Japan.

Our organization, CRIEPI, is conducting studies on regional grids as part of the NEDO project. In order to improve the resilience, it is important to take measures not only on the grid side but also on the demand side. If the penetration rate of PV, EV, and battery storage increases in the future, there is a possibility that detached houses will operate independently using these resources during a power outage. The possible duration of independent operation will also be affected by the supply capacity of the grid side.

In this paper, we conducted a simulation of power supply and demand within a detached house during normal times and during a power outage when distributed resources are introduced, targeting houses with installed photovoltaic (PV) systems. By introducing distributed resources, the simulation results show that it is possible to self-supply power within the house during a power outage and reduce CO2 emissions. Therefore, electrified houses with PV and storage batteries or EV/V2H, and SOFC houses, can be expected as demand-side measures to simultaneously promote climate change mitigation and improve resilience. The challenge is the economic feasibility. Future challenges include expanding the method to quantitatively evaluate resilience improvement measures for both supply and demand sides with regional grids, and enabling evaluations that consider regional characteristics such as energy conditions and disasters.

# Dynamic Resilience: Empirical Evaluation and Simulation for Improved Assessment and Management

SpSe-08-H (hybrid)

Room 3 (Municipal Amphitheatre)

Monday, 29 September 2025

14:40-16:10

## Chairs

**Kakuya MATSUSHIMA**, Disaster Prevention Research Institute, Kyoto University, Japan

**Hirokazu TATANO**, Disaster Prevention Research Institute, Kyoto University, Japan

## Rationale and Introduction to the Topic of the Session

This session evaluates dynamic resilience, a crucial aspect of disaster risk reduction (DRR). Unlike static resilience (focused on immediate crisis response), dynamic resilience encompasses long-term post-disaster actions such as repairs, reconstruction, and adaptations to prevent future disruptions. This involves potentially new resources and a longer timeline. Focusing on dynamic resilience is vital for long-term recovery and future disaster preparedness.

The session will explore methodologies for assessing dynamic resilience, analysing pre- and post-disaster investments, including insurance, government support, and other financial instruments. We will also introduce a business recovery simulation system. This system simulates business recovery (e.g., sales, cash flow) and evaluates the impact of proactive and reactive strategies on dynamic resilience.

## Format of the Session

Panel discussion.

Opening Remarks: A brief welcome and introduction from the session chair.

Review of Dynamic Resilience Studies: A presentation reviewing existing methodologies and research on evaluating dynamic resilience in disaster risk reduction (DRR). This will include a discussion of pre- and post- disaster investments and the role of financial instruments.

Introduction of the Business Recovery Simulation System: An overview of a new simulation system designed to model business recovery following a disaster. The system will be demonstrated, highlighting its ability to simulate key metrics (e.g., sales, cash flow) and assess the impact of different recovery strategies.

## Panellists

- Yoshio KAJITANI, Faculty of Engineering and Design, Kagawa University, Japan
- Yota HIRONO, Disaster Prevention Research Institute, Kyoto University, Japan

- Noah DORMADY, John Glenn College of Public Affairs, The Ohio State University, USA
- Huan LIU, Disaster Prevention Research Institute, Kyoto University, Japan
- Subir SEN, Department of Humanities & Social Sciences, Indian Institute of Technology Roorkee, India

# Experiences from La Réunion: Lessons Learned from 2024 and 2025 Cyclones and Initiatives to Further Improve Population Preparedness

SpSe-09-O (online)

Room 5 (General State Archives of Samos)

Tuesday, 30 September 2025

11:30-13:00

## Chairs

**Matthieu BRANLAT**, SINTEF, Norway

**Aurélie GRONDIN**, Association Sciences Réunion, La Réunion / France

## Rationale and Introduction to the Topic of the Session

A French island of the Indian Ocean, La Réunion has a long history of exposure to extreme weather events. Two cyclones recently affected the island, Belal (2024) and Garance (2025). In addition to 5 people tragically losing their life, the latter generated tremendous damage in infrastructures and households, with communities affected by interruptions of roads, communication, power and water over several weeks. In spite of this dramatic impact, it might be argued that more dire consequences were avoided thanks to many successes in the preparation to and management of these events, for instance: weather forecast functioned well and was communicated effectively to the population, which was attentive to various information channels; although not all, many people followed preparedness practices and guidance, or requests to evacuate to emergency shelters.

Through lessons learned from recent events, as well as concrete examples of successful initiatives over the past years in La Réunion, the panel will reflect on the specific challenges such islands face (e.g., exposure to risks, changing conditions and capacities), but also on the opportunities they represent to improve disaster management and involve the population. The panel will also discuss remaining challenges and ways forward. The initiatives presented will cover a wide range of themes, including: the role of authorities in animating the local network of stakeholders; the education of the population, including the youth; the various forms of involvement of local communities as multipliers of knowledge and capacity; and approaches to address further needs and drive innovation in disaster management.

The panel will be organized remotely from La Réunion. It will be chaired by representants of Horizon project SYNERGIES, which currently conducts a pilot in La Réunion on the topic of population preparedness, and will involve actors of the island to provide knowledge on the local context and disaster management activities.

### Format of the Session

Panel discussion.

All presenters will draw from their experiences related to the cyclones that affected la Réunion in 2024 and 2025. They will provide their perspectives on needs and directions for improvement of preparedness.

### Panellists

- Sabine STAAL (DEAL) and Thomas PINOT (EMZ) will present the overall context and organization of DRM activities in the island
- Camille CHARRIER (PIROI) will present disaster risk education activities for schools and the larger public
- Martine NOURRY (association K-pab6T) will present the development of resilience capabilities in and through communities, in collaboration with the French
- Daniel DAVID (AGORAH) will present communication initiatives to increase risk awareness, including the information platform on natural risks managed by the planning agency AGORAH
- Evelyne TARNUS will provide a perspective on challenges and opportunities for DRM research and innovation on the island

# Building Resilient, Inclusive Disaster Response Frameworks for Animals

SpSe-10-IP (in-person)

Room 2 (Amphitheatre of the Region)

Tuesday, 30 September 2025

11:30-13:00

## Chairs

**Gaia BONINI**, Humane World for Animals (Global, United States of America)

**Elena DEDE**, Dogs' Voice (Athens, Greece)

## Rationale and Introduction to the Topic of the Session

The Society for Integrated Disaster Risk Management (IDRiM) emphasizes innovative approaches to disaster resilience, particularly for vulnerable and remote areas such as islands. Despite significant advancements in disaster risk reduction, the welfare of animals continues to be an underrepresented area within disaster preparedness, response, and recovery frameworks. This Special Session seeks to address these gaps by presenting a collaborative, multi-level approach to integrating animal welfare into comprehensive disaster resilience structures, specifically those rooted in island nations.

## Format of the Session

Presentation and panel discussion.

Humane World for Animals will present a global perspective on developing resilient frameworks that include animals within disaster management systems. This presentation will showcase best practices and strategic frameworks aimed at enhancing preparedness and response capabilities for animals during crises, particularly in regions where resources and response capabilities are limited. The organization's approach aligns with the overarching goals of IDRiM2025 to foster cross-sectoral collaboration and knowledge-sharing for enhanced disaster resilience.

Dogs' Voice will offer a complementary national perspective focused on the development of Greece's preparedness and response mechanisms for animals during disasters. By detailing the establishment of a cooperative Memorandum of Cooperation for a national preparedness plan dedicated to the protection of animals, Dogs' Voice will illustrate the importance of formalized frameworks in advancing national resilience goals. This national plan emphasizes the training of response personnel across various disciplines, including shelter medicine, animal search and rescue, emergency sheltering and post-crisis management of the stray animals' population. Additionally, Dogs' Voice has developed island-specific response protocols to address the logistical and infrastructural challenges unique to Greece's island communities, ensuring that preparedness and response strategies are both adaptable and locally tailored to enhance resilience.

The session will conclude with a panel discussion featuring representatives from Dogs' Voice, Humane World for Animals, the president of the Greek Veterinary Association, and the Special Secretary for the Protection of Companion Animals (Ministry of Interior Affairs) overseeing Greece's preparedness planning. This dialogue will explore collaborative strategies, lessons learned, and actionable recommendations for developing adaptive, inclusive, and resilient disaster response frameworks that protect both human and animal welfare during crises.

### PANELLISTS

- Gaia BONINI, Humane World for Animals, Global - Presenter
- Elena DEDE – Dogs' Voice, Greece – Presenter/Panelist
- Adam PARASCANDOLA – Humane World for Animals, Global - Panelist
- Stephanos BATSAS – Vice- President of the Greek Veterinary Association - Panelist
- Nikolaos CHRYSAKIS – Special Secretary for the Protection of Companion Animals / Ministry of Internal Affairs – Panelist

# Sharing Experiences of Disaster and Recovery: Voices from The Island of Samos, Greece, and Noto Peninsula, Japan

SpSe-11-H (hybrid)

Room 3 (Municipal Amphitheatre)

Tuesday, 30 September 2025

09:40-11:10



## Chairs

**Miranda DANDOULAKI**, Disaster management specialist, Athens, Greece

**Norio OKADA**, Advisor, Kwansei Gakuin University and Professor, Kyoto University, Japan

**Robert GOBLE**, Professor, Clark University, United States of America

## Rationale and Introduction to the Topic of the Session

The importance of sharing disaster-related experiences is well recognized in the field of hazards and disasters. At an international and country level, organizations such as UNDRR, WEF, the World Bank, the US National Weather Service have supported sharing stories and disaster experiences among a variety of key actors and experts. At a local level, research on formal and informal sharing of disaster experiences exposed the positive effect of sharing disaster-related experiences on relationship building, boosting disaster preparedness, learning from past disasters, and overall, on enhancing community resilience.

The Session brings together local stakeholders and community leaders from two areas, one in Greece and one in Japan, who have experienced a disaster through different roles and in different disaster phases and builds on their organized exchange and communication. The aim is to develop a living document on commonalities, differences, lessons learnt and challenges. This session is intended to collaborate closely with the IDRiM Implementation Gap Task Force.

Samos, Greece, was hit by an Mw=7.0 earthquake followed by tsunami in October 2020, which killed 2 teenagers and caused extended damages to buildings and infrastructure. Noto Peninsula, Japan suffered a Mw7.5 earthquake followed by tsunami in January 2024, which devastated a vast area. Although very different, the two areas present characteristics of isolation and remoteness. Furthermore, though not in the same disaster phase, they might undergo similar paths towards reconstruction.

Besides exploring how disaster-related experience exchange can be employed in promoting disaster preparedness and better disaster response and recovery, the ambition of the Session is to build relationships and use the collectively developed living document as means for maintaining future communication and collaboration among participants and

communities. This effort is an example of a human-centered approach toward the challenges to disaster risk management; the stories and comparisons will provide new knowledge that can contribute to better understanding of implementation gaps and implementation in general.

### Format of the Session

Panel discussion.

The Session opens with two presentations that expose the local context and disaster conditions in Samos and Noto. Afterwards, each community member/local stakeholder shares his/her experiences. The series of speeches is arranged according to the disaster phases. Questions and comments by other participants are welcome after each speech.

At the end, the moderators will sum up commonalities and differences, lessons and challenges, and all participants will discuss and shape the outcome of the session to generate a living document that will initiate future communication between the two communities and will be revisited in a similar session in IDRiM2026 Conference.

# Disaster Risk Reduction in the Era of Climate Change: Addressing Complex Risks in Mountain Regions Through Systemic Lenses

SpSe-12-H (hybrid)

Room 4 (Municipal Board Meeting Room)

Wednesday, 1 October 2025

11:30-13:00

## Chairs

**Stefan SCHNEIDERBAUER**, UNU-EHS & EURAC Research, GLOMOS programme, Italy

**Federica ROMAGNOLI**, EURAC Research, GLOMOS programme, Italy

## Rationale and Introduction to the Topic of the Session

Mountain regions are highly prone to multiple risks intensified by climate change and socio- demographic drivers. They are characterised by steep terrain, high climatic variability, physical isolation as well as human mobility and migration processes – all aspects, which complicate respective disaster risk management procedures. At the same time, mountain communities who are living in mountainous high-risk landscapes, have developed intricate understandings of their environment. This knowledge, often rooted in centuries of living with harsh nature conditions, is the result of social, cultural, spiritual, political, and economic spheres, shaping the community norms and land management practices throughout generations and hence strongly influencing their levels of vulnerability and resilience. The resulting complexity of mountain social-ecological systems calls for disaster risk management and climate change adaptation strategies to be both systemic and tailored to the unique conditions of mountain environments. This is of particular importance as the positive or adverse consequences of the risk management procedures in the upland often cascade beyond high-altitude areas, affecting ecosystems and populations downstream.

Against this background, the session aims at scrutinizing mountain-specific challenges and opportunities related to reducing disaster risk and enhancing climate resilience from a systemic perspective and taking into account the interconnection of upland – lowland processes. With this session we aim at encouraging a dialogue among experts from different disciplines and sectors from mountain regions worldwide and to share experiences in the integration of diverse knowledge systems for the development of mountain-specific risk management strategies.

Participants will have an opportunity to engage in discussions on:

- Mountain specific multi-hazards risk reduction activities
- Mountain-tailored strategies to increase resilience to climate change impacts
- Local transformation processes in the contexts of climate change adaptation

- Risk governance and management approaches connecting highland and lowland areas
- Beyond Top-Down DRM and CCA: Promoting systemic, locally embedded, and community-led risk management and climate change adaptation strategies

### Format of the Session

Panel discussion.

The session will consist of two components. Following an opening and introductory speech, in a first part, selected speakers will give concise presentations on key issues related to risk management in mountain regions. In the second part we will host panel discussion, where invited experts will reflect on guiding questions to explore challenges and future pathways for risk management in mountains.

A concluding activity will engage participants in identifying key messages that highlight both shared challenges and local particularities. This interactive segment would possibly employ digital tools (e.g., Miro, Mentimeter) to facilitate inclusive participation from both in-person and remote attendees.

### Presentations and Panelists

- "Mountains in transformation: Ecosystemic relations and adaptive resilience between Lowlands and Highlands in Trentino (Italy)", Alisia TOGNON, Assistant Professor, School of Architecture Urban Planning Construction Engineering, Department of Architecture and Urban Studies (DAStU), Politecnico di Milano (Italy)
- "The IAHS Drought in Mountain Regions working group", Dr Francesco AVANZI, CIMA Research Foundation / Mountain Drought Network (Italy) (online)
- "Dynamic Landslide Risk linked to Urbanisation and Climate Change in Steep Terrain", Ugur OEZTUERK, Professor, University of Wien (Austria) (in person)
- "Leave No Mountains behind: Solutions and Best Practices addressing and reducing risks through Climate Change Adaptation", Otto SIMONET, Director, Zoï Environment Network (Switzerland) (online)
- "Post-eruption analyses in a Chilean Patagonian catchment", Lorenzo PICCO, Associate Professor, TESAF Department of Land, Environment, Agriculture and Forestry, University of Padova (Italy) (in person)
- Arighna MITRA; Suchismita MUKHOPADHYAY; Sakshi DASGUPTA, Coalition for Disaster Resilient Infrastructure (online)

# From Theory to Action: Lessons from Multi-Risk Case Studies for Advancing Disaster Risk Management

SpSe-13-H (hybrid)

Room 4 (Municipal Board Meeting Room)

Wednesday, 1 October 2025

14:40-16:10

## Chairs

**Silvia TORRESAN**, Euro-Mediterranean Center on Climate Change, Italy

**Timothy TIGGELOVEN**, Vrije Universiteit Amsterdam, VUA, The Netherlands

**Ignacio Agustin GATTI**, Euro-Mediterranean Center on Climate Change, Italy

**Stefan SCHNEIDERBAUER**, Global Mountain Safeguard Research (GLOMOS), United Nations University, Institute for Environment and Human Security, Germany; Eurac Research, Italy

**Erick MAS**, International Research Institute of Disaster Science, Tohoku University, Sendai, Japan

## Rationale and Introduction to the Topic of the Session

Natural hazards are becoming more intense and frequent worldwide (UNDRR 2024). Almost 19% of the 16,535 disasters recorded in EM-DAT (1900–2023) are classified as multi-hazard events, representing 60% of the estimated global economic losses (Lee et al. 2024). Remote islands, urban, mountain and coastal areas, are among the most affected regions (Sjöstedt & Povitkina 2016).

Against this background, several research projects have developed a broad range of methods, tools, frameworks, and innovative solutions in recent years, enabling decision-makers to adopt a systemic and multi-risk approach to disaster risk management and transformational climate adaptation. Effective multi-hazard risk management faces many challenges (Trogrlić et al. 2024), particularly related to the hurdles and impediments of translating academic research into practical applications. In response, innovative risk and resilience frameworks have been proposed in multiple applications worldwide. However, the level of integration of these concepts into policies, risk management practices, and replicability and transferability to other areas, is still not satisfactory.

This session aims to bridge the implementation gap between theoretical risk frameworks and practical applications by presenting multiple case studies on compound, consecutive, and multi-hazard risks, as well as climate adaptation. It highlights recent advancements in multi-risk case studies that address real-world challenges. They cover a wide range of applied tools, techniques, and successful practices, and follow an approach that co-develops solutions by including risk owners and relevant actors from the project design

stage. It explores both qualitative and quantitative approaches for building multi-risk scenarios and identifying effective risk management strategies.

By integrating insights from both EU and global projects and initiatives, the session will foster a forward-looking dialogue on advancing disaster risk reduction and climate change adaptation. This will be achieved by focusing on innovative, evidence-based systemic risk approaches and discussing the upscaling and transferability of these tools on other regions.

### Format of the Session

Panel discussion.

1. Welcome & Introduction by the Chairs.
2. Five presentations derived from international projects like AGILE, MYRIAD-EU, Enabling Human-Centered Digital Twin for Community Resilience.
3. Interactive Panel Discussion, including Audience Engagement & Q&A (20 min). Here the session chairs will drive a dynamic debate on exchanging experiences, best practices, or implemented solutions. This section includes interactive polls (i.e. Mentimeter) for the audience.
4. Closing & Takeaways (5 min)

The chairs will conclude by synthesizing key takeaways from the discussion, emphasizing the potentialities for upscaling and transferability. Interactive Panel Discussion, including Audience Engagement & Q&A. Here the session Chairs will drive a dynamic debate on exchanging experiences, best practices, or implemented solutions. The section includes interactive polls (i.e. Mentimeter) for the audience.

Closing & Takeaways. The Chairs will conclude by synthesizing key takeaways from the discussion, emphasizing the potentialities for upscaling and transferability.

### Presentations and Panellists

- “Co-Designed Multi-Risk Governance and Adaptive Pathways in the Canary Islands”, Noemi PADRON FUMERO, Universidad de La Laguna, Canary Islands, Spain.
- “Applying stress testing in different operational contexts: potential and challenges”, Gianluca PESCAROLI, University College London, London, United Kingdom.
- “Real time estimation of population exposure to multihazards with mobile spatial statistics”, Erick MAS, Tohoku University, Sendai, Japan.
- “Supervised Machine Learning for multi-risk assessment across different landscapes: a Myriad-EU case study”, Davide FERRARIO, Euro-Mediterranean Center on Climate Change, Venice, Italy.
- “Social Ageing and Vulnerability in Rural Areas: A Case Study of the Noto Earthquake and Flood”, Miwako KITAMURA, International Start-up Incubation, Tohoku University, Sendai, Japan.

# EU Research in Support of Disaster Risk Reduction with Focus Islands and Remote Areas – State of Play and Perspectives

SpSe-14-IP (in-person)

Room 3 (Municipal Amphitheatre)

Wednesday, 1 October 2025

09:40-10:40

## Chairs

**Giannis SKIADARESIS**, DG HOME, European Commission

**Philippe QUEVAUVILLER**, DG HOME, European Commission

## Rationale and Introduction to the Topic of the Session

EU Research and Innovation in support of Disaster Risk Reduction policies is active in various thematic areas of the Horizon Europe Programme (2021-2027), covering a wide range of issues related to e.g. health, social sciences, security, environment and climate, food and agriculture. In particular, the Civil Security for Society (Cluster 3) programme has a focused research streams called "Disaster-Resilient Societies" (DRS) which, besides other research efforts related to fight against crime and terrorism and border security, gathers key DRR actors, including policymakers, scientists, practitioners, SME/industry and civil society representatives. DRS research activities are supporting international Disaster Risk Reduction (DRR) policies such as the UN Sendai Framework for Action and, in the European Union, the Union Civil Protection Mechanism (UCPM), as well as sectorial regulations (e.g. related to floods, droughts, health, CBRN etc.).

A range of EU projects is hence running in the fields of societal resilience, disaster risk management and governance, technologies for first and second responders and standardisation, and current programming for further funding in the context of the three last Horizon Europe calls (2025-2027). Research outputs contribute to enhancing methodological knowledge and technologies that are needed within the DRM cycle, namely prevention, preparedness, response and recovery, for a wide range of disasters (hydrometeorological extreme events, health threats, industrial accidents including NaTech risks, as well as threats related to Chemical, Biological, Radiological or Nuclear (CBRN) accidents or criminal/terrorist origins). The results hence contribute to recommendations that guide policy actions at national, regional and local levels, and exchanges are undertaken within the EU among different sectors and disciplines in the framework of the Community of European Research and Innovation for Security (CERIS), which facilitates the identification of research gaps in the DRR above mentioned areas.

The side-session will gather representatives of on-going DRS projects to illustrate different threats and needs faced by isolated regions such as islands and remote areas, e.g. weather extreme events, digital breakdowns, community resilience to disasters, and CBRN incidents, as well as a representative of the European Commission to exchange about

research perspectives. The session will potentially raise new ideas of research as well as strengthening or developing partnerships at international level.

### Format of the Session

Panel discussion.

### Panellists

- "Co-developing stakeholder support tools for managing systemic risks and promoting disaster preparedness and resilience (PARATUS project)" by Dr Funda ATUN, University of Twente, The Netherlands.
- "Mediterranean and pan-European forecast and Early Warning System against natural hazards (MEDEWSA project)" by Prof. Dr. Juerg LUTERBACHER, Justus Liebig University Giessen, Germany.
- "Holistic capability and technology evaluation and co-creation framework for upskilled first responders and enhanced CBRN-E response (TeamUp project)" by Dr Eleftherios OUZOUNOGLOU, ICCS, Greece.
- Solid Preparedness and Resilience for Robust Operations during disaster Wilderness (SPARROW project) by Matous BOLEK, Drony SIT, Czech Republic.

# Implementation Science III: Cataloguing Implementation Situations, Stories, and Gaps

SpSe-15-HP (hybrid, plenary)

Room 1 – Main Venue (Epicurean Cultural Centre)

Tuesday, 30 September 2025

14:30-16:10

## Chairs

**Norio OKADA**, Adviser, Kwansei Gakuin University, and Emeritus Professor, Kyoto University, Japan

**Robert GOBLE**, Professor, Clark University, USA

**Kami SEO**, Associate Professor, Aoyama Gakuin University, Japan

**Guoyi HAN**, Senior Research Fellow, Stockholm Environment Institute, Sweden

## Rationale and Introduction to the Topic of the Session

To better understand implementation of disaster risk reduction measures and to develop an appropriate and useful implementation science is one of the goals of the IDRiM society. We, the four conveners, have pursued this goal and reported progress in three previous IDRiM conferences. We began with a concept paper at IDRiM2022. That paper argued that studying implementation gaps would be a pathway to developing an implementation science. "Implementation gaps" refer to discrepancies between what was planned or expected and what actually happened during the course of a project, program, or policy. These gaps may involve positive or negative deviations from expectations. Different stakeholders—implementers, beneficiaries, funders, or observers—may have divergent understandings of both plans and outcomes. Gaps, as they are perceived, are thus dynamic features of the complex, evolving, real world processes of implementation.

After much discussion, the concept paper became a published paper in the IDRiM journal. An IDRiM implementation task force was formed; its mandate was to create more interest in implementation and enlarge the research effort. The research focus has been to develop an empirical base of stories about implementation situations and implementation gaps. The task force holds seminars and has scheduled a special issue of the IDRiM journal on implementation.

This session is to continue the discussions at previous IDRiM conferences. Our objectives are to report on progress made, and to encourage broader participation in the research effort. Okada and Goble will provide an introduction and discussion of the human-centered nature of our perspective on implementation; Seo and Han will discuss the research focus on collecting stories and cataloguing them; Matsuda and Onishi will each provide an example of implementation gaps associated with a particular implementation situation.

The session will conclude with a substantial open discussion that we hope will elicit more implementation stories.

### Format of the Session

Panel discussion.

The session will include three 20 minute 2-part presentations:

1. An introduction and progress report on the implementation task force activities including a discussion of human-centred approaches in implementing disaster risk management measures (Norio Okada and Robert Goble)
2. A description of our effort to collect implementation stories, observe implementation gaps, and make a catalogue of implementation situations (Kami Seo and Guoyi Han)
3. Two example implementation stories illustrating implementation gaps (Yoko Matsuda and Masamitsu Onishi).

These presentations will be followed by a substantial open discussion which we hope will elicit more stories.

### Panellists

- Norio OKADA, Adviser, Kwansei Gakuin University, and Emeritus Professor, Kyoto University, Japan
- Robert GOBLE, Professor, Clark University, USA
- Kami SEO, Associate Professor, Aoyama Gakuin University, Japan
- Guoyi HAN, Senior Research Fellow, Stockholm Environment Institute, Sweden
- Yoko MATSUDA, Associate Professor, Kyoto University, Japan
- Masamitsu ONISHI, Professor, Kyoto University, Japan

# Supporting Vulnerable Communities in the Senegal River Valley, West Africa: An Initiative from CODEREM, Senegal

SpSe-16-O (online)

Room 5 (General State Archives of Samos)

Monday, 29 September 2025

16:30-18:00

## Chair

**Carole FAUCHER**, University Clermont-Auvergne/UNESCO Chair Global Health and Education, France

## Rationale and Introduction to the Topic of the Session

In 2024, the regions bordering the Senegal River experienced a natural disaster caused by exceptional flooding that affected the entire West African sub-region. In response to this situation, the association Convergence pour le Développement de la Région de Matam (CODEREM) (Convergence for the Development of the Matam Region) mobilized to help those affected. The damage includes collapsed homes, lost food supplies, submerged agricultural land, decimated livestock and destroyed equipment. Given the large number of households affected, CODEREM brought together a group of around 20 NGOs on both sides of the river in Senegal and Mauritania to coordinate efforts. Donations were collected and distributed to hundreds of victims in the form of food kits, clothing and building materials. In line with its mission, CODEREM has decided not to limit itself to providing relief but to set up a strategy to tackle the root causes of the problem, namely the effects of climate change, the lack of development policies, unregulated land use, the poor quality of building materials, low household incomes, etc.

The strategic areas of intervention are as follows:

1. Combat desertification and its adverse effects on people's lives through three components: land reclamation (construction of half-moon dykes); creation of tree planted windbreaks; management and conservation of ponds and seasonal water points.
2. Developing the land along the Senegal River with areas reserved for housing, agricultural land, grazing areas, small-scale fishing and craft activities.
3. Developing sustainable housing project including urban master plans and sustainable construction techniques using bio-based materials.

To carry out these strategies, CODEREM has gathered a pool of experts in the fields of planning, hydraulic and civil engineering, agronomy, socio-economy, housing and public health. In addition, the organization collaborates with the Senegalese government to search for potential partners at the community, local, national and international levels.

### Format of the Session

Panel discussion – Roundtable.

The format is between a panel discussion and a roundtable. First, the three speakers will explain together the situation around the Senegal River and how they have mobilized communities, local organizations and government offices through CODEREM. The second part of the session will consist of an open discussion with Q&A. The session will be interactive and various tools will be employed to help achieve this.

### Panellists

- Mamadou DIAGNE, Civil Engineer. Expert in Housing, Urban Development, Infrastructures. President of CODEREM
- Amadou Seydou DIA, Civil and Agriculture Engineer. Expert in Water Sanitation, Irrigation and in Institutional Reforms
- Aliou DIA, Medical Doctor and PhD Candidate (last year at the University Clermont-Auvergne. Head of School Health for the Government of Senegal. Expert in Public Health and active contributor to the UNESCO Chair Global Health and Education in Senegal

# Complex Adaptive System Theory for Disaster Resilience

SpSe-17-IP (in-person)

Room 4 (Municipal Board Meeting Room)

Tuesday, 30 September 2025

09:40-11:10

## Chairs

**Milad ZAMANIFAR**, Bauhaus University Weimar, Germany

**Lucian-Constantin UNGUREANU**, "Gheorghe Asachi" Technical University of Iasi, Romania

## Rationale and Introduction to the Topic of the Session

Urban areas comprise natural, built, and social systems. It is well established that such an agile, highly structured, highly intertwined network with interdependencies, interconnectedness, and multi-level emergences follows the commonality of a Complex Adaptive System (CAS). We are also not alien to this notion that disaster is one dynamic state of society under stress that eventually self-organizes into a new post-disaster equilibrium. However, a setting in which the two can meaningfully coexist has not yet been developed. Major advancements in the last decade have been made in operationalizing the concept of resilience in disaster research. The suitability of CAS to advance this understanding in the disaster resilience domain remains rather underexplored.

Complex Adaptive Systems theory has found its application as a versatile, transdisciplinary approach for understanding dynamic, non-linear phenomena that emerge from the reciprocal exchanges of energy, matter, and information among numerous heterogeneous agents. It has the potential to provide a powerful, innovative lens that can create new dimensions of understanding and operationalization in which microscopic and macroscopic system dynamics and behaviours can be understood and causalities and nexuses identified.

The track's objective is the following:

1. To explore opportunities in perceiving and modelling disasters informed by CAS theory, as well as set up research priorities for a forward-looking, disaster resilience research agenda,
2. To foster collaboration between complexity scientists, critical infrastructure, and disaster resilience researchers,
3. To showcase innovative applications of CAS theory in disaster risk reduction, highlighting lessons learned and best practices and,
4. To provide a platform for critical evaluation of existing methods and frameworks in resilience and complexity science.

## Format of the Session

Oral presentations and collaborative group work.

**PANELLISTS**

- Opening remarks on Complex Adaptive System Theory for Disaster Resilience (Dr. Lucian-Constantin UNGUREANU)
- Complex Adaptive System Theory for Disaster Resilience: Application, Challenges, and Future Research (Dr. Milad ZAMANIFAR)
- Modelling Critical Flows for Systemic Resilience: A Framework for Addressing Complex Hazards and Hybrid Crises (Dr. Haris RAHADIANTO, Dr. Jonas JOHANSSON)
- Beyond one-size-fits-all: the Cynefin framework for adaptive disaster management in small island states (Dr. Farah NIBBS)
- Interactive group knowledge co-creation lab: Who's Connected to Whom? Mapping post-disaster networked interactions and feedback loops in the urban system (group work and discussion)

# Complex Adaptive System Theory for Disaster Resilience: Application, Challenges, and Future Research

A109

Milad ZAMANIFAR[1], Lucian Constantin UNGUREANU[2]

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**Keywords:** Complex Adaptive Systems, Disaster, Hazard, Resilience.



Urban ecosystems consist of natural, built, and social systems. Such systems—highly structured and deeply intertwined—are well understood to function as Complex Adaptive Systems (CAS), characterized by constantly evolving multi-level emergent properties. Disasters, too, are recognized as dynamic states in which stressed urban systems self-organize toward new equilibria. Yet, a framework enabling their meaningful coexistence remains undeveloped. While significant progress has been made in operationalizing resilience within disaster research, the suitability of CAS to advance this understanding remains underexplored.

CAS theory found its application as a versatile transdisciplinary approach for understanding dynamic non-linear phenomena that emerge from the reciprocal exchanges of value —whether energy, matter, or information— among numerous heterogeneous agents. It provides a powerful, innovative lens for new dimensions in which microscopic and macroscopic system dynamics and behaviors can be understood and causalities and nexuses identified. These features could be valuable, particularly for disaster risk management, which involves an embedded urban system of highly ordered networked actors across scales and levels, exhibiting functional polymorphism when facing external noise or energy (e.g., hazards).

Through a review of disaster resilience and CAS literature, this paper examines the opportunities, challenges, and limitations of integrating CAS theory into disaster resilience research. We critically assess whether this integration represents a meaningful interdisciplinary advance or merely introduces redundant jargon to an already fragmented field.

Unlike traditional disaster research, which focuses on resilience through vertically large-scale high-level changes in the system, we argue that the CAS perspective frames resilience as an emergent property and product of a system rising from horizontally distributed local-level interactions. This view, in addition to the universality and commonality of CAS's principles and methodologies across disciplines, offers a unique capacity for new understanding of disaster resilience dynamics, its enablers and disruptors, and designing effective interventions. CAS application promises a real opportunity, a lens, and language that could potentially connect different disciplines, a holistic and in-depth system view, and unify a common

understanding across sectors, scales, and contexts. In addition, non-trivial system demarcation, causal ambiguity, computational intensity, mathematical unpredictability, and system

heterogeneity pose significant challenges for the practical application of CAS in disaster resilience research. We conclude by outlining key directions for advancing CAS-based resilience frameworks.

# Modelling Critical Flows for Systemic Resilience: A Framework for Addressing Complex Hazards and Hybrid Crises

A167

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**Keywords:** Critical Flows, Systemic Resilience, Interdependencies, Modelling Framework, Complex Hazards.



In the face of increasing complexity and uncertainty, societies must enhance their ability to withstand and adapt to disruptions from a broad range of hazards. These include natural disasters, technological failures, and hybrid crises, which often lead to cascading effects across sectors, magnifying systemic vulnerabilities. In an increasingly interconnected and interdependent world, disruptions that traverse sectors and systems pose significant threats to critical societal functions. However, traditional risk assessments, often focused on isolated assets or events, fall short in capturing the systemic nature of modern vulnerabilities.

To address these challenges, this study advances the concept of Critical Flows as a foundational approach for understanding and enhancing systemic resilience. Critical Flows refer to the interdependent and dynamic movements of essential resources, services, and information that sustain vital societal functions [1]. Rather than focusing solely on critical infrastructure, this approach prioritises the flows through and between systems. Drawing from empirical studies and conceptual frameworks developed in a Swedish context [2], we argue that understanding the structure, behaviour, and vulnerability of these flows is essential for anticipating and mitigating cascading disruptions.

By mapping and modelling Critical Flows, stakeholders can better identify hidden interdependencies and critical points of failure that may not be visible through conventional infrastructure-based lenses. This paper presents a conceptual framework that incorporates a systems-of-systems perspective and demonstrates how it can be applied in resilience planning. The framework is intentionally generalisable across contexts and sectors, recognising that flows traversing systems are dynamic and context dependent. This approach enables the identification of both direct and indirect interdependencies within and between sectors and their relative criticality under stress.

The proposed framework supports a shift from reactive crisis response to proactive resilience building. It enables scenario-based analysis, cross-sectoral coordination, and prioritisation of interventions under uncertainty. Unlike traditional risk assessments focused on single assets or infrastructures, this approach captures the fluid, multi-level interconnections that underpin societal functioning. The resulting outcomes can facilitate prioritisation of response, support cross-sectoral contingency planning, and offer insights for authorities seeking to build robust preparedness strategies. By operationalising interdependencies and their behaviours under duress, the framework will enable decision-makers, planners, and analysts with the insights necessary to

strengthen societal robustness and adaptability in the face of a wide spectrum of evolving threats. In doing so, it lays a foundation for the future integration of Critical Flows into broader resilience policies and disaster risk reduction strategies.

## REFERENCES

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2. Månefjord, J. L., & Johansson, J. (2024). Critical flows throughout the Covid-19 pandemic – A longitudinal study on interdependencies and resilience in a Swedish context. International Journal of Disaster Risk Reduction, 103, 104295. Doi: 10.1016/j.ijdrr.2024.104295.

# Beyond One-Size-Fits-All: The Cynefin Framework for Adaptive Disaster Management in Small Island States

A054

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**Keywords:** Cynefin Framework, Small Island States, Disaster Management, Context-Based Decision-Making, Adaptive Governance.



Small island states face compounded disaster risks due to climate change, resource constraints, and systemic vulnerabilities [1, 2]. Traditional linear management models often fail to address the complex and emergent nature of these challenges [3]. This study proposes a theoretical framework for enhancing disaster management in small island states by applying the Cynefin Framework as a sense-making tool for complex situations [4]. The study aims to examine how this contextual decision-making approach can address the unique disaster vulnerabilities of small island states by providing appropriate response strategies across different types of environments—from clear to complicated, complex, and chaotic contexts.

The research employs:

1. A systematic literature review examining current disaster management practices in Caribbean small island states and applications of sense-making frameworks in crisis management contexts.
2. A qualitative case study of hurricane response in Dominica (Caribbean), mapping decision-making processes to Cynefin's domains (e.g., post-disaster chaos vs. long-term adaptation complexity).

The theoretical framework demonstrates the potential of the Cynefin approach to improve disaster management by:

- Distinguishing between different types of disaster contexts (ordered vs. unordered) to select appropriate management strategies
- Enabling more effective navigation of chaotic disaster environments through initial stabilization actions before seeking sustainable solutions
- Facilitating probe-sense-respond approaches in complex post-disaster recovery scenarios
- Applying good practices in complicated contexts and best practices in clear domains

The research identifies how disaster management in small island states often fails by treating all situations with the same approach, when different phases and aspects of disasters require domain- specific strategies. The framework provides decision-makers with contextual guidance for when to analyse (complicated), experiment (complex), act immediately (chaotic), or apply standard procedures (clear).

This theoretical work contributes to implementation science by providing a nuanced approach to disaster management that acknowledges different levels of complexity. For policymakers and practitioners in small island states, the research offers:

1. A contextual framework to categorize disaster risks by domain (chaotic to clear), avoiding one- size-fits-all responses.
2. Tools for identifying when standard operating procedures are appropriate versus when emergent, adaptive approaches are needed
3. Guidance for navigating between different domains as disaster situations evolve

The proposed framework demonstrates how context-aware approaches could enhance resilience in the diverse, rapidly-changing, and resource-constrained environments characteristic of small island states.

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# Response and Reconstruction in Samos, Greece, After the 2020 Earthquake and Tsunami: Challenges and Lessons Learnt at National, Regional, and Local Level

SpSe-18-IP (in-person)

Room 3 (Municipal Amphitheatre)

Wednesday, 1 October 2025

14:40-16:10

## Chairs

**Asimina KOUROU**, Head of the Direction of Emergency Planning, Earthquake Planning and Protection Organization, Ministry of Climate Crisis and Civil Protection, Athens, Greece

**Maria KLEANTHI**, Former Head of the Directorate General for Natural Disasters Rehabilitation, Ministry of Infrastructure and Transport, Athens, Greece

## Rationale and Introduction to the Topic of the Session

On October 30, 2020, 11:51 UTC, a large earthquake of Mw7.0 in eastern Aegean Sea area affected several Greek islands, mainly Samos, as well as the Izmir area in Turkey. A moderate damaging tsunami followed the earthquake and inundated many coastal zones in the area. It was the largest in the Aegean Sea since 1956 CE. In Samos, the damage was extended, 2 teenagers were killed, there were severe socioeconomic impacts.

Response was immediate and comprised a range of activities among them initial announcements of the earthquake and first assessment of the impact, dissemination of instructions to the population through the European emergency communication service 112, search and rescue, medical care, setting up of emergency shelters, provision of essential supplies to the affected population, psychological support, public information activities, and financial support to the affected population for emergency needs, inspection of building for the assessment of the suitability to be used.

Following the first emergency response phase, the national standard scheme for the rehabilitation of private buildings was implemented in parallel with a program for the organized demolition of buildings damaged beyond repair, the repair of public buildings, repair of damaged infrastructure.

Today, about 5 years after disaster, it is high time to generate an exchange on challenges and lesson learnt for response and recovery and to bring about the multifaceted governance challenges such a disaster presents in an island context.

## Format of the Session

Panel discussion.

## Panellists

- Maria KLEANTHI, Former Head of the Directorate General for Natural Disasters Rehabilitation, Ministry of Infrastructure and Transport, Athens, Greece/Title to be confirmed
- Dr Asimina KOUROU, Head of Social Earthquake Defence Directorate of Earthquake Planning and Protection Organization (EPPO), Ministry of Climate Crisis and Civil Protection, Athens, Greece/ “The Role of Earthquake Planning and Protection Organization in Responding and Recovering from Samos Earthquake”
- Georgios STANTZOS, Former Mayor of Eastern Samos Municipality, Samos, Greece/"The Front Line of Crisis: Multiple Emergencies and the Experience of Local Government in Samos (Earthquake – Tsunami, COVID-19, Migration Pressure)"

# Knowledge Formation and Paradigm Shifts in Disaster Risk Management: Unforeseen Disasters and Roles of Research and Practice

SpSe-19-IP (in-person)

Room 2 (Amphitheatre of the Region)

Monday, 29 September 2025

11:30-13:00

## Chairs

**Muneta YOKOMATSU**, International Institute for Applied Systems Analysis, Austria

**Tomoki ISHIKURA**, Tokyo Metropolitan University, Japan

## Rationale and Introduction to the Topic of the Session

This special session will discuss the process by which new disaster/disaster risk management (DRM) knowledge and paradigms are formed from theoretical, empirical, and practical perspectives. Disaster/DRM knowledge is categorized into diverse fields (e.g., natural science, technology, behavioural codes), layers (e.g., basic theory, application method), and stages (e.g., discovery, common wisdom). It is essential to carefully analyse the properties of each type of knowledge and the unique characteristics of the environment in which it is formed and shared.

Often, an occurrence of an unforeseen disaster triggers a change in an existing knowledge system. Two cases of the changes may be considered: a) strengthening existing standards, and b) qualitative paradigm shifts (i.e., the case where methodologies/approaches are qualitatively replaced after a disaster). This session will also focus on the latter case. Knowledge systems may be destroyed. However, recognizing this fact is not an easy task. How experts and policymakers who have promoted the traditional paradigms respond to the situation will be a major factor in determining subsequent socioeconomic dynamics. We may reexamine the build-back-better and creative destruction theories from the perspective of attitudes and viewpoints toward the renewal of knowledge systems. Furthermore, it is possible to assume the possibility that something unforeseen could happen and prepare human, organizational, and financial resources for research and investigation. This session will also focus on the policies and management of the knowledge formation process, learning, and education.

The session encourages presentations on conceptual and theoretical research as well as case studies and action research. Accumulating cases through careful qualitative descriptions is also an important step in organizing “stylized facts”. Feedback between “description of facts and practices/data collection” and “conceptualization/theorization” will serve as the driving force for systematizing this topic. The discussion will potentially contribute to the discussion of implementation science.

### Format of the Session

Presentations and discussion.

This session will consist of an explanation of the purpose by the session organizer, 3-5 research presentations, followed by Q&A, and a general discussion.

### Presentations

- Acushla SCIASCIA & Kristie-Lee THOMAS “Indigenous Self-Determination in Disaster Resilience Research: Weaving Knowledge, Community and Institutions in Aotearoa NZ”
- Areti PLESSA “Engaging the Public in Disaster Risk Reduction and Management: Cases from Greece”
- Kaori KITAGAWA “Co-learning’ and ‘co-creation’ – what are they?”
- Muneta YOKOMATSU and Tomoki ISHIKURA “A simple model of opportunity-based learning and knowledge formation in disaster management”

# Indigenous Self-Determination in Disaster Resilience Research: Weaving Knowledge, Community and Institutions in Aotearoa NZ

A096

Acushla SCIASCIA[1], Kristie-Lee THOMAS[2]

[1] *Ngāruahinerangi, Ngāti Ruanui, Te Ati Awa Te Kunenga ki Pūrehuroa Massey University (Aotearoa New Zealand)*

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**Keywords:** Indigenous, Mātauranga, Resilience, Interweave Knowledge, Māori Research.



Aotearoa New Zealand, located within the Pacific Ocean, shares disaster risk reduction (DRR) challenges with neighbouring island nations, many of whom face increasing exposure to climate change and natural hazards. At the same time, Aotearoa is positioned to mobilise Indigenous knowledge systems, governance and practice to inform grounded and tangible approaches to DRR – both within Aotearoa and across the wider Pacific. Many Māori communities in Aotearoa, particularly those in coastal, rural and geographically isolated areas, face challenges at the intersection of environmental processes such as earthquakes, tsunami and volcanic eruptions, and the long-term impacts of colonisation, which have restricted the ability of communities to live in balance with the environment. Indigenous communities are increasingly reclaiming authority in DRR research and governance. At the same time, New Zealand's science and policy systems are shifting, having adverse effects on the constitutional relationship (forged through Te Tiriti o Waitangi) between the Māori tribes and the Crown (government) creating further complexity to navigate indigenous-led solutions for managing and reducing risk.

This presentation contributes to international discussions on science-policy-practice-community collaboration by offering grounded insights into the real-world challenges and experiences of working at the interface of Indigenous knowledge systems and Western-values based academic and science institutions and articulates the tensions and opportunities within that space. Drawing from lived experience, we reflect on and share strategies for navigating between institutional frameworks, scientific processes and tribally led priorities and ways of knowing. We highlight how rangatiratanga (Māori self-determination and sovereignty), as both a leadership practice and a relational ethic, enables research that shifts power, strengthens partnerships and remains deeply accountable to place and people. We argue that recognising Indigenous leadership and resourcing these collaborations is essential for building resilient futures in island and remote contexts and is a catalyst for producing tangible solutions.

# Engaging the Public in Disaster Risk Reduction and Management: Cases from Greece

A164

Areti PLESSA[1], Miranda DANDOULAKI[2]

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**Keywords:** Public Awareness, Disaster Preparedness and Education, Disaster Risk Reduction, Greece.



Disaster risk reduction and management to be successful calls for the engagement of a variety of stakeholders involved in the different phases of the disaster management cycle. Local authorities, citizens, schools, volunteers and NGOs, scientific institutions, media, businesses, the tourism sector are just some of the stakeholders involved in the different disaster risk management phases. Among the stakeholders, the public is the most challenging to attract their interest, inform and to actively engage.

At international level, the Sendai Framework for Disaster Risk Reduction 2015–2030 advocates for people-centered approaches. To this end, best practices, lessons learnt, and success stories are publicized to facilitate the transition from top-down disaster risk reduction policies to policies, strategies and practices that are developed in more collaborative, interactive, and all-of-society ways.

Focussing on Greece, the paper discusses initiatives to inform, educate, involve, engage various stakeholders in disaster risk reduction due to natural (earthquakes, wildfires, and floods) and technological hazards. We examine initiatives such as:

- Risk awareness and education of the school community (teachers, students, parents)
- Public information initiative “We are informed-We are protected” of the Region of Attica on protection measures at the level of individuals, households, and at the local level
- Civil protection exercises at local level
- Community preparedness (e.g. Tsunami ready initiative)

Based on the Greek experience, we conclude that public information efforts are continuous, target multiple audiences and use a range of channels and media. However, beyond public information, how to bridge the gap from information to action and how to lastingly engage the various stakeholders remains a challenge.

# ‘Co-learning’ and ‘co-creation’ – what are they?

A076

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**Keywords:** Co-Learning, Co-Creation, Collaborative Learning.

This is part of an ongoing study to conceptualise the notion of ‘co-learning’. Addressing “learning” is relevant in the field of DRR because DRR activities inherently involve learning, as they aim to influence people’s behaviour, perceptions and emotions. While “co-learning” has become increasingly prevalent in DRR, its conceptual exploration has been largely absent. In examining co-learning, it is essential to clarify its relationship with “co-creation”. “Co-creation”, along with its synonyms such as “co-production” and “co-construction”, is a widely applied concept in DRR research and beyond. Particularly in community-based DRR projects, co-creation has become the dominant methodology. By placing the target population at the centre of DRR efforts, co-creation fosters collaboration among various stakeholders to develop knowledge or measures for DRR. Additionally, co-creation research has yielded some theoretical advancements. Both “co-creation” and “co-learning” highlight a process of collaboration that leads to meaningful outcomes. Drawing on literature from the field of education, this study suggests that “co-creation” and “co-learning” are two sides of the same coin: the former focuses on what is being created, while the latter examines how participants collectively learn. The term “co-learning” is often used interchangeably with “collaborative learning” and “cooperative learning” despite subtle differences particularly regarding reciprocity. “Collaborative learning” refers to processes in which more than two individuals work together towards a common goal, with knowledge socially constructed within the group rather than transmitted from a “teacher” to “students”. Here, the “teacher/expert” typically takes on the role of task-giver or facilitator. By contrast, “co-learning” describes a more informal learning process, where everyone assumes the dual role of student and teacher simultaneously. This study synthesises key features of “co-learning” from existing literature to formulate a tentative framework. In doing so, it lays a foundation for the future integration of Critical Flows into broader resilience policies and disaster risk reduction strategies.

# A Simple Model of Opportunity-Based Learning and Knowledge Formation in Disaster Management

A122

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**Keywords:** Unforeseen Disaster, Survey, Knowledge, Communication, Non-Linear Dynamics.



Unprecedented disasters, such as the 2011 Tohoku earthquake and tsunami and the subsequent accident at the Fukushima Daiichi Nuclear Power Plant, cause situations that are qualitatively different from the assumptions that had been shared by society up until that point. Such “unforeseen disasters” cannot be simulated in detail in advance in any essential sense. Therefore, disaster experts go to disaster-stricken areas after a disaster to conduct detailed surveys of the damage. In practical and academic R&D (research and development) for disaster risk management, surveys of disaster-stricken areas immediately after a disaster are emphasized, and technological innovation and revisions to systems and standards are born through the study of the facts discovered and collected there. Old technologies, systems, and sometimes even conventions, behavior codes, and paradigms are replaced with new ones.

This study calls the process of obtaining new tasks for the next challenges during a disaster “opportunity-based learning (OBL)”. We formulate a model of a three-dimensional nonlinear differential equation system to analyze the process of systematizing “facts” collected through a survey into “knowledge” with general applicability through R&D and the process of capital deepening. In addition, we assume that the disaster damage rate changes with capital deepening and that the damage rate exhibits a convex- concave-convex function of capital.

The study revealed that the parameter of communication between field survey/practice and basic research leads to a Supercritical Hopf bifurcation in the dynamics of the fact-and-knowledge plane.

Furthermore, depending on the phase and portrait, disasters can have the following three pathways on the economy: 1) a completely reversible pathway, 2) a pathway with hysteresis, and 3) an irreversible pathway. If OBL is insufficient, irreversibility may occur, and the economy may also stagnate.

# Case Station-Field Campus Approach: How Can We Work Together Better in Field Sites for DRR?

SpSe-20-H (hybrid)

Room 3 (Municipal Amphitheatre)

Monday, 29 September 2025

11:30-13:00

## Chairs

**Norio OKADA**, Adviser, Kwansei Gakuin University, Japan and Emeritus Professor, Kyoto University, Japan

**Katsuya YAMORI**, Professor, DPRI, Kyoto University, Japan

## Rationale and Introduction to the Topic of the Session

How can we work together better in field sites for DRR? This is a central issue of implementation. We propose to make use of the Case Station-Field Campus scheme. In this relation, how to institutionalize the opportunities offered by action research is also an issue. An effective institutional scheme can help stabilize and maintain the contributions the research activities make to the particular DRM situation. It can also foster better communication and learning from other research activities. We demonstrate in this session that a good example is the Case-Station-Field-Campus (CaSiFiCa) Scheme originally proposed by Okada and Tatano.

The CaSiFiCa Scheme is characterized as follows: a set of local case stations and field campuses and their globally networked linkages are expected to operate synergistically to achieve the following objectives: promotion of DRR research and education at all levels, multilateral knowledge sharing and knowledge creation, and implementation of knowledge and gaining knowledge from implementation. Note that a unit within this scheme (in one place) is intended to be networked together with other parallel units in other locations. The units thus can complement each other and mutually collaborate to realize the synergistic dynamics of communicative spaces for implementation.

The main objective of this session is to invite speakers who have already adopted this scheme, two cases from Japan and one from India, and share their experiences and thoughts with the audience. This will offer a timely occasion for the participants to discuss how to extend this time-tested approach for DRR.

## Format of the Session

Panel discussion.

The session will include:

1. An introduction on Case Station-Field Campus (CaSiFiCa) Approach (Norio OKADA and Katuya YAMORI)

2. Three examples of CaSiFiCa practices:
   i. Case of Mashiki Lab, Kumamoto University for disaster recovery and restoration (Yuta YOSHIKAI, Ryuji KAKIMOTO and Yuji HOSHINO),
   ii. Case of Kuroshio Town, Kochi, Japan for Tsunami evacuation (Katsuya YAMORI), and
   iii. Case of Odisha, India for reducing avoidable deaths from snake bites (Hideyuki SHIROSHITA and Nibedita RA-BENNET).

These presentations will be followed by a substantial open discussion which we hope will elicit more potential cases.

### Discussants

Prof. Yoshiyuki YAMA, Kwansei Gakuin University, Nishinomiya, Japan

Dr. Sebastian POLAK-ROTTMANN, German Institute for Japanese Studies, Tokyo, Japan

# Understanding Transformative Resilience: Insights from the Greek Islands and Remote Communities

SpSe-21-IP (in-person)

Room 3 (Municipal Amphitheatre)

Monday, 29 September 2025

09:40-11:10

## Chair

**Shingo NAGAMATSU**, Kansai University, Japan

## Rationale and Introduction to the Topic of the Session

This session explores the emerging concept of transformative resilience—how communities fundamentally adapt and reorganize their systems in response to major disruptions. Unlike conventional notions of resilience, which emphasize returning to normal, transformative resilience involves deliberate and often systemic changes in livelihoods, governance, spatial patterns, and social values. Such shifts are particularly relevant in island and remote settings, where ongoing hazards, isolation, and demographic pressures challenge the viability of business-as-usual recovery approaches.

Greek island and peripheral communities, facing complex layers of risk—from earthquakes and wildfires to depopulation and tourism dependency—offer a rich context to examine transformative change in practice. This session brings together multi-national researchers including Greek and to engage in critical dialogue around how resilience is understood, enacted, and evaluated in these regions.

The session will serve multiple purposes. First, it provides a knowledge-sharing platform for academic and community-based perspectives on resilience, capturing diverse experiences and interpretations. Second, it aims to advance the theoretical and methodological discourse on transformative resilience by identifying local indicators, mechanisms, and outcomes of change.

Ultimately, the session will contribute to developing more nuanced, people-centred approaches to disaster risk reduction in island and remote areas. By connecting research with practice and theory with lived experience, it seeks to inform both local adaptation strategies and global DRR discussions.

## Format of the Session

Panel discussion.

The session will feature short thematic presentations by Greek researchers and practitioners, followed by a moderated panel discussion and interactive Q&A segment. A central innovation is the inclusion of community narratives, offering firsthand insights into how transformation occurs in practice. This story-driven approach emphasizes the social

and cultural dimensions of resilience. The session also serves as a preparatory platform for a planned post-conference field study, allowing organizers to gather contextual knowledge, identify key issues, and engage with relevant stakeholders. Insights from the session will help shape the design and focus of the subsequent research activities.

**PANELLISTS**

- Dr. Daisuke SASAKI, Tohoku University, Japan
- Dr. Yasmin BHATTACHARYA, University of Tokyo, Japan
- Dr. Pavlos-Marinos DELLADETSIMAS, Emeritus Professor, Harokopion University of Athens, Greece

# Enhancing Tsunami Preparedness Through Community-based Initiatives and Technology in the Northeastern Atlantic and Mediterranean Region

SpSe-22-H (hybrid)

Room 3 (Municipal Amphitheatre)

Tuesday, 30 September 2025

11:30-13:00

## Chairs

**Elena DASKALAKI**, National Observatory of Athens, Greece (in person)

**Maria Ana BAPTISTA**, Instituto Superior de Engenharia de Lisboa, Portugal (online)

**Ignacio AGUIRRE AYERBE**, Instituto de Hidráulica Ambiental de la Universidad de Cantabria, Spain (online)

## Rationale and Introduction to the Topic of the Session

Tsunamis are low-probability, high-consequence hazards, making tsunami risk awareness a challenge, especially in coastal tourist or urbanized areas. Therefore, community engagement is vital for risk reduction and disaster preparedness.

Following the Indian Ocean 2004 and the 2011 Great Japan tsunami events, much progress has been made concerning tsunami risk reduction and preparedness. New technologies, such as mobile alerts and personal devices, are designed to enhance preparedness. Adapting and preparing these tsunami risk reduction strategies and preparing them for the local context has proven successful worldwide. Involving local community leaders, integrating such programs into national disaster plans, and convergence with international organizations like UNESCO are beneficial steps towards their implementation. The UNESCO- IOC Tsunami Ready Recognition Programme (TRRP) delineates a pathway focusing on hazard and evacuation mapping, public education, and response measures, all of which are key to the culture of preparedness.

In the North Eastern Atlantic and Mediterranean Region (NEAM), the UNESCO-IOC TRRP is being implemented to promote tsunami preparedness in coastal communities. The main objective of this initiative is to inform all stakeholders about tsunami risk and response measures and to raise public awareness. To this end, the Programme includes preparing tsunami hazard maps that show the area prone to tsunamis and drafting evacuation maps that provide clear information on tsunami evacuation zones so that people are not misled during emergencies. Moreover, it requires developing tsunami emergency plans, especially at a local level, and practicing regularly through drills to refine plans and make them apt to be applied in case of a tsunami.

The session will showcase the implementation of TRRP in the NEAM region and share experiences, good practices, successes, and challenges found in the first years of implementation. Furthermore, it will promote cross-fertilization between tsunami preparation policies and practices worldwide.

### Format of the Session

Panel discussion.

Each speaker will share their viewpoint aligned with the session rationale, focusing on case studies and examples from their countries. Furthermore, there will be presentations on global and regional initiatives such as the UNESCO-IOC TRRP.

### Panellists

- Musavver Didem CAMBAZ, Bogaziçi University, Kandilli Observatory and Earthquake Research Institute, İstanbul, TÜRKIYE (in person)
- Lorenzo CUGLIARI, National Institute of Geophysics and Volcanology, Rome, ITALY (online)
- James D. GOLTZ, Berkeley Seismological Laboratory, University of California, Berkeley, USA (in person)
- Nikos KALLIGERIS, Institute of Geodynamics, National Observatory of Athens, GREECE (in person)
- Ardito M. KODIJAT, UNESCO-IOC Indian Ocean Tsunami Information Centre, UNESCO Office Jakarta, INDONESIA (online) (TBC)
- Nikolaos PAPADIMITRIOU, Seismology and Geophysics Section, Geological Survey Department, Lefkosia, CYPRUS (in person)
- Nurcan Meral ÖZEL, Bogaziçi University, Kandilli Observatory and Earthquake Research Institute, İstanbul, Türkiye

# Building Resilient Communities by Strengthening Diversity and Inclusion in Science and Practice

SpSe-23-H (hybrid)

Room 4 (Municipal Board Meeting Room)

Monday, 29 September 2025

14:40-16:10

## Chairs

**Irene PETRAROLI**, University of Twente, Netherlands

**Mark Ashley PARRY**, Northumbria University, UK

**Funda ATUN**, University of Twente, Netherlands

## Rationale and Introduction to the Topic of the Session

Disasters expose and exacerbate societal inequalities, particularly in access to information and resources. Vulnerable populations—such as youth, women, foreigners, and individuals with disabilities—often experience greater challenges due to socio-economic marginalization and limited inclusion in resilience strategies. Providers of disaster services face difficulties understanding the specific concerns of these groups, while marginalized populations often receive incoherent or inaccessible information, leading to heightened stress and cognitive biases.

The "Building Resilient Communities by Strengthening Diversity and Inclusion in Science and Practice" session aligns with the IDRiM Conference's mission to advance multi-dimensional accessibility (physical, social, economic, institutional, etc.) in disaster prevention and mitigation, emergency response, and disaster recovery. This session, promoted by the IDRiM Women in Disaster Science and Practice Committee, centres on the importance of inclusivity and representation in disaster-resilient communities and infrastructures. Underpinning this session is the understanding that resilience in disaster preparedness extends beyond physical structures to incorporate the social and emotional needs of marginalised and vulnerable groups, particularly women, youth, and ethnic minorities.

This session highlights the efforts of the IDRiM Women in Disaster Science and Practice, emphasizing the transformative role of art, media, and technology in fostering resilience. The session will showcase innovative participatory research methods, using creative mediums to reach and engage vulnerable groups not as potential victims but as empowered contributors—actively promoting resilient and inclusive societies.

The session will allow space for the presenters to share art, media and technology platforms interactively with the audience.

### Format of the Session

Interactive.

Opening speech by Funda Atun (co-founder of IDRiM Women in Disaster Science and Practice Committee).

A series of flash talks (about 2 minutes each).

Panel Discussion on the role of inclusion, diversity, art and technology for building disaster resilient communities. The ambition is that the discussion will stimulate a dynamic dialogue between panel speakers and the audience, facilitating in-depth discussions and knowledge exchange.

Participants will engage in simultaneous group activities (5–6 participants per group), such as PARATUS (In-person), Map@Me (In-person or online).

### Panellists

- Narratives of Risk: Exploring Hazard Maps and Capabilities in Europe and Japan, Irene PETRAROLI, University of Twente
- Children Citizen Geo-Science Project: Children as Co-researchers for Developing Climate Adaptive Cities, Funda ATUN, University of Twente

The list will be extended and more IDRiM members talks will be included.

# Children's Geo-Citizen Science Project for Climate Adaptive Cities

A153

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**Keywords:** Children, Citizen Science, Geoscience, Climate Adaptation, Science Communication.



The overall aim of the project is to highlight the capacities of children, as co-researchers, to understand the problems in their community and their capacity to find strategies and solutions to the identified climate change- related challenges. The main research question is 'How can children's geo-citizen science support the structural and societal transformation in cities to reduce the impact of climate change?

Children are a highly interactive group and can succeed in recognising the collective good. Despite their true potential, children are considered passive victims with no role to play in communicating. Sharing their knowledge and perception about their neighbourhood will prove their capability to respond appropriately. The climate school strike triggered by one child also shows that children would like to participate in decision-making and processes and take roles in reducing the impacts of climate change.

In this project, International School Twente and the University of Twente collaborated to involve children as co- researchers to uncover and further develop their capacities that contribute to improving methodologies in citizen and climate adaptation science. The project started with seminars on the methods and topics, and we discussed the application of methods for data collection with children. We applied a qualitative GIS approach, including participatory mapping, to enable a connection between the macro-scale urban phenomenon and the micro-scale of the perceptions of the individual child. Finally, the children produced an art exhibit with the support of an artist to communicate their findings to a wide range of audiences.

Throughout the project, we've followed an active research framework that we co-developed, co-adapted, and co- improved throughout the process with children. Children had been part of every research step from the beginning till the end, i.e. collecting and analysing data, deciding and communicating actions that support the structural transformation in cities to reduce the impact of climate change, collaborating with the artist, and communicating with the public during the exhibition opening.

# Adjusting European Policies to Future Wildfire Regimes in a Changing Climate

SpSe-24-IP (in-person)

Room 4 (Municipal Board Meeting Room)

Wednesday, 1 October 2025

09:40-11:10

## Chairs

**Kostas KALABOKIDIS**, University of the Aegean, Greece

**Urbano FRA PALEO**, University of Extremadura, Spain

## Rationale and Introduction to the Topic of the Session

The temporal and spatial patterns of wildfires are changing as the result of climate change and of the interaction with multiple human processes, such as land use change, rural depopulation, reforestation and urbanization. Wildfires in Europe are increasingly more intense and less manageable if adopting emergency response as the preferred policy option. They are, as well, more frequent in regions where they were less common. The European Union needs to adjust multiple sectoral policies and integrate them by adopting a landscape approach to reduce wildfire risk. The unintended consequences of certain European policies in increasing wildfire risk need to be identified, while synergies between others have to be sought, in order to drive change and help to indirectly strengthen the proactive capacities of the EU policies, in the absence of a specific mandate.

## Format of the Session

Panel discussion.

The main scientific findings, as well as the policy options proposed in an ad hoc Report by the European Academies' Science Advisory Council (EASAC), will be examined in a conference session, and will serve as the basis for the discussion with the participants and for the further elaboration of an integrated approach to wildfire risk by the European Union and countries elsewhere.

## Panellists

- “Report "Changing Wildfires: Policy Options for a Fire-Adapted and Fire-Literate Europe" by Kostas KALABOKIDIS, University of the Aegean, Greece; and Urbano FRA PALEO, University of Extremadura, Spain
- “Emerging Innovations toward Integrated Fire Management” by David GREEN, Director for S&T Innovation, Transition and Integration Systems, Green Resilience Insights, LLC, USA
- “Living Fire Lab Greece: Scenario planning for optimizing forest and fuel management in Europe” by Kostas KALABOKIDIS, University of the Aegean, Greece

- "OPTIFUEL: A multi-criteria web-GIS tool for optimizing fuel treatment scenarios in fire-prone landscapes" by Christos VASILAKIS, University of the Aegean, Greece
- "Civil protection field exercise under the code name "AINEIAS 2024 – VARI-VOULA-VOULIAGMENI" for fire response" by Eva FRAKTOPOULOU, Independent Civil Protection Department, Municipality of Vari Voula Vouliagmeni, Greece

# Emerging Innovations toward Integrated Fire Management

A175

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[1] *Director for S&T Innovation, Transition and Integration Systems Green Resilience Insights, LLC (United States)*

**Keywords:** Integrated Fire Management, Wildfire, Partnerships

Wildfire disproportionately impacts isolated island and remote communities that present unique challenges due to specific fuel types, shifting fire behaviour under the pressures of climate change and other drivers. Drought and the inability to retain sufficient water impedes firefighting, particularly in rain shadows of islands and coastal ranges. Many island and remote communities are in forested or vegetated regions outside the jurisdiction of local firefighters, have limited escape routes, and lack fire-hardened infrastructure. This isolation exacerbates risk, leading to high evacuation rates and displacement.

This presentation examines how science and technology can accelerate Integrated Fire Management and adaptive strategies. Emerging solutions coincide with digital transformation and new collaborative initiatives for wildfire autonomy. The presentation will discuss using autonomous systems like drones, helicopters, or satellites to assist in preparing for wildfires, early detection, and preventing catastrophic impacts. This includes using AI and machine learning to analyze data from interconnected sensor networks for identifying and visualizing emerging threats to people, property and economies. The goal is to improve early action, reduce the risk to communities and develop resilience for infrastructure, lifelines, and public and environmental health. This session aims to highlight new partnerships among philanthropies, agriculture and food organizations, Insurtech, utilities and academic institutions. Integrated Fire Management with climate-smart, data-driven solutions, including resource management and infrastructure design, are key to our sustainable futures.

# Living Fire Lab Greece: Scenario Planning for Optimizing Forest and Fuel Management in Europe

A179

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**Keywords:** Scenario Planning, Fuel Treatments, Stochastic Fire Simulations, Wildfire Governance, Trade-Offs.



Prioritizing investments in forest and fuel management projects and measuring outcomes is a significant challenge in the midst of extreme wildfire events in Europe. The need to prioritize and strategically allocate fuel treatments requires a methodological approach that accounts for the implementation costs and prioritization based on different management objectives and effectiveness for different landscapes and values-at-risk. For that purpose, the ForSys spatial planning system [1] was used as a model to prioritize forest and fuel management investments and understand trade-offs among alternative scenarios in the Living Lab of Greece (i.e. in the Peloponnese region).

Decision support for trade-offs among six forest management priorities varied within many study areas. Results showed that the business-as-usual way of allocating fuel treatment projects (e.g. randomly or in proximity to roads) cannot provide substantial reduction to key management objectives like the protection of communities or risk reduction of protected areas and can have a similar impact only for the objective of reducing ignition probability [2].

Implementation of a 10-year plan to effectively reduce the fire risk of communities and protected areas from the sources of their exposure resulted in spatial optimization of a number of projects. There were also examples that showed the proposed fuel treatments being effective in altering the fire behavior from potential fires that can reach communities. In the absence of fuel management, some settlements were severely affected by fast-moving and high-intensity fires. In the Peloponnese landscapes that are prone to fire, the thinning scenario seems to have more effective results as an aid in mitigating fuel loadings and lowering fire spread rates and severity (e.g. the newer Anti-Nero fuel reduction program in Greece) in public forests and high-use wildland-urban interface [3].

This study has been part of the FIRE-RES project, funded by the European Union, aiming for fire-resilient landscapes and minimal wildfire losses under changing climate in novel fire regimes. Since increasing fuel loads and continuity represent factors responsible for the recent catastrophic fire events in the European countries and elsewhere, these results can inform fire management agencies on the optimization of forest management to improve fire suppression efficiency and

reduce fire spread to the wildland-urban interface and protected areas. We eventually need more than national direction to succeed – meaning spatially explicit umbrella policies are needed as generated by high-resolution scenario planning – in order to foster collective landowner actions at the scale required to significantly change large fire behavior [4].

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# OptiFuel: A Multi-Criteria Web-GIS Tool for Optimizing Fuel Treatment Scenarios in Fire-Prone Landscapes

A171

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**Keywords:** Fuel Treatments, Wildfire Risk, Scenario Planning, Fire Exposure, GIS.

As climate change intensifies wildfire regimes across Europe, the strategic allocation of fuel treatment projects is increasingly essential. Within this context, OptiFuel platform was developed as a web-based decision-support application that enables spatial prioritization of fire mitigation strategies. Built using the ArcGIS Online platform [1-2], OptiFuel supports dynamic scenario planning through the lenses of a) Efficiency, b) Equity, and c) Trade-Offs, providing a tailored analytical interface for visualizing and filtering exposure sources across diverse landscapes.

The web application was developed as part of the FIRE-RES EU-funded project and is linked directly to its Living Labs initiative. Upon launch, users are introduced to FIRE-RES's objectives and can select one of five regional applications: Peloponnese (Greece), Bio Bio (Chile), Vale do Sousa (Portugal), Catalonia (Spain), and Nouvelle-Aquitaine (France). Each region includes fire simulation outputs and geospatial data specific to local vegetation, communities, and protected areas. A guided tutorial assists users in navigating the interface, enhancing accessibility for both technical and non-technical stakeholders. The platform integrates exposure data with stochastic fire spread simulations, offering a robust, user-friendly interface for planning and prioritization.

The Efficiency and Equity modules of the OptiFuel web application allow users to filter fire exposure data by year of implementation or rank per Forest Service district, respectively, across three key sources: 1. community exposure, 2. protected area exposure, and 3. high-probability ignition zones. This supports both temporal and spatial analyses of treatment prioritization. The Trade-Offs module [3] enables comparative scenario analysis by allowing users to select between two fire exposure scenarios and apply weighted criteria to rank objectives such as biomass, hazard, and exposure sinks. Together, these functions provide a multi-dimensional view of fire risk to inform balanced and transparent fuel treatment planning. Additionally, the platform includes measurement tools, basemap customization, and boundary selection (e.g., forest districts services or municipalities), allowing fine-grained spatial control and cartographic clarity.

OptiFuel aims to strengthen wildfire resilience by enabling stakeholders to visualize fire risk, simulate outcomes, and compare trade-offs. The tool supports science-informed decision-making at multiple governance levels [4]. Its application in the FIRE-RES Living Labs highlights the

importance of integrating spatial planning tools into collaborative fire management strategies across Europe's most fire-prone regions.

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# Civil Protection Field Exercise Under the Code Name "AINEIAS 2024 – Vari Voula Vouliagmeni" for Fire Response

A124

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**Keywords:** Drills, Natural Disasters, Civil Protection, Local Government, Region of Attica.



The climate crisis has brought the issue of managing natural and other disasters, crises, and risks to the forefront, as a matter of critical importance for society, the economy, and, most importantly, human life. In this context, Local Government Authorities represent the institutional body closest to the citizens, with a core mission to enhance quality of life, ensure protection, and promote public well-being.

Consequently, they play a decisive role in Civil Protection, particularly in the stages of prevention, response, and restoration, as defined by Greek legislation. Effective disaster management and risk deduction requires a holistic approach to the critical sector of Civil Protection, involving the active participation of emergency services. It cannot be addressed as a fragmented or exclusive responsibility of a single department, but rather demands an integrated and comprehensive strategy.

In particular, within Local Government Authorities, Civil Protection issues extend across almost every operational and administrative aspect, from the Civil Protection Department, Municipal Police, and technical services, to health services and environment departments, social structures and financial services. As such, a Civil Protection action plan must involve the entire organization, fostering cross- departmental collaboration and a unified approach to prevention, preparation and responsiveness [1].

This paper presents a case study of a comprehensive Civil Protection exercise conducted by the Municipality of Vari Voula Vouliagmeni, in collaboration with the Independent Directorate of Civil

Protection of the Region of Attica. The drill included the pre-emptive and organized evacuation of citizens under simulated emergency conditions—one of the most critical and complex operations to execute in real scenarios. The implementation highlighted major challenges such as the unique local topography, coordination difficulties amongst stakeholders, and operational constraints that affect overall effectiveness [2].

Emphasis was placed on the need to strengthen local preparation and responsiveness, not only amongst municipal departments but also with all state and non-state actors. This becomes even more urgent in situations involving simultaneous events beyond local boundaries, where the

dispersion of central government forces reduces the efficiency of the overall responsiveness. It is evident that a well-prepared local community can respond immediately, manage the initial phase of a crisis, and support the ongoing operations of arriving emergency forces [3].

In this context, the regular implementation of field exercises is essential, revealing the continuous need for training, assessment, and improvement of action plans. These drills effectively test operational plans, expose weaknesses, and help identifying needs for further training and enhancement of Civil Protection mechanisms, ultimately contributing to greater local resilience against natural disasters.

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# Civil Protection in Islands and Remote Areas: The Greek Case

SpSe-25-IP (in-person)

Room 4 (Municipal Board Meeting Room)

Monday, 29 September 2025

16:30-18:00

## Chairs

**Kalliroi FERENTINOU**, Head of Civil Protection Office, Municipality of Eastern Samos

**Konstantinos CHOUVARDAS**, Head of Independent Direction of Civil Protection, Region of East Macedonia-Thrace

**Konstantinos KOKOLAKIS**, Special Consultant to the Mayer of Thermaikos

## Rationale and Introduction to the Topic of the Session

Civil protection is becoming increasingly important in policies and administration in many countries and in Greece among others, due to an increased public awareness of the climate crisis and a new emphasis on climate adaptation.

For civil protection, islands and remote areas are often a challenge. Their geographic isolation and accessibility (physical, social, economic, institutional, etc.) call for innovative, collaborative and agile solutions to reduce and manage disasters, however such solutions are difficult to generate and implement. Limited infrastructure and services that are overstrained by tourism are by themselves a pressure in normal times, even more so in case of emergencies and disasters. Fragmented governance structures and weak connection to emergency management systems hinder timely and efficient preparedness and response. Communication obstacles test access to critical information.

Taking a pragmatic view and based on experiences, the round table will discuss challenges and opportunities for civil protection in and for islands and remote areas.

## Format of the Session

Round table discussion.

## Panellists

- Konstantinos CHOUVARDAS, Head of Independent Direction of Civil Protection, Region of East Macedonia-Thrace
- Kalliroi FERENTINOU, Head of Civil Protection Office, Municipality of Eastern Samos
- Konstantinos KOKOLAKIS, Special Consultant to the Mayer of Thermaikos
- Despina MALAGARI, Regional Councillor, Sub-Region of Samos
- Georgios MIAOULIS, Fire Colonel, Commander of Fire Service of Samos
- Dimitrios TSINIAS, Harbourmaster, Port Authority of Samos, Hellenic Coast Guard

# Conflicts in Wildfire Risk Management: Aspect of Justice, Nature-Based Solutions and Stakeholder Engagement in Light of Increasing Extreme Events

SpSe-26-O (online)

Room 5 (General State Archives of Samos)

Tuesday, 30 September 2025

16:30-18:00

## Chairs

**Claudia BERCHTOLD**, Senior Researcher – Project Manager, Fraunhofer Institute for Technological Trend Analysis – INT

**JoAnne LINNEROOTH-BAYER**, Acting Programme Director Risk and Resilience, International Institute for Applied Systems Analysis (IIASA)

## Rationale and Introduction to the Topic of the Session

The European Union has invested more than 70 mil. € in wildfire risk management related research and innovation activities. Collectively, these projects proposed governance advances at European level. However, wildfire risk is a multi-scalar challenge that requires the involvement of national and regional levels of managing risk. Specifically, in light of an increasing number of extreme wildfire events, we want to explore key aspects on the intersection of equity, nature-based solutions (NbS), and stakeholder engagement in addressing wildfire challenges and the potential for advancing their uptake. The overall aim is to discuss how justice considerations can inform wildfire risk management strategies, the potential of nature-based solutions to foster resilience, and effective methods for engaging stakeholders in face of changing risks. This session aims to inspire collaborative action towards a just and sustainable approach to wildfire risk management.

Key Discussion Points:

1. Justice in Wildfire Management: We will examine how marginalized communities disproportionately face wildfire impacts and discuss the need for equitable resource allocation, access to information, and inclusion in decision-making processes.
2. Nature-Based Solutions: The session will highlight how NbS—such as reforestation and sustainable land management—can enhance ecosystem resilience while mitigating wildfire risks. These solutions provide environmental benefits and promote social equity.
3. Stakeholder Engagement: Effective wildfire risk management requires the participation of diverse stakeholders, including local communities, indigenous peoples, and government agencies. We will explore best practices for inclusive dialogue and co-development of strategies that ensure all voices are heard.

4. Case Studies: Real-world examples will illustrate successful integration of justice, NbS, and stakeholder engagement in wildfire management, showcasing innovative approaches that enhance community resilience and promote equitable outcomes.

### Format of the Session

Panel discussion.

### Panellists

- Ramona VELEA, ISIG - Istituto di Sociologia Internazionale di Gorizia, Italy
- Eduard PLANA BACH, Forest Science and Technology Centre of Catalonia (CTFC), Spain
- Tim FOREMAN, International Institute for Applied Systems Analysis (IIASA), Austria
- Valentina BACCIU, Centro Euro-Mediterraneo siu Cambiamenti Climatici (CMCC), Italy

# Online Young Scientist Session Abstracts

# Neighbourhood Perceptions and Business Recovery outcomes from COVID-19 in Vancouver and Calgary, Canada

YS65-OL

Juri KIM[1], Stephanie CHANG[1]

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**Keywords:** Neighbourhood Effects, Business Recovery, COVID-19 Pandemic.

In the aftermath of the COVID-19 pandemic, businesses have faced uneven recovery outcomes. These disparities raise questions about whether the location where a business operates influences its recovery. A growing body of research emphasizes that neighbourhood characteristics influence recovery outcomes as much as hazard itself or business-specific factors (Chang & Falit-Baiamonte, 2002; Marshall et al., 2015), yet empirical evidence remains limited in the pandemic context. This study analyzes how business owners' perceptions of their neighbourhood relate to post-pandemic business outcomes in Vancouver and Calgary.

We surveyed 442 local business owners or managers in April 2025, including 235 in Vancouver and 207 in Calgary, assessing whether they perceived their neighbourhood as an advantage, neutral, or disadvantage during the pandemic. We also recorded their recovery status and current sales relative to pre-pandemic levels. In Vancouver, Spearman's rank correlations indicated positive associations between favourable neighbourhood perceptions and recovery status ($\rho = 0.12$, $p = 0.08$) as well as sales ($\rho = 0.20$, $p = 0.004$). Similarly, Calgary showed positive associations for recovery status ($\rho = 0.15$, $p = 0.04$) and sales ($\rho = 0.26$, $p < 0.001$). Open-ended responses identified neighbourhood attributes such as community support, pedestrian foot-traffic, and neighbourhood demographics as common neighbourhood advantages. Ongoing analyses will incorporate additional business characteristics and use multivariate models to evaluate whether these perception effects persist after controlling for structural factors.

The preliminary findings across both cities suggest that subjective assessments of place capture locally relevant resources that meaningfully influence business recovery outcomes following the pandemic. Using neighbourhood resources as an actionable factor in disaster recovery support, policies aimed at enhancing place confidence could effectively complement direct financial aid. Urban planning interventions, such as creating neighbourhood plazas, may help maintain visible pedestrian activity. Additionally, small grants that help build community connections and a sense of belonging could provide benefits, as respondents frequently cited these elements as advantageous.

# Uncovering Community Perspectives: A Qualitative Exploration of Auckland Residents' Perceptions and Attitudes Towards Wetland Restoration as a Strategy for Disaster Risk Reduction

YS37-OL

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[2] *Faculty of Health and Environmental Sciences, Auckland University of Technology (New Zealand)*

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**Keywords**: Urban Flood Risk, Nature-Based Solutions, Ecosystem-Based Disaster Risk Reduction.



Flooding is one of the most common causes of disasters globally [1], and the most common hazard in New Zealand [2,3]. Auckland, the largest metropolitan area in New Zealand, encountered two extreme hydro-climatological events in January and February 2023 [4,5], causing devastating damage to properties in residential and commercial areas, disruptions to businesses and public services, and resulted in some tragic loss of lives, as well as millions of dollars' worth of insurance claims and payouts. These impacts stretched the capacity of the organizations and agencies involved in disaster response and recovery in Auckland. With the changing landscape of New Zealand's disaster risk, driven by ongoing urbanization and climate changes, the 2023 flooding events rang alarm bells for the need to revisit the local council's approach and practice [6]. The interest in nature-based solutions (NBS) has become more apparent as people see the value of nature for tackling climate change, driving sustainable socio-economic development, ensuring water and food security, as well as reducing disaster risk for rapidly growing world populations [7]. In Aotearoa New Zealand, the emphasis has been on using NBS for the conservation and restoration of biodiversity of native flora and fauna for ecological and sustainable management. However, a gap in the research area becomes apparent when wetland restoration is recognized as a practical strategy for reducing the flood risk in light of recent events. Using interpretive description methodology, the research endeavors to uncover community perceptions, awareness, and engagement of local residents in Waiatarua Reserve, Auckland, regarding wetland restoration as a pivotal strategy for urban flood risk reduction. The findings reveal that while the research participants perceived the Waiatarua Reserve as a useful urban amenity for various ecosystem services, they thought its ability to mitigate the flood risk is 'limited', and they emphasized that the need for a hybrid approach to handling extreme weather events in urban areas, which combine engineering and natural elements. The findings also revealed the critical role of community involvement in ensuring the long-term sustainable management of the Waiatarua Wetland. These findings provide valuable insights for the decision-making of local authorities in formulating urban flood risk management policies and public engagement initiatives.

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# Perceptions and Emotions Toward False Alarms in Flood Warnings and their Effects on Evacuation Behavior in Kyushu, Japan

A089-OL

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**Keywords:** False Alarms, Flood Warnings, Emotion, Perception, Protective Actions.

Repeated false alarms in weather warnings may undermine public trust and reduce the likelihood that people will take necessary protective actions during warnings. This phenomenon is called “cry wolf effect” [1]. Although efforts have been made to enhance the accuracy of weather warnings, false alarms still occur.

This study investigates public perceptions and emotional and behavioral responses to, false alarms in flood warnings, with the aim of empirically examining the cry wolf effect. Using a calculated false alarm ratio (FAR) of flood warnings and data from questionnaire survey in the Kyushu region, Japan, we addressed four research questions (RQs) through statistical analyses.

RQ1. What do people define “false alarm” in flood warnings?
RQ2. What kinds of emotions do people have when false alarms occur?
RQ3. Does the actual FAR affect the perceived FAR? Does this effect differ depending on people’s definition of false alarms?
RQ4. Does the perceived FAR discourage people from taking evacuation behavior? Does this effect differ depending on people’s emotions in response to false alarms?

The analysis revealed that people's definitions of false alarms were generally consistent with the criteria used by the Japan Meteorological Agency (JMA) (RQ1), and that when people received a false alarm, they tended to report positive emotions such as joy and relief, probably reflecting a sense of safety from a potential disaster (RQ2). The results also showed that the actual FAR did not have significant relationships with perceived FAR, and this effect did not vary significantly depending on people’s definitions of false alarms (RQ 3). However, the higher perceived FAR was found to discourage people from taking evacuation behavior, and the aforementioned positive emotions in response to false alarms were found to reduce this negative effect (RQ 4).

These findings imply the need to develop strategies that more effectively shape public emotions and perceptions of false alarms.

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# The Potential Earthquake Disaster in Beijing and its Impact on the Socio-Economic System and Residents' Income

YS32-OL

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**Keywords:** Earthquake, Scenario Simulation, Input-Output Model, Higher-Order Economic Loss, Urban-Rural Income Impact.

As socio-economic development continues to integrate, the impact of earthquake disasters is no longer limited to the directly affected areas but extends to other regions through supply chains, resulting in ripple effects across industries and causing income disparities between urban and rural workers in related sectors. Quantifying the potential socio-economic impacts of possible earthquake disasters in advance is crucial for future earthquake disaster risk management. This research constructs an integrated framework that covers earthquake scenario development, production capacity loss assessment, ripple effect evaluation, and the impact on urban and rural residents' income. It explores the socio-economic impact of various earthquake scenarios in Beijing, China, with an exceedance probability of more than 10% over the next 50 years. In particular, the earthquake scenario development uses ground motion prediction equations (GMPEs) to generate the distribution of peak ground acceleration (PGA) in all grids (cell size = 0.05 × 0.05 degrees) for Beijing. Based on the industrial location information distribution within each grid, production capacity losses are assessed using functional fragility curves. The capacity losses across all grids are aggregated to estimate the total production capacity loss in Beijing. The loss is then incorporated into the input-output model to evaluate the economic impacts on other cities in China, as well as the income differences between urban and rural residents. By revealing the vulnerable regions, industries, and resident groups, this research can provide scientific support for emergency management agencies to prioritize earthquake disaster policies.

# Examination of Disaster Prevention Education Practices to Promote Consideration of Vehicle Tsunami Evacuation – As an Example of Practice in Kuroshio Town, Kochi Prefecture, Japan

YS03-OL

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**Keywords:** Learning Environment Design, Vehicle Tsunami Evacuation, Education, Community Disaster Management Plan, Drill.

This study examined how to design drills and disaster prevention education practices that would promote discussion on the introduction of vehicle tsunami evacuation. When tsunamis occur, it is important for people to evacuate safely and quickly. However, using vehicles to evacuate has generally been discouraged due to the risk of causing secondary disasters. But in recent years, more and more areas are considering the introduction of vehicular tsunami evacuation, because of the difficulties of walking evacuation for aging populations and the benefits of using vehicles. Based on this situation, it is important to support discussions with local stakeholders and consider the characteristics of each region when examining suitable methods for introducing vehicle tsunami evacuation.

In this study, it examined how to introduce vehicle tsunami evacuation in the region, and planned drills and other practices to support discussions. Specifically, it examined the problem of traffic congestion during evacuations in the Nishikino area, Kuroshio Town, Kochi Prefecture. First, it conducted a simulation to check how traffic congestion would occur on local evacuation routes if vehicles gathered. After that, it ran a drill to verify vehicle tsunami evacuation. This evacuation drill was attended by people from residents, town office workers, high school students and teachers from the area. In the drill, pedestrians and vehicles evacuated at the same time, and it was investigated whether it was possible to go to the evacuation site quickly, and what kind of situations would cause problems.

In this study, it was compared with the results of previous drills, and it was examined the effects and issues of introducing vehicle tsunami evacuation in the target area. As a result, it seemed that there had been progress in organizing the issues more concretely than in the previous survey, and discussions had also advanced on methods of guiding people to resolve traffic congestion.

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# Measurement of Reconstruction Fund Allocation Optimization on the Effectiveness of Post-Disaster Reconstruction: Insights from Business Interruption Losses and Ripple Losses

YS33-OL

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**Keywords:** Post-Disaster Reconstruction, Business Interruption Losses, Ripple Losses, Fund Allocation Optimization.

Extreme precipitation events have become increasingly frequent and intense, leading to substantial social and economic losses and posing significant challenges to urban post-disaster recovery and reconstruction. The effectiveness of recovery and reconstruction efforts hinges on the rational allocation of reconstruction funds. However, existing studies primarily allocate funds based on assessment of direct losses, paying limited attention to the dynamic evaluation of business interruption losses and the transmission mechanisms of ripple effects across industries. This study measures the effectiveness of the dual perspectives of business interruption losses and ripple losses. We quantify the static loss rate ranges for various industrial sectors using functional fragility curves and assess enterprise recovery through survival analysis, thereby estimating dynamic production capacity losses across industries. Furthermore, by inputting the production capacity loss data at different stages into an extended input-output model and applying multi-objective optimization theory, we develop a constrained funding allocation model to achieve the optimal distribution of limited resources among direct loss compensation, industrial chain restoration, and economic resilience reconstruction. We exemplify this through a case study: a heavy rainfall disaster in Zhengzhou, China, in July 2021. We integrate micro-enterprise recovery mechanisms with macro-industrial linkage networks to construct a government disaster funding allocation model. We find that under the constraint of 6 billion yuan in disaster reconstruction funds, the optimized model can achieve an economic stimulus effect of 4.17 times, representing a 56.8%improvement in efficiency compared to the traditional allocation approach. Priority should be given to investing in key sectors such as construction and light textile industries, as they play crucial roles in infrastructure repair and industrial chain stability. This research provides a quantitative decision-making framework for governments to formulate differentiated post-disaster reconstruction policies, enhancing the efficiency of fund utilization and regional economic recovery.

# Assessing the Potential of Mosques in Disaster Response in Tokyo

A098-OL

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**Keywords:** Hazard, Potential, Mosque, Disaster, Macro Analysis.



As the principles of the Sustainable Development Goals [1] have become more widespread, there has been an increasing demand for disaster risk reduction that leaves no one behind. In Japan, however, cultural, linguistic, and religious minorities are not adequately supported. Under such circumstances, mosques (Islamic places of worship) are one of the places that support them during disasters (Picture. 1), so this study focuses on the use of mosques in Japan during disasters. Although some previous studies have reported on the support activities (e.g., serving as evacuation shelters and distribution centers of relief supplies) of a small number of mosques in Japan during disasters and assessed their potential for support [2,3], there have been no studies that have assessed the potential for mosques to provide support from a macro perspective. Therefore, the purpose of this study was to evaluate the potential of mosques in the entire Tokyo prefecture (n=18) to provide relief activities during disasters caused by natural hazards (e.g. tsunami, landslides, storm surges, floods, liquefaction).

In the framework of this study (Figure. 1), potential was determined from the hazard the mosque is exposed to and the resilience of the mosque community [4,5]. Hazard exposures were assessed using the hazard map portal site published by the Japanese government [6]. Resilience was assessed from physical and social capitals [7]. These capitals were assessed by conducting structured interviews with mosque representatives, each of which was normalized between 0 to 1.

The results show that for tsunami, landslides, and storm surges, only a few mosques are exposed to those hazards (Figure. 2). In the resilience assessment, more than half of the mosques in Tokyo scored above 0.5 for both social and physical capital. From these results, many mosques in Tokyo could be considered to have the potential for relief activities. For floods and liquefaction, many mosques are exposed to these hazards, and the distribution of social and physical capitals of these mosques indicates that the potential in their current conditions is likely to be greatly affected by the degree of their physical capitals (Figure. 3).

This study will not only help Muslims in Japan better understand the hazards mosques are exposed to and their capital that works in disasters, but also provide governments and NPOs with new options for relief activities, such as the use of mosques during disasters.

Picture. 1 a mosque in Tokyo


Figure. 1 research framework

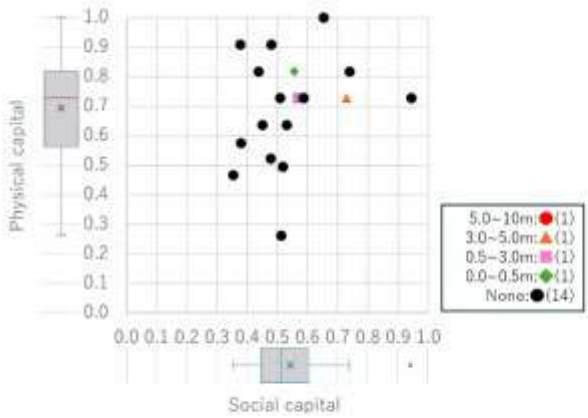


Figure. 2 Potential assessment of mosques in Tokyo for storm surge

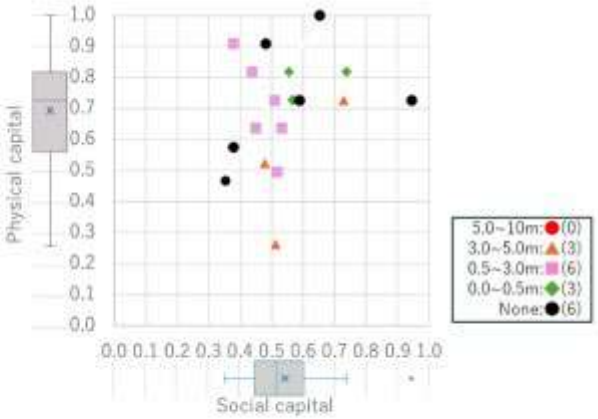


Figure. 3 Potential assessment of mosques in Tokyo for floods by planned scale rainfall

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# Modeling Regional Production Capacity Loss Rates Considering Response Bias: Insights from a Questionnaire Survey on Zhengzhou Flood

YS34-OL

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**Keywords:** Production Capacity Loss Rate, Response Bias, Exceedance Probability Curve, Zhengzhou Flood.

Flood disasters in specific regions not only cause physical damage but also disrupt the production and operations of enterprises, making economic system more vulnerable. Assessing production capacity loss rate (PCLR) in enterprises is crucial for quickly evaluating disaster losses. However, PCLR in enterprises is difficult to measure through physical damage. On-site investigations offer a compromise method, but inconsistencies between respondents and investigators in understanding production capacity may result in response bias. Therefore, this study employed the vulnerability curve method for categorizing damage states to divide PCLR into different damage states and constructed exceedance probability curves to mitigate response bias. Then, this study utilized distribution function fitting to calculate the expectation of loss rate for each state, and finally integrated the probabilistic information with the expectation of loss rate under each state to construct PCLR curves. The proposed methodology is realized by the questionnaire data from the “7.20” extreme flooding event in Zhengzhou, Henan. We found that when the inundation depth is less than 80 cm, wholesale and retail trade sector suffers the greatest losses; however, when the inundation depthexceeds80 cm, we should pay more attention to manufacturing sector. Monte Carlo simulation(MCS) established the prediction intervals of PCLR curves, offering an alternative for PCLR. This study effectively accounts for response bias, providing input conditions for assessing ripple losses

# Identifying Critical Gaps in Offshore Wind Hazard Standards for Offshore Wind-to-Hydrogen Platforms: Comparative Review and Preliminary Risk Management in Kyushu, Japan

YS61-OL

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**Keywords:** Wind Hazard, Offshore Hydrogen, Typhoon Risk, Offshore Standards, Natech.

The global transition toward renewable energy is accelerating under climate change pressures, yet offshore infrastructure standards often remain anchored in historical hazard assumptions [1]. Offshore wind-to-hydrogen (WTH) platforms, which integrate offshore wind energy generation with green hydrogen production via electrolysis, introduce new structural, operational, and safety challenges that traditional offshore platform standards do not fully address. In Japan, the Green Growth Strategy toward 2050 Carbon Neutrality highlights the deployment of offshore wind and hydrogen systems, particularly in vulnerable regions such as Kyushu [2].

This study aims to identify critical gaps in current offshore wind hazard design standards and address their implications for future offshore hydrogen infrastructure. Through a comparative review of Japanese and Norwegian design codes, five major gaps are identified: (1) the lack of systematic incorporation of future climate change projections into hazard parameters; (2) inadequate modeling of joint wind-wave extreme events, which are critical under typhoon conditions; (3) limited applicability of existing standards to emerging floating and hydrogen-producing offshore platforms; (4) the absence of Natech (Natural Hazard-Triggered Technological Accident) scenario considerations in design assumptions; and (5) insufficient regional calibration to account for localized extreme typhoon risks.

Building upon the identified gaps, this study aims to demonstrate how current design assumptions may be insufficient under intensified typhoon activity projected by future climate scenarios. A preliminary stochastic hazard assessment is conducted for the Kyushu offshore region. Synthetic typhoon tracks are generated through parametric modeling to simulate multiple hazard scenarios, reflecting potential future intensification trends. Wind fields are estimated using the Holland model, while corresponding wave fields are derived from Young's empirical growth equations. Extreme value analysis (GPD) is applied to estimate the return levels of wind speeds and wave heights. Furthermore, copula-based joint probability modeling is utilized to characterize the dependency between wind and wave extremes, identifying critical combined hazard scenarios that could threaten offshore WTH platforms and reveal limitations in current design standards.

The findings of this study provide a hazard-informed basis for offshore platform design and site selection under evolving meteorological risks. Moreover, this work establishes a foundation for subsequent Natech risk assessments focused on hydrogen leakage, structural failure, and cascading accident scenarios under typhoon-induced extreme conditions [3]. The outcomes contribute to bridging the gap between traditional design practices and the resilience needs of next-generation offshore energy systems in a changing climate.

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# The Chain Disaster Mainly Caused by the Flood Resulting from the Breach of the Dike at Huayuankou in 1938

A113-OL

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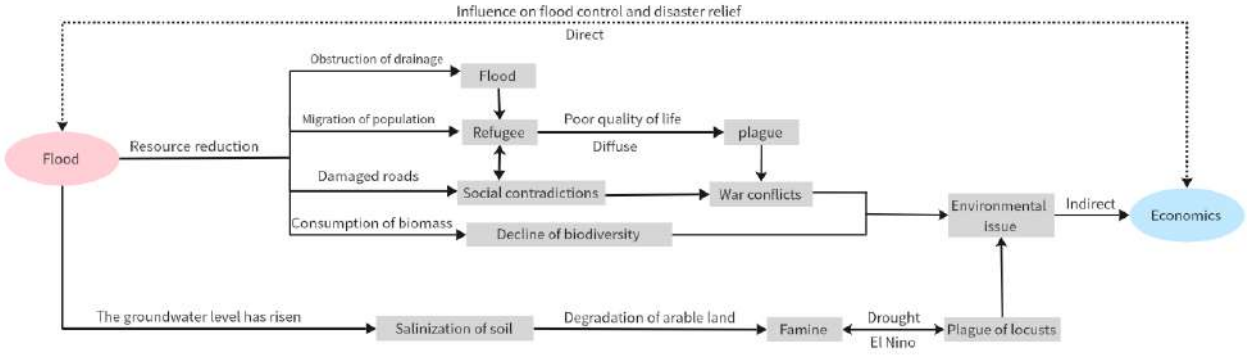
**Keywords:** Garden Mouth Dam Breakage, Disaster Chain, Natural Destruction, Social Impact.

The major man-made event of the Garden Mouth Dam Break in 1938 profoundly influenced the natural environment, society and regional economy, forming a complex chain of causal relationships of "flood - ecological collapse - social crisis - compound disaster".(1) In terms of nature: Floods destroy vegetation, resulting in a sharp decline in biomass - loss of biodiversity - the rise of groundwater levels leads to soil salinization and a significant drop in agricultural productivity; ecological imbalance causes frequent droughts and locust plagues, leading to an aggravation of natural disasters. (2) At the social level: A large number of people are forced to migrate, and the number of refugees surges - the quality of life declines, hygiene conditions deteriorate, and the risk of epidemic spread significantly increases; floods directly cause blockages and drainage difficulties - leading to floods and subsequently affecting the capacity for flood control and disaster relief investment, infrastructure damage hindering the distribution of materials - the gap between the rich and the poor widens, and the risks of conflicts and wars increase sharply. (3) The breach of the Garden Gate Dam, as a typical case of man-made disasters, serves as a warning to us that we should not only focus on individual disaster events but also adopt a systematic approach to enhance research and response to each link of the disaster chain. We should attach importance to the correlation between natural and social vulnerabilities, pay attention to the scientific nature of human intervention, and achieve coordinated and sustainable development of the natural and social systems.




- Figure 1: The Disaster Chain of the Garden Mouth Floodgate Failure

# Estimation of Population Exposure to Flood Risk by Using a Geospatial Information System Overlay of Mobile Spatial Statistic (MSS) Data, Flood Inundation Map, and Land Use Zone

YS14-OL

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**Keywords:** Mobile Spatial Statistics, Population Exposure, GIS, Flood Risk, Land Use Zone.



Floods are considered one of the deadliest natural disasters worldwide and can cause severe damage to human life, the environment, and economic aspects [1]. The devastating flood phenomena that hit several cities in Gifu Prefecture, Japan, from 1959 until 1976 remains a potential threat to the communities and properties living around the downstream part of the Nagara River basin [2]. Realizing that the affected population is essential in disaster risk reduction, an accurate and targeted estimation of population exposure is needed to reduce the flood disaster risk. In Japan, MSS has been used in many aspects, such as transportation, urban planning, disaster management, etc. Compared to traditional Census data, MSS data presents a substantial advantage when analyzing population exposure to flood disasters by offering dynamic, time-sensitive insights into population distribution and mobility patterns [3]. This ability served by MSS can make the population exposure estimation more diverse and targeted. In addition, with dynamic and time-sensitive insights into population distribution and mobility patterns served by MSS data it is allows for the identification of temporal and spatial variations in population exposure that cannot be captured by traditional statistic data such as census data [4]. Therefore, this research proposed the use of advanced geospatial technologies, with the integration of MSS data and flood inundation maps, to analyze population exposure to flood risks across different times of day which in this research from midnight (00:00-03:00), midday (11:00-13:00), and evening (17:00-19:00) and estimate how many people are exposed to flood in each land use zone of Gifu City. The workflow of this research can be seen on Fig.1. The results by using time-based population exposure from MSS data indicate that population exposure varies with time, land-use zones, and demographic factors, with residential areas particularly at-risk during midnight and commercial areas during midday. The study highlights the high exposure of middle-aged and elderly populations, emphasizing the need for targeted disaster mitigation strategies. This approach, replacing traditional census data with MSS data, provides a real-time insight on flood disaster which will be beneficial on flood risk management, urban planning, and policy evaluation, especially in regions lacking comprehensive statistical data.

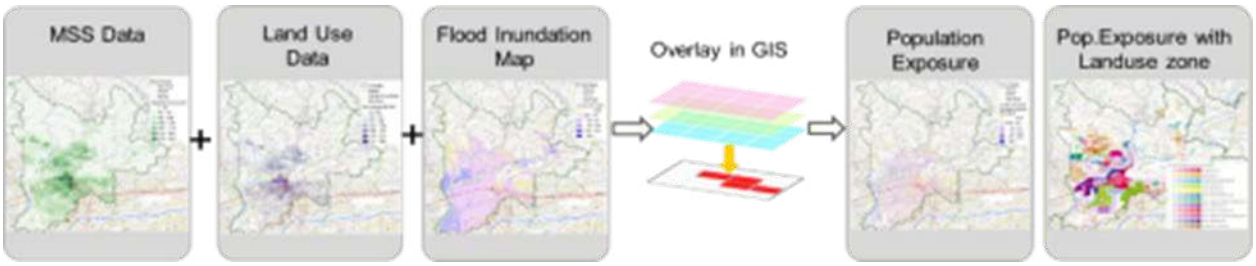


Fig.1 Workflow of Overlaying Method of MSS Data, Flood Map, and Land Use Data to Estimate Population Exposure.

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# Impact on Urban-Rural Income Inequality of Flood Disasters in China: Insight from Mixed-Irio Model Considering Households Endogeneity

YS28-OL

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**Keywords:** Urban-Rural Income Inequality, Flood Disaster, Mixed Interregional Input-Output Model, Household Endogeneity, China.

As one of the most disaster-prone countries globally, China is particularly affected by flood disasters, which have significant economic impacts. Traditional disaster economic impact assessments typically focus on industrial losses, often overlooking the effects on households as an important economic agent. This paper aims to quantitatively analyze the impact of flood disasters on urban-rural income inequality in China. Based on the Miyazawa model's method of classifying household income groups, households are divided into urban and rural categories, and a mixed interregional input-output model (Mixed-IRIO) that incorporates household endogeneity is constructed. An empirical analysis is conducted using data from 31 provinces in China between 2013 and 2023, focusing on the effects of flood disasters on urban and rural income. First, the direct economic loss rate is estimated using data on direct economic losses and GDP from 2013 to 2023 across provinces, which serves as an input variable for the model. The impact of flood disasters on industrial chains and the feedback mechanism of household income is simulated, and the income losses of urban and rural households in different regions are assessed. The analysis is conducted from two perspectives: urban-rural income loss values and income loss rates, with additional considerations of the absolute differences in urban-rural income loss values and the relative differences in income loss rates. These indicators comprehensively measure the impact of flood disasters on urban-rural income inequality. The study provides new insights into the mechanisms by which natural disasters impact income distribution patterns and offers important empirical evidence for the development of targeted post-disaster recovery and income support policies.

# Temporal and Spatial Variation Characteristics of Precipitation Isohyets on the Qinghai-Tibet Plateau from 1961 to 2023

A115-OL

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**Keywords:** Isohyet, Climate change, Qinghai-Tibet Plateau.

Against the backdrop of warming and humidifying climate change [1], the "solid-liquid structure" of water bodies in the Qinghai-Tibet Plateau has become unbalanced [2-3], and the spatial pattern of precipitation has undergone significant changes. Based on the monthly precipitation spatial data of the Qinghai-Tibet Plateau from 1961 to 2023, the 200mm and 400mm isohyets of the plateau were extracted. The climate tendency rate method and the center of gravity migration method were used to depict the spatial distribution of annual precipitation and the temporal and spatial variation pattern of isohyets [4-6]. The results show that: (1) Precipitation increased significantly (4.17 mm/10a), decreasing from southeast to northwest. Regionally, precipitation increased in areas such as the southern Qinghai plateau, but decreased in the southern Himalayas and the south-central Altun Mountains. (2) The 200mm isohyet line moves northward in southeastern Qiangtang and shrinks around the Qaidam Basin, generally moving northeastward; the 400mm isohyet line moves westward in eastern Qiangtang and the Hehuang Valley, and northward in southern Qinghai, generally trending northwestward. (3) The center of gravity of the 200-mm isohyet line shifted northward by about 49 km and eastward by about 17 km from 1961 to 1990 to 1991 to 2023, with an overall northeastward trend; the center of gravity of the 400-mm isohyet line shifted northward by about 22 km and westward by about 19 km from 1961 to 1990 to 1991 to 2023, with an overall northwesterly trend. The overall trend is moving to the northwest. (4) During the period 1961 to 2023, the 200mm isohyet line migrates to higher elevations on the vertical gradient at a rate of 7.11 m/10a; the 400mm isohyet line rises at a more moderate rate of 2.61 m/10a.

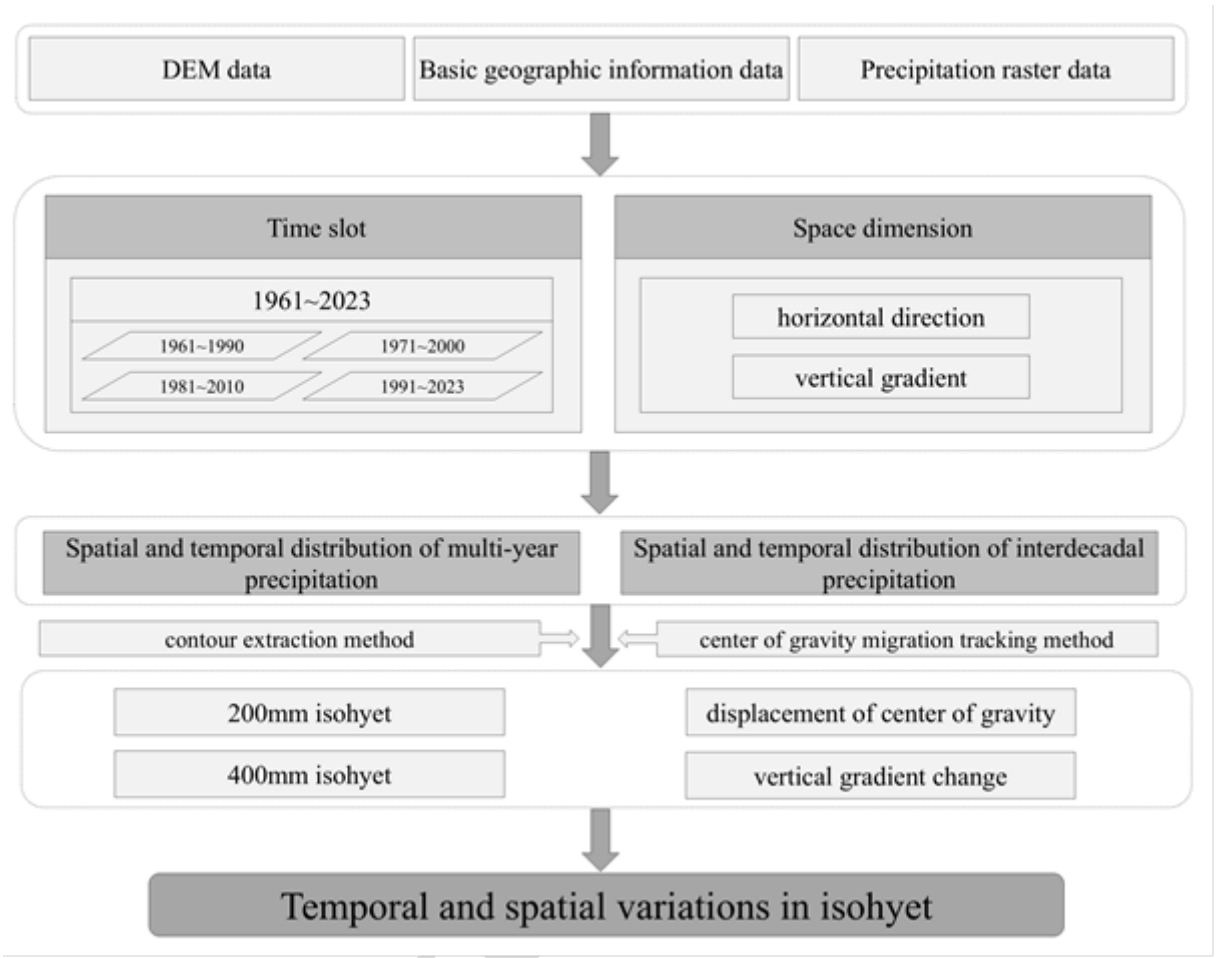


Figure 1 Technology roadmap

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# Modeling Enterprise Capacity Loss Through Infrastructure Interruptions: A Nested Logistic Framework for Natural Disaster

YS30-OL

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**Keywords**: Enterprise Capacity Loss, Infrastructure Interruptions, Nested Logistic Framework, Hazard-Induced, Cascading Effects, Risk Assessment.

Assessing enterprise capacity loss under hazard impacts requires accounting for cascading effects through infrastructure systems, yet existing models often overlook the mediating role of infrastructure interruptions and the nonlinear dynamics in hazard-loss relationships. Traditional loss frameworks typically establish static correlations between hazard intensity (e.g., typhoon wind speed, denoted as H) and losses, neglecting the intermediate process where hazards first disrupt infrastructure (infrastructure interruption index I), which then propagates losses to enterprises (L). This oversight limits the accuracy of risk assessments and the effectiveness of resilience strategies.

This paper proposes a nested functional framework to model the causal chain H→I→L, identifying I as a critical mediating variable. Two logistic growth models with error terms are developed: the first quantifies how H influences I, capturing the nonlinear escalation of infrastructure failures as hazard intensity increases; the second links I to L, incorporating unobserved heterogeneities through error terms. The nested function L(H,I(H)) systematically integrates these cascading effects, enabling a dynamic representation of loss propagation from hazards to enterprises via infrastructure systems.

The framework is validated using survey data from Typhoon Yagi (2024) in Haikou, China, with ongoing analysis expected to yield key findings: (1) Infrastructure interruption I acts as a pivotal mediator, amplifying or dampening the relationship between hazard intensity H and enterprise loss L; (2) The nested model is expected to reveal critical thresholds in H→I and I→L linkages, where minor increases in H beyond specific levels could trigger abrupt, nonlinear jumps in I and subsequent L; (3) Error terms in the models account for unobserved factors (e.g., operational adaptability, regional resilience disparities), enhancing the framework's robustness in capturing real-world uncertainties.

By integrating mediating mechanisms and nonlinear dynamics, this research addresses a key limitation of static loss models, advancing the understanding of cascading disaster impacts. The framework empowers policymakers and enterprises to: (1) prioritize infrastructure resilience investments by identifying hazard thresholds that drive disproportionate losses; (2) improve risk projections by incorporating step-by-step failure processes in infrastructure-enterprise systems;

and (3) design targeted interventions to disrupt the hazard-interruption-loss chain, particularly in typhoon-prone regions where infrastructure vulnerability exacerbates economic consequences.

# Learning From the Past Multi-Hazard Events. Forensic Analysis Application for 2018 Kerala Floods

YS38-OL

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**Keywords:** Forensic Analysis, PARATUS Project, Kerala Flood, Resilience Building, Early Warning.



In 2018, Kerala, India, experienced flooding caused by unprecedented monsoonal rainfall and the release of excess water from 37 dams, which compounded vulnerabilities across physical, environmental, socio-cultural, economic and institutional dimensions. With a 100-year return period, this disaster affected 14 districts of Kerala and displaced over 1.4 million people, claiming more than 500 lives. Beyond the immediate human and infrastructural losses, the flood triggered cascading hazards such as landslides and soil erosion, causing long-term damage to agricultural productivity, critical infrastructure and ecosystems. Contaminated floodwaters led to a surge in waterborne diseases and mental health crises among the affected populations.

In the context of the PARATUS project, we developed a forensic approach based on three specific methodologies: Investigation of Disasters (FORIN), Post Event Review Capability (PERC), and Detecting Disaster Root Causes (DKKV). PARATUS approach applies a combination of these three forensic analyses to a set of learning case studies drawn from selected past disaster events to analyze and navigate the complexity of disaster impacts across diverse contexts.

The forensic analysis investigates the pre-existing vulnerabilities, including inadequate urban planning, poor infrastructure maintenance, and fragmented land use practices, which are exacerbating the impacts of the floods. The marginalised communities, with limited access to resources, bore the brunt of the catastrophe. The economic fallout included a 7.7% decline in activity during the disaster, with significant losses to key sectors such as agriculture and plantations, disrupting livelihoods and regional stability. The immediate response to the disaster involved large-scale rescue and relief operations coordinated by national forces, local governments and volunteers, leveraging early warning systems and social media for real-time updates. While these efforts saved lives and provided temporary relief, recovery and reconstruction efforts faced delays due to financial constraints and bureaucratic inefficiencies.

In the aftermath of the Kerala floods, resilience-building initiatives were implemented, including enhanced disaster management plans, land-use mapping, and improved hydro-meteorological warning systems. However, it was found in the forensic assessment that persistent vulnerabilities, particularly among marginalised groups, highlight the need for inclusive governance and equitable distribution of resources to mitigate future risks. This case study underscores the importance of

integrating socio- environmental systems with robust institutional frameworks to build resilience against extreme climate events.

# Modeling and Quantifying the Impact of Climate Stress on Coffee Yield: A Comparative Study of Yunnan, China and Ethiopia

YS43-OL

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**Keywords:** Climate Stressors, Coffee Yield Loss, Coffee-Climate Response Model, Resilience to Climate Change.

Coffee, one of the world's three major beverages, is the main source of livelihood for many small and medium- sized farmers. As geographical shifts to higher latitudes are proposed as a warming climate adaptation, understanding coffee yield responses to climate stress in marginal and traditional areas is crucial. This study conducts a comparative research on Yunnan, China, a marginal coffee-growing area, and Ethiopia, the birthplace of coffee. Based on climate data and statistical coffee yield data, we identify the critical climate stressors and quantify their yield impact by using generalized additive models and random forest models. In Yunnan, our results show coffee yield can decrease by 18.9% per 1°C decrease in minimum of daily minimum air temperature during maturity or by 4.0% per 0.1kPa increase in vapor pressure deficit during flowering. During 1992–2022, chill stress topped the relative contribution to coffee yield loss for 66% of counties, followed by drought. TNn and VPD are used as indices for chill and drought stresses respectively to determine the insurance payout scheme and calculate the pure risk loss rate. In Ethiopia, studies show drought is the biggest climate stress on yield, followed by chill and wet. A coffee index insurance product is being designed according to these relevant relationships. Our results could enrich understanding of climate-coffee yield interactions and underscore the need to focus on the differences in typical climate stresses affecting coffee yield between new and old coffee-growing areas under future climate change.

# Towards a Theoretical Framework for Assessing the Role of Religious Institutions in the Disaster Recovery

A108-OL

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**Keywords:** Disaster Management, Religious Institutions, Community Resilience, Risk Adaptation, Disaster Preparedness.

Religious institutions have historically played a vital role in providing spiritual guidance, social support, and community resilience during times of crisis. With the increasing frequency and intensity of disasters - whether natural, such as earthquakes and floods, or human-induced, like conflicts and industrial accidents—it becomes essential to reassess the role of religious spaces in disaster preparedness and risk management. This paper addresses the issue of reduced recognition of these religious spaces in formal disaster management frameworks. This paper aims to explore the role of religious institutions across different cultural and geographical contexts have contributed to disaster mitigation, response, and recovery efforts, and whether their social and moral influence continues to be relevant in present times and in the future. The study includes a literature review that discusses the global experiences of religious institutions in disaster recovery process. Secondary case studies from various traditions are reviewed to understand the role of Religious Institutions in the disaster recovery process. The study identifies different kinds of risks—sudden (like earthquakes), ongoing (like climate change), and human-made—and investigates how religious institutions have responded to such cataclysmic changes in the community systems. It also explores the extent to which communities perceive these buildings and institutions as socially and spiritually significant, especially in contexts of uncertainty and crisis. The review highlights that despite their ability to endorse social control and collective responsibility, religious institutions are often overlooked by the modern risk adaptation approaches. The evidence reveal that these institutions have mediated, assisted in the provision of shelter resources, disseminated critical information, and developed a sense of collective care and resilience in affected communities. This paper develops a theoretical framework for a broader, interdisciplinary understanding of disaster management—one that acknowledges the relevance of religious institutions in promoting social cohesion, fostering collective preparedness, and mitigating disaster impacts through culturally resonant practices.

# Standard Tool for Assessing and Evaluating the Cultural Resilience of Cities

YS05-OL

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**Keywords:** Resilience, Tangible and Intangible Culture, Multicriteria System, MAUT.



This paper explores the relationship between resilience and culture, proposing a methodology for assessing the cultural resilience of the residential environment in Greece through a multicriteria model. It argues that every residential community faces historical pressures and crises. The establishment of a cultural resilience assessment model for cities ensures both the continuity of culture for the future and its transmission from generation to generation. The proposed model is constructed around the two parameters of resilience and culture and is applied to every locality.

The interaction between resilience and culture has become an increasingly important area of study within urban planning and community development. This research focuses on developing a robust assessment tool that measures cultural resilience within Greece's residential contexts and integrates both quantitative and qualitative criteria. The proposed model is structured along two central parameters: resilience and culture. Each residential cluster is assessed concerning its cultural assets—both tangible and intangible—ensuring that the evaluation is comprehensive and representative of the local context.

The framework will consist of categorized cultural assets, where each category is evaluated using indicators relevant to various pressures or crises that may affect them. This dual approach aims to mitigate potential disturbances and enhance preparedness for future challenges. The choice of a multicriteria system stems from the realization that evaluating cultural resilience necessitates the simultaneous use of various types of indicators. The inconsistency arises from the reliance on different measurement forms, including qualitative descriptors (e.g., binary indicators like YES/NO) and quantitative data (e.g., numerical values such as dates). This complexity underscores the importance of a unified assessment framework.

To address this complexity, the methodology of the model focuses on the development of both quantitative and qualitative criteria guided by a user toolkit. The toolkit outlines the necessary steps, stages, and calibration methods for evaluating the criteria effectively. This consideration aims to facilitate a common methodology that any stakeholder—government entities, cultural organizations, and community members—can apply.

The integration of cultural resilience assessments in urban planning marks a significant step towards fostering sustainable community development in Greece. The proposed multicriteria model serves as a scientific tool for evaluating both tangible and intangible cultural aspects of residential environments, ultimately contributing to a richer and more resilient urban landscape.

# Enhancing Communication for Adoption of Hazard-Resilient Housing: Co-Creating Cognitive and Peer Learning Tool for Rural Nepal's Flood Recovery

YS41-OL

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**Keywords:** Disaster Communication, Hazard-Resilient Housing, Behavioral Segmentation, Co-creation.



In post-disaster recovery a persistent gap remains between the availability of technical knowledge and its effective adoption at the community level. Conventional communication tools, such as posters, mobile apps, and technical manuals, often overlook cognitive, social, and infrastructural limitations within disaster-affected populations in remote and low-income communities. Additionally, growing funding gaps in humanitarian assistance further restrict resource-intensive interventions like door-to-door assistance or demonstration houses. This study investigates how communication interventions can be effectively designed to support learning and decision-making about flood-resilient housing in remote areas of Nepal, where literacy barriers, limited resource access, and financial constraints severely reduce the effectiveness of conventional tools.

This research develops a structured, behaviorally informed approach to designing communication tools tailored specifically for flood-resilient housing in low-literacy, low-income settings. It utilizes the Motivation–Ability–Opportunity (MAO) behavioral framework to better understand community readiness for safer reconstruction practices. Applying the MAO framework allowed the segmentation of communities into groups with distinct cognitive and motivational readiness, providing the empirical basis to design an adaptive, multi-level learning tool responsive to varied needs.

A cluster analysis was conducted using household survey data (N = 2,024) from two flood-affected districts in Nepal's Terai region. The Systematic Targeted Interaction Design (STID) approach, originally developed and applied to earthquake-affected regions, was adapted here to flood-affected areas. Three distinct behavioral clusters (target groups 7, 16, and 25) emerged, reflecting significant intra-community variation in motivation, perceived ability, and resource access. These segmentation results highlighted the inadequacy of uniform, top-down approaches given the diverse needs within communities.

Recognizing this diversity, segmentation results informed the development of an interactive communication tool that leverages behavioral differences to facilitate structured peer-to-peer knowledge exchange. The resulting intervention is a non-digital, simulation-based game enabling collaborative decision-making under realistic conditions, including budget constraints and escalating flood risks. The game explicitly aligns each gameplay element with Bloom's cognitive learning levels, matching different components to the learning readiness identified through MAO

segmentation. This cognitive layering ensures foundational knowledge acquisition for less-prepared community members, while also enabling higher-order decision-making skills among more capable individuals.

The game underwent iterative refinement through structured prototyping, engaging local humanitarian practitioners to ensure contextual appropriateness, game design experts to refine mechanics, and university students to evaluate usability and structural coherence. By integrating behavioral segmentation, cognitive learning principles, and peer learning dynamics, this study offers a replicable framework for developing inclusive, contextually adaptive, and cost-effective communication tools, particularly valuable in resource-constrained and geographically isolated communities.

# Local Heat Action Plan: Developing Framework for Mobilizing Governance in Rural Areas – Case Study, Moodady Gramapanchayath, Kozhikoda

A075-OL

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**Keywords:** Local Governance, Heat Mitigation, Decentralization, Infrastructure.

Kerala witnessed its deadliest heatwave during one of the warmest years in the past century in 2024. In the near future, in the year 2030, March temperatures are projected to increase between 0.45°C and 0.7°C under the SSP2-4.5 and SSP2-8.5 scenarios. In the 2050s, under the SSP2-4.5 scenario, a 1°C increase is projected, and a 1.25°C to 1.55°C increase under the SSP5-8.5 scenario [1]. This paper presents a framework, Local Heat Action Plan (LHAP), which can be adopted by local self-governments to reduce the impact of extreme heat by mobilizing the existing governance system. The study also extends to understanding the gap in implementing the framework in a selected LSG, Moodady Grama Panchayat in Kozhikode District.

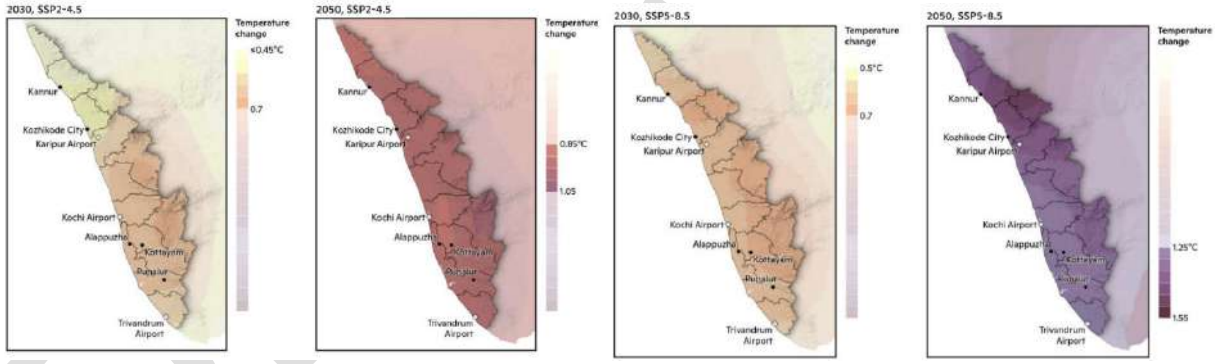


*Figure 1: The projected increase in March Tas, max under two time periods: 2030 (2020- 2040) and 2050 (2040-2060), and two scenarios: SSP2-4.5 and SSP5-8.5* [source: Heat Analysis for Kerala, India. (2024)]

Reports have been stating that the trend of warming involves a combination of factors such as higher average temperature, shifting monsoon patterns, and growing number of heat wave days. It is warned that without region centric intervention, extreme heat events will become more and severe affecting the vulnerable the most. [2]

Local self-government institutions in Kerala have emerged as effective agencies for the implementation of developmental programs. The People's Plan Campaign and District Planning Committee are the key components of decentralized planning for the development of local communities, focusing on participatory planning.

The Local Heat Action framework intends to engage the governing structure and working group within the system of local self-government to mitigate rising heat emergencies. It starts from the identification of vulnerable populations and critical infrastructure in the context of extreme heat scenarios. The LHAP framework details the early warning dissemination and monitoring mechanisms within the capacity of the local governing system. The paper discusses the derivation of short-term and long-term interventions by stakeholders and local communities through participatory processes.


*Figure 2: Map of Moodady Grama Panchayath* [source: https://map.opendatakerala.org]

Moodady Gramapanchayath (local self-government body) is located on the coastal side of Koylandy Taluk in Kozhikode district, Kerala. To the eastern side, it borders laterite rocky terrain. This unique feature presents challenges in formulating tailor-made heat-mitigating interventions. The paper aims to analyze the gaps and challenges in the implementation of the local heat action plan, mobilizing the governing structure with the help of communities.

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# Towards Inclusive Vulnerability Mapping: A Systematic Review of Gender Integration in Vulnerability Analyses

YS73-OL

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**Keywords:** Inclusive, Vulnerability, Geospatial, Gender Integration.

Gender inequality is a key challenge and major barrier to human and economic development. Further, the integration of gendered data into political and/or decision-making structures is rare. This leaves a significant gap in the ability for interventions to be impactful and sustainable. For example, geospatial assessments at local, national, and regional scales of the vulnerability of populations to disaster risk, and/or climate change impacts typically use publicly available data from surveys, statistics agencies, and Earth observations to create one map. These vulnerability, impacts, and assessment studies have influenced governmental and donor investments in specific areas to protect these identified regions. Traditionally, these measures of vulnerability do not make gender informed or disaggregated conclusions despite a growing body of research documenting that men, women, and other diverse identities face different vulnerabilities to climate change across all sectors. Additionally, failure to disaggregate findings based on sex has been shown to exacerbate inequalities. This study conducts a systematic literature review on the current practices of how gender is incorporated into disaster and climate change vulnerability research in order to develop recommendations for better inclusion in the future. Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Protocols 2020 (PRISMA) guidelines. A search strategy was defined to capture studies that involved geospatial vulnerability mapping, gender, and climate change, 61 papers were identified and analyzed for 1) how gender has been operationalized within vulnerability analyses, 2) what were the findings of these analyses, and 3) what gaps and challenges remain.

Overall, the majority of studies focus on inherently vulnerable regions, but few comprehensively address gender. Methodologies of the studies varied widely, and validation of the results of any methodology remains a key challenge. Many additional opportunities are identified that work towards capturing the social dynamics that could shape our understanding of a more gender inclusive vulnerability assessment. Future research will apply the lessons learned from this review and develop methodologies for inclusive geospatial vulnerability assessments to inform resilience policies, planning, and implementation.

# Investigating the Roles and Gendered Implications of Volunteering in Disaster-Affected Communities: A Case Study of Cameroon

YS74-OL

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**Keywords:** Volunteer Disaster, Displaced Women, Empowerment, Vulnerabilities.

This research critically investigates the roles of volunteerism by disaster-displaced women in Cameroon, particularly in addressing reducing their unique vulnerabilities [1] through pathways toward sustainable livelihood. In this study, sustainable livelihood is defined as one that enables individuals to cope with and recover from disasters, provide opportunities for future generations and contribute meaningfully to their communities [2]. Recognizing the multifaceted nature of volunteering, this study explores how specific volunteer practices may exacerbate or mitigate vulnerabilities [3]. It builds on the experience of women displaced from the Northwest and Southwest regions of Cameroon living by the sea in Douala Cameroon. The case of these women highlights how internally displaced women volunteer to support their peers. The study explores which demographics are most effective in providing meaningful support, and the extent to which volunteering can genuinely lead to sustained livelihoods among disaster-displaced women.

PURPOSE

To explore the mechanisms of internally displaced women peer to peer volunteering geared towards achieving sustainable livelihood.

METHODOLOGY

This is a prospective cohort study with a mixed method approach. For the quantitative dimension, internally displaced women volunteering to support their peers were sourced from the Belosy Africa Database. A need assessment was conducted identify the demographics of displaced women and their most pressing needs and vulnerabilities. Qualitatively a focus group discussion will be done to identify the motivation behind volunteering among displaced women, and feedback on how their volunteering efforts have enhanced the livelihood of displaced women in Douala.

RESULTS

The study is expected to provide an original academic contribution to the field of volunteerism among displaced women. Preliminary quantitative results suggest that displaced women aged 15 to 45 years are most likely to volunteer in supporting their peers especially those living in hard-to-reach locations, to sustain a skill and develop a small business.

CONCLUSION

Preliminary result suggests that displaced women aged 15 to 45 years are most likely to provide unremunerated services to support their peers in Douala. This study is ongoing and so far, the data highlights marked potentials in internally displaced women peer to peer volunteering. However, other vulnerabilities have arose from such volunteering such as displaced women who are volunteers travelling far distances to support that peers even though they are the main breadwinners exposes their family to unsafety and exacerbates destitution among the displaced population.

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# Water Insecurity and Anxiety in Post-Disaster Nepal: A Gendered Analysis from Earthquake Affected Remote Communities in Nepal

YS40-OL

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**Keywords:** Water Insecurity, Water Anxiety, Gendered Vulnerability, Psychosocial Distress, Disaster Risk Reduction.

While infrastructure and service disruption, such as water supply, transportation networks and energy supply systems receive increasing attention in disaster risk reduction, the psychosocial dimensions of disaster impacts remain critically underexplored. There is limited understanding of how failures and breakdowns of essential services, such as safe drinking water supply systems, trigger psychological conditions in post-disaster settings. Our study seeks to address this gap by examining water insecurity and its psychological effects, conceptualized as water anxiety, in the context of the 2023 Karnali earthquake in Jajarkot district, Nepal. As a remote and mountainous area, Jajarkot faces heightened disaster vulnerability due to geographic isolation and multidimensional poverty.

Building on our newly developed Water Insecurity and Anxiety Framework, we adapt and combine indicators from the Individual Water Insecurity Experiences (IWISE-12) scale and Generalized Anxiety Disorder (GAD-7) scale to assess pre- and post-disaster water insecurity and associated psychosocial distress at the individual level. An empirical mixed-methods research approach comprising household surveys (n=248) and 4 gender-separated focus group discussions, was applied in two geographically remote and socio-economically distinct communities in Jajarkot, Nepal (Badi-Basti and Kalpat).

We found significant spatial and gendered differences in both water insecurity and related psychosocial distress before and after the earthquake. In Kalpat, women reported the highest levels of post-disaster water insecurity, reflecting a sharp deterioration following the collapse of piped infrastructure. In contrast, Badi-Basti—already reliant on informal sources—showed smaller increases in perceived insecurity. While men in both communities reported lower levels of distress, spearman's correlation analysis showed a moderate negative association between pre-disaster water insecurity and distress among men ($r = -0.542$), suggesting that prior exposure to water insecurity may build psychological resilience. Conversely for women, post-disaster water insecurity was moderately positively correlated with distress ($r = 0.507$), indicating greater sensitivity to sudden disruptions. These findings suggest that women's daily responsibilities in water collection and caregiving amplify their emotional burden during crises.

This study underscores the need for context-specific and gender-sensitive disaster interventions. It also points to the importance of understanding baseline conditions. Communities with long-standing water insecurity may respond differently to disasters than those that experience sudden disruption, and gendered responsibilities significantly shape those responses. We learn that future research should explore local coping mechanisms to understand how these practices might be integrated into formal water supply and recovery initiatives. By framing water anxiety as a measurable psychosocial outcome of disaster-induced water insecurity, this research calls for its inclusion in disaster risk governance frameworks.

# Seismic Crisis Communication and Response Under Uncertainty in Islands: The Perspectives of Science, Administration and the Local Community

YS07-OL

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**Keywords:** Emergency Seismic Information, Crisis Management, Remote Islands, Earthquake, Greece.

In early 2025, South Aegean Sea in Greece, particularly the area between the touristic islands of Santorini and Amorgos, experienced a significant earthquake swarm activity -the strongest event reaching a magnitude of 5.3- puzzling scientists and leading to widespread uncertainty and anxiety among residents and authorities. On 6 February 2025 the Greek government declared a state of emergency to mobilize resources and emergency services leading to the implementation of unprecedented precautionary measures to handle uncertainties and mitigate the risks entailed. More than 11,000 people voluntarily evacuated the island of Santorini in fear of a stronger earthquake and its impacts. The intense seismic swarm and large deformation gradients raised concerns for a possible volcanic eruption associated with significant hazards for gas emissions, landslides and tsunamis. The intensive seismic activity (more than 5000 events within 5 weeks) led to extensive media coverage with numerous scientific announcements, warnings, and guiding messages originating from experts and the competent authorities. The present study presents a thematic analysis of these public announcements, interviews, and reports circulated by scientists, first responders, and the government as well as the reactions and opinions expressed by local residents and not only, in response to the experts' views and advice, official instructions and governmental decisions. By conducting comparative analysis of the above seismic crisis with past earthquake related crises that affected other touristic insular areas of Greece, namely the islands of Kos (2017) and Samos (2020), the study also explores similarities and differences of crisis management and communication strategies to reveal possible common weaknesses or patterns in crisis management and arrive at key horizontal recommendations for handling emergency situations of this kind. The findings include (a) understanding the perceptions and public's trust/mistrust in science and the established crisis management and communication system under conditions of high scientific and other uncertainty, (b) the special challenges of crisis communication and management in the case of seismic events in insular areas which are global tourism destinations and (c) marking the role of autonomous local resilience all through the seismic crisis and disaster risk management cycle.

# A Framework to Quantify the Impacts of Multi-Hazard Interactions

YS77-OL

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**Keywords:** Multi-hazard, Interrelation, Temporal, Spatial, Impact.

Hazards do not always occur in isolation. They often interact in space and time triggering, compounding, or amplifying each other and result in complex, cascading impacts. Recent decades have seen a rise in the frequency, intensity, and complexity of such events. Understanding how one hazard can trigger or increase the likelihood of another is essential for realistic risk assessment and effective decision making. Recognizing this, the Sendai Framework for Disaster Risk Reduction have called for integrated, multi- hazard approaches to risk assessment and management. However, despite advances in multi-hazard risk analysis, existing methods still fall short in quantifying the dynamic and interconnected nature of multi- hazards. Traditional approaches have typically focused on single hazards or considered multiple hazards independently, neglecting the ways in which hazards can interact over space and time. This can lead to underestimation of risk.

To address these, the study introduces a structured, five-step framework designed to quantify and visualize multi-hazard interactions. The framework begins with the identification of relevant hazards and their potential interrelations, such as triggering, cascading, conditioning and independent. Spatially the hazards can be overlapping, source and spread or not overlapping and temporal interrelations include simultaneous, consecutive and events after a long time. In the third step, hazard modelling approaches are applied to reflect these interactions. Step four incorporates evolving exposure and vulnerability, accounting for dynamic changes. This emphasizes that disaster impacts are not static, and assets can become vulnerable as events occur. The final step is impact assessment that accounts for interrelations.

The study also presents a novel visual method that organizes multi-hazard events along a temporal axis and categorical sections for triggers, hazards, and impacts. This framework and visualization helps stakeholders grasp the sequence and interdependence of events, supporting both retrospective analysis and forward-looking perspectives. To demonstrate the framework's applicability, three real-world case studies are analyzed: the 2023 Kahramanmaraş earthquakes in Turkey, the 2021 La Soufrière volcanic eruption in Saint Vincent and a case study of Dominica. The results highlight how multi-hazard interactions can have non-linear, compounding effects and alter exposure and vulnerability conditions. By systematically capturing these patterns, the framework not only reconstructs past event sequences but also aids in anticipating future scenarios under evolving conditions.

# Enhancing Disaster Risk Governance in Remote Areas Through a Multi-Hazard, Multi-Stakeholder DSS: A Mediate Project

YS67-OL

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**Keywords:** Disaster Risk Governance, Decision-Support System, Remote Areas, Multi-Hazard, Participatory.



Remote and island regions face critical challenges in managing disaster risk due to limited infrastructure, access constraints, and fragmented governance. The Horizon Europe-funded MEDiate project responds to these issues through the development of a Multi-Hazard Decision Support System (DSS) tailored for use by local and regional authorities in complex, resource-constrained environments.

The MEDiate DSS incorporates forecast-based hazard modeling, socio-physical vulnerability assessments, and participatory approaches to co-develop risk scenarios and resilience strategies. The project's objectives are to improve risk-informed decision-making, enhance multi-sectoral coordination, and support climate change adaptation at the local level. Methodologically, MEDiate combines historical disaster data, future climate projections, and stakeholder input to generate dynamic scenarios. These scenarios are evaluated using a transparent Multi-Criteria Decision Analysis (MCDA) framework co-designed with local authorities and community representatives in four testbeds: Oslo (Norway), Nice (France), Essex (UK), and Austurbrú (Iceland).

Findings from these testbeds demonstrate the value of embedding end-user preferences—such as repair costs, emissions, and critical service accessibility—into scenario modelling. By actively involving stakeholders through Participatory Action Research, the project ensures that the DSS reflects real-world constraints and community priorities, enabling adaptation strategies that are both locally relevant and operationally feasible.

The MEDiate approach exemplifies implementation science in practice: integrating interdisciplinary research, policy relevance, and practical usability. Its outputs support disaster preparedness and long-term planning in areas where access to services, funding, and information is limited. The paper will highlight transferable methodologies, lessons learned in stakeholder engagement, and the scalability of the MEDiate approach to other remote or isolated regions.

MEDiate advances disaster risk governance by bridging knowledge gaps, democratizing access to scenario-based tools, and strengthening resilience where it is most urgently needed.

# Vulnerability and Resilience: Older Adults in the 2021 Ahr Valley Flood

YS10-OL

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**Keywords:** Flooding, Challenges, Resilience, Recovery, Health.

Floods are known to cause immediate casualties and material damage, but they also have lasting impacts on the health of affected populations. According to the WHO Constitution, health encompasses not only physical but also mental and social dimensions [1]. While the physical health consequences of flooding among people have been extensively studied, the social and mental health impacts remain underexplored. Older adults represent a certain population group during disasters, and understanding the factors that exacerbate or mitigate their vulnerability is critical. This study examines the 2021 flood in Germany's Ahr Valley as a case study to investigate how such events affect the social and mental well-being of older individuals. Using a mixed-methods approach, comprising in-depth interviews, structured questionnaires, and group discussions, we explore the challenges, barriers, coping strategies, and sources of support that shaped their recovery experiences. Our findings highlight the need for more inclusive and socially responsive disaster preparedness and response that addresses the specific health dimensions of older adults in crisis contexts.

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# Addressing the Interplay between Local Development Planning and Drought Resilience Building in Insular Areas through a Social-Hydrological Systems Approach

YS45-OL

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**Keywords:** Resilience, Social-Hydrological Systems, Drought Risk, Local Development.



Local development in insular areas has been associated with the monoculture of tourism, increased water demand and lack of consideration for the carrying capacity of the local hydrological systems. Insular societies and water management authorities mitigate the risk of socioeconomic drought through technical solutions such as desalination process and water transfers. Although such solutions may benefit certain social groups (e.g. tourist accommodation facilities), they also reinforce cycles of resilience and vulnerability reallocation among water users and water management institutions, increasing the vulnerability of the most disadvantaged groups. In the context of their adaptation to drought risk, water users and water management authorities interact with hydrological systems at various spatial and temporal scales to attain the necessary resilience resources, thus forming Social-Hydrological Systems (SHSs) (Sapountzaki & Daskalakis, 2016). SHSs, a special category of SESs, are comprised of subsystems (water users, water management authorities, hydraulic and energy technical works, natural hydrological system) whose resilience is determined through their evolutionary co-definition in time and space. (Mis)allocation of resilience resources may trigger adaptive transformations of the social system that may enhance or undermine not only the resilience of the respective SHS and its subsystems but the resilience of other interconnected SHSs as well. The interplay between local development planning and drought resilience building plays a crucial role in determining the allocation of resilience resources as well as the trajectories of such transformations. The author suggests that the SHS approach is fit-for-purpose to examine such interplay. Based on relevant research the paper identifies the SHSs in two Aegean islands and attempts to highlight (a) the preferred adaptation choices of each group of water users and the water management authorities, (b) the factors that influence the adaptation cycles and the capacity of water users and water management authorities to build their resilience against drought risk, (c) the role of local development plans in the allocation of resilience resources and thereby the facilitation of certain drought adaptation cycles over others, (d) the impacts of adaptation cycles on the SHS transformative processes and (e) the relevance of adaptive governance of SHSs in designing and implementing development plans geared towards local resilient development.

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# Nature-based Solutions for Reducing Flood Risk: A Case Study in South Tongu District, Ghana

YS75-OL

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**Keywords:** Nature-based Solutions, Flood risk reduction, Flood modelling, NbS effectiveness, NbS practicality.

Flooding poses a significant threat to socio-economic and ecological systems in Ghana, particularly in rural districts such as South Tongu. Conventional flood management strategies have proved inadequate in addressing recurrent and severe flooding in the region. This study investigates the effectiveness and practicality of implementing Nature-based Solutions (NbS) for flood risk management in South Tongu District, Ghana. Using a mixed-methods approach, the research integrates spatial analysis, hydrological modelling via the fast flood model, and expert interviews to assess flood-prone areas, evaluate selected NbS interventions, and examine implementation feasibility.

Three NbS, permeable surfaces, river restoration, and riparian/forested buffers, were selected based on literature review and local applicability. The fast flood model was used to simulate baseline and intervention scenarios. Results indicate that all three measures reduced flood extent, depth and affected buildings, with river restoration showing the most significant reduction. Permeable surfaces were most effective in built-up areas, while riparian buffers contributed to reduced runoff and erosion along riverbanks.

Expert interviews revealed key practical challenges, including high initial costs, limited stakeholder awareness, and weak institutional coordination. Nonetheless, local soil conditions and vegetation support the feasibility of NbS integration, provided site-specific adaptations are made. The study concludes that NbS offer a viable and sustainable alternative to traditional flood management approaches in rural Ghana. By aligning ecological restoration with risk reduction, these interventions support the achievement of SDGs related to climate resilience, sustainable cities, and land use. Recommendations are made for policy integration and scaling up NbS across similar vulnerable regions.

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# Understanding Expert Discourses for Improved Wildfire Risk Management

A151-OL

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**Keywords:** Wildfire Risk Management, Nature-based Solutions, Discourse Analysis, Mediterranean Context, Stakeholder Perspectives.

Wildfire risk management has gained importance as wildfires are increasing in frequency and intensity, contributing to climate change, biodiversity loss and increasing societal vulnerability to multi-hazards. Resulting from historical processes influenced by socioeconomic factors, political decisions and changes in human-nature interactions, wildfire risk management has become more complex, involving multiple stakeholders often holding competing views, for example, on the respective roles of fire suppression. Integrated wildfire risk management aims to gain a holistic understanding, combining sophisticated technologies with land-use planning, forest practices and nature-based solutions. Therefore, a multifaceted, stakeholder approach is needed to address the wildfire challenge.

We conducted a discourse analysis of expert discourses on wildfire risk management in the Mediterranean context, focusing on narratives of how experts frame the wildfire risk problem and the interventions they propose for its management, especially relating to Nature-based Solutions. Within the European Union's Horizon 2020 project Firelogue (Cross-sector Dialogue for Wildfire Risk Management), data has been collected from two cross-sectoral workshops and semi-structured interviews. Reports and notes from the workshops and interviews were coded manually to identify a plurality of views that are classified along the three axiological categories of the Nature Futures Framework: the instrumental values of nature to society, the intrinsic values of nature, and the relational values weaving human-nature relationships together.

The dual role of fire being crucial for certain ecosystems with regenerative functions on the one hand, and a destructive force to socio-ecological systems on the other, contributes to the complexity of the nexus between fire, nature and people. Understanding the social constructions and views of the expert wildfire community, documented with qualitative methods, can help identify compromise solutions and a robust policy space. This study aims to facilitate a holistic understanding of complex wildfire risk management and contribute to improving decision-making process taking into account different views and objectives.

# Scenario-based Urban Growth Modelling for Dominica Island

YS76-OL

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**Keywords:** Urban Growth, Climate-Related Hazards, Resilience, Scenario, Spatial Logistic Regression.

Urbanisation and climate change are converging challenges, particularly in Small Island Developing States (SIDS), where limited land availability, fragile ecosystems, and high hazard exposure converge. Dominica exemplifies these challenges, having experienced severe impacts from tropical storms and hurricanes in recent decades. This research addresses the need for spatially informed, climate-resilient urban planning by developing and analysing urban growth scenarios for Dominica using a GIS-based modelling approach.

The study assessed how different planning strategies could influence future urban expansion under hazard and climate constraints. Historically built-up area data from the Global Human Settlement Layer (GHSL) for 1985–2015 were used to project urban growth to 2050 using linear regression. A land suitability analysis incorporating ten spatial drivers, multiple hazard layers, field work-based participatory mapping, and sea level rise projection was procured to allocate urban growth across four future scenarios: Business-as-Usual, Low-exposure to local hazards, Stakeholder perspective, and Climate-Resilient Planning.

Findings indicate a strong pattern of urban clustering around existing built-up areas, particularly near Roseau, with topography and hazard exposure significantly limiting outward expansion. Integrating hazard data into the modelling process highlighted spatial trade-offs between development potential and disaster risk. The Climate-Resilient scenario, which excluded high-hazard zones, demonstrated the most balanced spatial outcome but reduced available land for expansion.

A key assumption of this study is that the past built-up growth trend will continue linearly, which may not hold under dynamic policy or demographic changes. Nevertheless, the scenario-based approach offers valuable insights for decision-makers, reinforcing the importance of hazard-informed, anticipatory planning in SIDS. Future work should incorporate recent land-use data and stakeholder input to refine model accuracy and policy relevance.

# Online Pre-Conference Workshops and Networking Events

for Young Scientists (YS) and Early Career Professionals

## About

The IDRiM Society is pleased to announce that nine pre-conference workshops will take place online on Wednesday 24th September 2025, offering valuable learning and networking opportunities for attendees.

Covering key topics such as academic publishing, grant writing, transitioning into practice, effective communication, and professional development, these interactive workshops will feature discussions with experienced researchers, industry practitioners, and journal editors. Whether you are just starting your research journey or looking to refine your expertise, these workshops will provide practical insights and strategies to support your professional growth.

While these sessions are designed to be particularly beneficial for young scientists and early-career professionals, they are open to anyone interested in enhancing their research skills, exploring new career pathways, and engaging with experts in the field. Each session will last half an hour.

Workshop Link: Click Here

Open Room Link: Click Here

## Schedule of Events

| GMT | EEST | JST | EDT | |
|---|---|---|---|---|
| 10:00 - 10:30 | 13:00 - 13:30 | 19:00 - 19:30 | 06:00 - 06:30 | Unlocking Academic Funding: Grant Writing Strategies & Opportunities |
| 10:30 - 11:00 | 13:30 - 14:00 | 19:30 - 20:00 | 06:30 - 07:00 | Presenting with Impact: Engaging Audiences in Research & Beyond |
| 11:10 - 11:40 | 14:10 - 14:40 | 20:10 - 20:40 | 07:10 - 07:40 | Navigating the Publishing Maze: Expert Insights from Editors |
| 11:40 - 12:10 | 14:40 - 15:10 | 20:40 - 21:10 | 07:40 - 08:10 | Bridging the Gap: From Researcher to Practitioner |
| 12:10 - 12:40 | 15:10 - 15:40 | 21:10 - 21:40 | 08:10 - 08:40 | Hazard Information Profiles (HIPs): An Introduction |
| 12:50 - 13:20 | 15:50 - 16:20 | 21:50 - 22:20 | 08:50 - 09:20 | Breaking Bias: Gender, Inclusion, and Support in Academia and Practice |
| 13:20 - 13:50 | 16:20 - 16:50 | 22:20 - 22:50 | 09:20 - 09:50 | Engage, Contribute, Lead: The IDRiM Society Committees Showcase |
| 14:00 - 14:30 | 17:00 - 17:30 | 23:00 - 23:30 | 10:00 - 10:30 | Building a Supportive Research Community: The Young Scientist Forum (YSF) |
| 14:30 - 15:00 | 17:30 - 18:00 | 23:30 - 00:00 | 10:30 - 11:00 | The Researcher Roundtable: A Space for Open Discussion & Networking |
| 09:00 - 16:00 | 12:00 - 19:00 | 18:00 - 01:00 | 05:00 - 12:00 | Open Rooms for Social Discussion |

# More About the Workshops

## Unlocking Academic Funding: Grant Writing Strategies & Opportunities

Securing research funding is a critical step in any academic career, yet the grant application process can often feel overwhelming. In this session, leading academic funders will share insights into what makes a successful grant proposal, common mistakes to avoid, and the types of funding opportunities available. Attendees will gain practical strategies for crafting compelling applications, understanding funder expectations, and increasing their chances of securing financial support. Whether you're new to grant writing or looking to refine your approach, this session will provide valuable guidance to help you turn your research ideas into funded projects.

- Speakers: Prof. Evaggelia Drakou, Harokopion University of Athens, Greece

## Presenting with Impact: Engaging Audiences in Research & Beyond

Effective presentation skills are essential for researchers—whether speaking at academic conferences or communicating complex ideas to a broader audience. This interactive session will explore techniques for delivering clear, engaging, and memorable presentations that resonate with both expert and non-expert audiences. Attendees will learn strategies for structuring talks, using visuals effectively, and overcoming common presentation challenges. Whether you're preparing for your next conference or looking to make your research more accessible to the public, this workshop will provide practical tips to enhance your confidence and impact as a speaker.

- Speaker: Dr Mark Ashley Parry, Northumbria University, United Kingdom

## Navigating the Publishing Maze: Expert Insights from Editors

Getting published in an academic journal can feel like navigating a complex maze. In this interactive session, journal editors will share insider knowledge on what makes a strong submission, common pitfalls to avoid, and how to successfully navigate the peer review process. Through real-world stories and expert tips, participants will gain a clearer understanding of the publishing journey and learn strategies to enhance their chances of acceptance. Even if you're preparing your first manuscript or looking to refine your approach, this session will provide invaluable guidance from those who make the final call.

- Speakers: Prof. Kalliopi Sapountzaki, Harokopion University of Athens, Greece.

## Bridging the Gap: From Researcher to Practitioner

Many early-career researchers grapple with the question: should I stay in academia or transition into practice? This session explores the rewarding and impactful world of practitioners, demonstrating how research and practice can complement each other. Featuring insights from professionals who have successfully made the transition, attendees will gain an understanding of the challenges, opportunities, and skills needed to bridge the gap between academia and real-world application. Designed mainly for early career, this session will highlight how pursuing a

practitioner role is just as valuable as an academic career—and how the two can work together to drive meaningful change.

- Speakers: Dr Miranda Dandoulaki, Disaster Management Specialist, Greece

## Hazard Information Profiles (HIPs): An Introduction

Hazard Information Profiles (HIPs) are a crucial tool for understanding, documenting, and analyzing hazard characteristics in a structured manner. This session will introduce participants to HIPs, exploring their origins, development, and practical applications in research and disaster risk management. Attendees will learn how HIPs can be integrated into academic work to enhance hazard assessment, support decision-making, and contribute to risk reduction strategies. Even if you are new to HIPs or looking to deepen your understanding, this session will provide valuable insights into their role in hazard research and practice.

- Speaker: Prof. Virginia Murray, UKHSA, United Kingdom

## Breaking Bias: Gender, Inclusion, and Support in Academia and Practice

Creating inclusive and supportive environments is essential across both academic and professional practice settings. This workshop will explore the intersections of gender, diversity, and mentorship, highlighting the challenges and opportunities for fostering equity in research and applied fields. Through shared experiences, case examples, and open discussion, participants will reflect on how to recognize and address bias, build inclusive networks, and support underrepresented voices. The session aims to create a space for dialogue between academics and practitioners, emphasizing the importance of mentorship and community in driving meaningful, systemic change.

- Speakers: IDRiM Women's Committee

## Engage, Contribute, Lead: The IDRiM Society Committees Showcase

The IDRiM Society thrives through the dedication of its committees, each playing a vital role in advancing research, international and intergenerational collaboration, and professional development. This session offers a unique opportunity to learn about the various committees, their missions, and the activities they lead. Committee chairs will share insights into their work and explain how researchers at all career stages can get involved. Whether you're looking to contribute your expertise, expand your professional network, or take on a leadership role within the society, this session will highlight pathways to engagement and impact.

- Speakers: IDRiM Committee Chairs

## Building a Supportive Research Community: The Young Scientist Forum (YSF)

Early-career researchers face unique challenges, from securing funding and publishing research to finding mentorship and career stability. This interactive session will bring together young researchers to discuss these challenges, share experiences, and explore solutions. Guided by

insights from a survey of young scientists, a panel of early-career researchers will answer key questions and spark discussions on how the research community—especially organizations like the IDRiM Society—can better support emerging scholars. Attendees will have the opportunity to engage, voice concerns, and contribute to shaping a more inclusive and supportive research environment.

- Speaker: Dr Dimitrios Tzioutzios, Norwegian University of Science and Technology, Norway

## The Researcher Roundtable: A Space for Open Discussion & Networking

Building meaningful connections in academia is essential for both professional growth and personal support. This interactive session provides a safe and open space for early-career and senior researchers to engage in candid conversations, share experiences, and discuss challenges in research and academia. Designed as a relaxed and informal forum, the session encourages open dialogue, mentorship, and knowledge exchange, allowing participants to gain insights from different career perspectives. This event provides an excellent opportunity for attendees to get acquainted and interact before the conference.

## Open Rooms for Social Discussion

This space will consist of four virtual rooms designed to give participants a place to drop in during the workshops for informal chats and networking. These rooms will not include scheduled speakers and are intended to encourage casual interaction. They will open one hour before the first workshop and remain accessible until one hour after the final workshop.

# IDRiM2025 Young Scientist Competition and Awards

## Aniello Amendola Distinguished Service Award

Name, Affiliation and Photo TBD

To acknowledge IDRiM members who contributed significantly to the IDRiM Society by providing distinguished services.

## Norio Okada Distinguished Implementation Science Award

Name, Affiliation and Photo TBD

To acknowledge someone who is not only active in research but also has worked on its implementation in the private, public and/or non-profit sectors.

## Distinguished Research Award

Name, Affiliation and Photo TBD

To acknowledge IDRiM members who have made significant contributions by providing path-breaking research to the discipline.

## Lifetime Service Award

As a very special award, it should be awarded only to the most deserving and outstanding individuals who have made a significant contribution to disaster risk management over the past three decades and who have an extensive international reputation.

## Young Scientist Award

Welcome to IDRiM 2025 YSS Competition!

Each year, the Young Scientist Session (YSS) is a special part of the IDRiM Conference and has been a cornerstone of the event for nearly 20 years, since the preceding IIASA-DPRI conference series. Since the COVID-19 pandemic, YSS has strengthened its focus on virtual participation, with both online and in-person formats now available.

We recognize that young researchers cannot always afford to travel to international conferences. In recent years, this challenge has become an increasing issue for many early-career researchers and practitioners. We do not want this to be a barrier for the next generation to participate and engage with researchers from different countries and generations. Everyone should have the opportunity to present their research without financial concerns.

On a personal note, this is my fourth year running the YSS, and each year it warms my heart to see so many early-career participants at the IDRiM Conference. I am continually

inspired by the excellent research that you all conduct. It makes me proud that so many of you choose to present your work here, with this year's submissions expected to exceed 60, an increase of around 15–20% compared to last year's conference in Colombia.

To all participants: good luck with your presentations! All of us at IDRiM are cheering you on as you share your work. We hope you make new connections and friendships during the conference. And please don't hesitate to connect with more senior researchers, we always enjoy engaging with early-career scientists.

Best Wishes!

Dr. Mark Ashley Parry

# Side Event

# Training School on Enhancing the Knowledge Base of Ecosystem Services on Small and Medium Islands

## Duration

Saturday and Sunday, September 27-28, 2025

## Organiser

Harokopion University of Athens

## Scientific Coordinators

Evangelia DRAKOU, Geography Department, Harokopio University of Athens, Greece

Roxanne LORILLA, Geography Department, Harokopio University of Athens, Greece

## Brief Description

The objective of the 2-day training school is to provide a platform for interdisciplinary research and hands-on learning on ecosystem services of small and medium islands (SMI).

Small and medium islands are places which bear physical attributes that generate benefits to society within the island space, but also to members of society that are located away from the island. These could refer to cultural benefits which relate to tourism and recreation in nature, or unique natural resources which are generated by islands and distributed across different geographic locations. Understanding how such resources can be safeguarded can be done through disciplinary methods, but also through interdisciplinary approaches, such as the ecosystem service concept.

The Training School aims to familiarize participants with the basic concepts of ecosystem services and the core methods used to assess, quantify and map them. The key topics that will be discussed are:

- Ecosystem Services in small and medium islands (SMI)
- Socio-ecological resilience and sustainability
- (Local) human well-being of island communities
- Climate and land-use change impacts on island ecosystems
- Nature-based solutions (NbS) for island sustainability
- Policy integration and participatory governance in island communities.

Participants are guided through these topics and gain insights into assessing, mapping, and managing ecosystem services across terrestrial, freshwater, and marine environments in island spaces. Theoretical knowledge is combined with practical and hands-on applications on basic tools on ecosystem services mapping and modelling. Special attention was given to issues of data availability and resolution within the island space. The participants are also able to interact with local stakeholders and conduct a field visit in nearby locations.

By the end of the training, participants will have:

- Gained practical skills in ES assessment, mapping, and stakeholder engagement
- Gained knowledge of the social, environmental, and economic specificities of island ecosystems
- Understood the role of policy, governance, and participatory approaches in island resilience.

### PARTICIPANTS

- Graduate students and early-career researchers in environmental sciences, geography, ecology, and sustainability studies
- Policy-makers and practitioners working on island conservation and management
- NGOs, stakeholders, and community representatives from island regions.

# Cultural Events

# Documentary Film ‘When the Calm Lights Up – Memories of Suzu in Noto, Ishikawa” and Discussion with the Director, H. Arima

### Venue

Samos Wine Museum

### Date and Time

Sunday, September 28, 2025, 20:50-22:30

### Commentator

Mr. Hisashi ARIMA, Director

### Short Greeting Message (from Mr. Hisashi Arima)

Let me introduce myself. I am Arima, the director of the film “When the Calm Lights Up - Memories of Suzu in Noto, Ishikawa”.

This documentary was filmed with the theme of recovery, first, from the strong earthquake with a magnitude of 6 that hit Suzu City in Ishikawa Prefecture on May 5, 2023. Suzu City had already experienced a major earthquake in June 2022, leaving the town devastated by repeated tremors.

In Suzu City, there is a traditional festival known as the “Kiriko Festival,” which is held once a year in various village communities. Many people in the city find “meaning in life” through this festival, living their daily lives for it. Through this cherished festival, we observed the town’s recovery. The people of Suzu City, undeterred by the earthquake damage, continued to prepare for this yearly festival, practicing their drums and moving forward with resilience toward recovery.

However, on January 1, 2024, another strong earthquake measuring 6 struck Suzu City. The damage was even more devastating than the previous year’s earthquake, and the town was left in ruins. I was also staying in Suzu to cover the atmosphere of recovery during the New Year holidays, and I was also affected by the disaster. Even after the disaster struck, I continued to live in evacuation shelters while collaborating with local residents and continued filming. Honestly, as a director, I am embarrassed to admit that I struggled to figure out what to film, but I somehow managed to compile the work. Through this film, I hope to convey what happened to Suzu City during this earthquake and what kind of place Suzu City was, is and will be.

### For More Information

I would like to complete a documentary film about Suzu City, Ishikawa Pref., and screen it in Suzu (When the Lights Shine, Released May 17, 2024) – Crowdfunding READYFOR

石川県珠洲市のドキュメンタリー映画を完成させて珠洲で上映したい。
（凪が 灯るころ 2024/05/17 公開） - クラウドファンディング READYFOR
https://readyfor.jp/projects/142054

# Art Exhibition ‘When Wounded Nature Produces Art’

## Venue

Epicurean Cultural Centre (Main Venue)

## Date and Time

September 28 to October 1, 2025

## Artist

Mr. Christos KOUTSOURAS, Visual Artist

## Short Introduction

The visual artist Christos Koutsouras, drawing inspiration from charcoal drawing, reverses the process and lets the "charcoal" of the burned trees of Samos "speak”. Now it is nature that controls the artistic result and speaks of its wounds, using art as its language of communication with humans.

Christos Koutsouras began this visual dialogue in 1995. His work was first presented in Cologne in 1997.

The second part of his work, in 2016, is an artistic intervention in another burned area of Samos, part of which is depicted in the exhibition’s photo and video. With a ten-year gap between the two visual narratives, Christos Koutsouras insists on showing the persistence of natural disasters as a result of human carelessness and aims to raise our awareness. This work was presented in 2018 at an exhibition in Indianapolis, USA.

Unfortunately, as he says, he is preparing the third phase of this work. Nature remains wounded, and humans remain unconcerned…

## Short Biography

The visual artist Christos Koutsouras was born in 1957 in Samos. From 1974 to 1980, he travelled with commercial ships to almost every continent, carrying with him the experience of places, people, and cultures as valuable material. He then studied in Germany, in Bonn and Cologne, focusing on drawing and painting from 1986 to 1991.

From 1998 to 2001, he taught drawing and painting at the University of Indianapolis in the United States. Since 1992, he has participated in numerous exhibitions and has held solo exhibitions in Cologne, Bonn, New York, Newport (Oregon), Seattle, Cleveland, Indianapolis, Astoria, and Denmark.

His works have also been exhibited at the “Alekton” gallery in Athens in 2001 and the same year at the Melina Merkouri Foundation.

# Presenter Index

| Letter | Name | Surname | Page No. |
|---|---|---|---|
| | Alexandra-Ioana | CRĂCİUN | 137 |
| | Ana Maria | CRUZ | 27, 211, 213, 214 |
| | Lorenzo | CUGLIARI | 265 |
| D | Hiroaki | DAIMON | 163 |
| | Miranda | DANDOULAKI | 155, 211, 233 |
| | Siriporn | DARNKACHATTARN | 61 |
| | Sakshi | DASGUPTA | 235 |
| | Elena | DASKALAKI | 188, 265 |
| | Ioannis | DASKALAKIS | 324 |
| | Daniel | DAVID | 229 |
| | Elena | DEDE | 231 |
| | Pavlos | DELLADETSIMAS | 96, 263 |
| | Aliou | DIA | 243 |
| | Amadou Seydou | DIA | 243 |
| | Mamadou | DIAGNE | 243 |
| | Valentina | DI TALIA | 82 |
| | Xiran | DONG | 327 |
| | Noah | DORMADY | 227 |
| F | Carole | FAUCHER | 243 |
| | Kalliroi | FERENTINOU | 279 |
| | Anna | FOKAEFS | 320 |
| | Tim | FOREMAN | 280 |
| | Urbano | FRA PALEO | 270 |
| | Flossie Antwiwaa Kyerewaa | FRIMPONG | 326 |
| G | Adriana | GALDERISI | 15, 35, 134 |
| | Carlos Rodrigo | GARIBAY RUBIO | 51 |
| | Ignacio Agustin | GATTI | 237 |
| | Paraskevi | GEORGIADOU | 68 |
| | Mohsen | GHAFORY-ASHTIANY | 17 |
| | Pritam | GHOSH | 202, 306 |
| | Kyriaki | GKOKTSI | 84, 214, 216 |
| | Robert | GOBLE | 233, 241 |
| | James | GOLTZ | 48, 209, 210, 265 |
| | Maria | GOULARA | 207 |
| | Elias | GRAMMATIKOGIANNIS | 101 |
| | David | GREEN | 272 |
| | Barrise | GRIFFIN | 177 |

| Letter | Name | Surname | Page No. |
|---|---|---|---|
| | Aurélie | GRONDIN | 229 |
| H | Guoyi | HAN | 159, 241 |
| | Karim | HARDY | 118 |
| | He | HE | 184 |
| | Chunyang | HE | 38, 171, 222 |
| | Ruchiru Dilshan | HERATH MUDIYANSELAGE | 194 |
| | Kei | HIROI | 92 |
| | Yota | HIRONO | 227 |
| | Stefan | HOCHRAINER-STIGLER | 133, 159, 220 |
| | Reiko | HODA | 71 |
| | Yuji | HOSHINO | 261 |
| | Jinpeng | HU | 129 |
| | Juanjuan | HU | 297 |
| | Katja | HUETTENBRENNER | 218 |
| | Seiya | HYODO | 292 |
| I | Yu | IRITANI | 153 |
| | Ryoga | ISHIHARA | 63 |
| | Tomoki | ISHIKURA | 110, 255 |
| J | Ravindra | JAYARATNE | 95 |
| | Peiyin | JIANG | 295 |
| | Xinyu | JIANG | 114 |
| | Yuefeng | JIANG | 222 |
| K | Reine Suzanne | KADIA | 316 |
| | Lucy | KAISER | 130 |
| | Yoshio | KAJITANI | 86, 223, 227 |
| | Ryuji | KAKIMOTO | 261 |
| | Kostas | KALABOKIDIS | 159, 270, 273 |
| | Nikos | KALLIGERIS | 209, 265 |
| | Sofia | KALOGEROMITROU | 206 |
| | Garyfallia | KATSAVOUNIDOU | 103 |
| | Konstantinos | KAVOURAS | 88 |
| | Toru | KAWASHITA | 54 |
| | Danai | KAZANTZIDOU-FIRTINIDOU | 99 |
| | Christine | KENNEY | 115, 141 |
| | Hannes | KERN | 218 |
| | Georgios | KIACHOPOULOS | 198 |
| | Kaori | KITAGAWA | 57, 259 |

| Letter | Name | Surname | Page No. |
|---|---|---|---|
| | Miwako | KITAMURA | 237 |
| | Juri | KIM | 283 |
| | Maria | KLEANTHI | 253 |
| | Ardito M. | KODIJAT | 265 |
| | Konstantinos | KOKOLAKIS | 279 |
| | Asimina | KOUROU | 253 |
| | Elisabeth | KRAUSMANN | 214 |
| L | Dan | LAI | 301 |
| | Aikaterini | LANTZA | 174 |
| | Qishan | LI | 136 |
| | Zilong | LI | 291 |
| | Aug Zaw | LIN | 284 |
| | Yue | LIN | 288 |
| | Eleni | LINAKI | 310 |
| | JoAnne | LINNEROOTH-BAYER | 280 |
| | Huan | LIU | 227 |
| | Xuan | LIU | 33, 302 |
| | Zhe | LIU | 42, 222 |
| | Xiaolong | LUO | 76 |
| | Yan | LUO | 294 |
| | Juerg | LUTERBACHER | 239 |
| | Despina | MALAGARI | 279 |
| M | Malavika | MANOJ | 328 |
| | Erick | MAS | 237 |
| | Yoko | MATSUDA | 70, 241 |
| | Kakuya | MATSUSHIMA | 227 |
| | Reinhard | MECHLER | 125, 220 |
| | Georgios | MIAOULIS | 279 |
| | Charlotte | MILNE | 40 |
| | Masaaki | MINAMI | 97 |
| | Arighna | MITRA | 235 |
| | Kanako | MORITA | 58 |
| | Suchismita | MUKHOPADHYAY | 235 |
| | Virginia | MURRAY | 28, 38 |
| N | Shingo | NAGAMATSU | 263 |
| | Garbhit | NAIK | 311, 318 |
| | Saki | NAKAMURA | 162 |
| | Genta | NAKANO | 116, 209 |

| Letter | Name | Surname | Page No. |
|---|---|---|---|
| | Arya | NARENDRAN | 313 |
| | Farah | NIBBS | 251 |
| | Zoe | NIVOLIANITOU | 75, 112 |
| | Paraskevi (Evi) | NOMIKOU | 20 |
| | Martine | NOURRY | 229 |
| O | Ugur | OEZTUERK | 235 |
| | Norio | OKADA | 27, 233, 241, 261 |
| | Natsumi | OKADA | 197 |
| | Makoto | OKUMURA | 165 |
| | Wataru | OMOTO | 289 |
| | Masamitsu | ONISHI | 143, 241 |
| | Eleftherios | OUZOUNOGLOU | 239 |
| | Augusto Cesar | OYAMA | 139 |
| | Nurcan Meral | ÖZEL | 265 |
| P | Noemi | PADRON-FUMERO | 237 |
| | Nikolaos | PAPAPDIMITRIOU | 265 |
| | Adam | PARASCANDOLA | 231 |
| | Lina Maria | PARRA-ORDUZ | 80 |
| | Mark Ashley | PARRY | 67, 160, 267 |
| | Nikolaos | PASSAS | 195, 277 |
| | Maciej | PAWLIK | 50 |
| | Gianluca | PESCAROLI | 237 |
| | Irene | PETRAROLI | 204, 205, 267 |
| | Suzanne | PHIBBS | 130, 141 |
| | Lorenzo | PICCO | 235 |
| | Thomas | PINOT | 229 |
| | Eduard | PLANA BACH | 280 |
| | Areti | PLESSA | 258 |
| | Sebastian | POLAK-ROTTMANN | 105, 261 |
| | Mümin | POLAT | 183 |
| Q | Philippe | QUEVAUVILLER | 123, 159, 239 |
| | Nibedita | RA-BENNET | 261 |
| R | Haris | RAHADIANTO | 249 |
| | Sun | RAN | 127 |
| | Federica | ROMAGNOLI | 120, 235 |
| S | Saut Aritua Hasiholan | SAGALA | 150, 152 |
| | Mayumi | SAKAMOTO | 49, 66 |
| | Nikolaos | SAKELLARIOU | 156 |

| Letter | Name | Surname | Page No. |
|---|---|---|---|
| | Subhajyoti | SAMADDAR | 57, 169, 190 |
| | Kalliopi | SAPOUNTZAKI | 22, 152, 220 |
| | Bektas | SARI | 186 |
| | Daisuke | SASAKI | 263 |
| | Stefan | SCHNEIDERBAUER | 124, 235, 237 |
| | Acushla | SCIASCIA | 255 |
| | Subir | SEN | 96, 227 |
| | Kami | SEO | 241 |
| | Lata | SHAKYA | 121 |
| | Peijun | SHI | 37, 124, 222 |
| | Hideyuki | SHIROSHITA | 73, 261 |
| | Otto | SIMONET | 235 |
| | Shivaang | SINHA | 172 |
| | Giannis | SKIADARESIS | 239 |
| | Chen | SONG | 323 |
| | Ioannis | SPILANIS | 24, 220 |
| | Sabine | STAAL | 229 |
| | Georgios | STANTZOS | 253 |
| | Itsumi | SUDO | 203 |
| | Takashi | SUGIYAMA | 148 |
| | Mariya | SUNIL | 321 |
| | Akihiro | SUZUKI | 200 |
| | Diva | SYANDRIAJI | 299 |
| | Costas | SYNOLAKIS | 209 |
| T | Masahito | TAKAHASHI | 226 |
| | Kensuke | TAKENOUCHI | 211 |
| | Stelios | TAMVAKIDIS | 174 |
| | Evelyne | TARNUS | 229 |
| | Hirokazu | TATANO | 96, 227 |
| | Richard | TEEUW | 32 |
| | Kiyomine | TERUMOTO | 135 |
| | Elisavet | THOIDOU | 107, 143 |
| | Kristie-Lee | THOMAS | 176, 257 |
| | Timothy | TIGGELOVEN | 237 |
| | Daisy Raphela | TLOU | 93 |
| | Alisia | TOGNON | 235 |
| | Tetsuya | TORAYASHIKI | 192 |
| | Zoltán | TÖRÖK | 77, 86 |

| Letter | Name | Surname | Page No. |
|---|---|---|---|
| | Silvia | TORRESAN | 237 |
| | Dimitrios | TSINIAS | 279 |
| | Dimitrios | TZIOUTZIOS | 66, 78 |
| | Angeliki-Maria | TZOURAMANI | 44 |
| U | Michio | UBAURA | 96, 144 |
| | Shiho | UCHIYAMA | 111 |
| | Tsuyoshi | UENO | 223, 225 |
| | Lucian-Constantin | UNGUREANU | 245 |
| V | Christos | VASILAKOS | 275 |
| | Ramona | VELEA | 280 |
| W | Jing'ai | WANG | 193 |
| | Yiwen | WANG | 41, 222 |
| | Xiaojie | WANG | 308 |
| | Mai | WATANABE | 286 |
| | Fang | WEI | 167 |
| | Xinchen | WEI | 132 |
| Y | Yoshiyuki | YAMA | 261 |
| | Amon | YAMAMOTO | 145 |
| | Katsuya | YAMORI | 182, 261 |
| | Yongsheng | YANG | 117 |
| | Ayako | YASUOKA | 223 |
| | Catalina | YEPES-ESTRADA | 30 |
| | Muneta | YOKOMATSU | 220, 255, 260 |
| | Yuta | YOSHIKAI | 261 |
| | Ayumi | YUYAMA | 223 |
| Z | Milad | ZAMANIFAR | 245, 247 |
| | Annegrace | ZEMBE | 53 |
| | Gangfeng | ZHANG | 222 |
| | Shengjin | ZHANG | 304 |

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