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Note about contributors

The following organisations contributed to the work described in this deliverable:

Lead partner responsible for the deliverable:

University of Copenhagen (UCPH), Denmark
Kristian Cedervall Lautu
Kristoffer Albris

Deliverable prepared by:

Kristoffer Albris (UCPH)

Chapter authors and contributors:

Chapter 1: University of Huddersfield (HUD) and Eidgenössische Technische Hochschule Zürich (ETH)

Chapter 2: University of Copenhagen (UCPH) and Analisi e Monitoraggio del Rischio Ambientale S.c.ar.l. (AMRA)

Chapter 3: Helmholtz Zentrum Potsdam Deutsches Geoforschungszentrum (GFZ) and Bureau de Recherches Géologiques et Minières (BRGM)

Deliverable reviewed by:

Giulio Zuccaro (AMRA)

Authorized by:

Giulio Zuccaro (AMRA)

Table of contents

Abstract	4
Acknowledgements	5
Introduction	6
Proposals for overcoming challenge 1: DRR and CCA	7
Proposals for overcoming challenge 2: Science and Policy	15
Proposals for overcoming challenge 3: Transboundary crisis management	20
Conclusion	25
References	26

Abstract

This report is the deliverable 4.7 of the ESPRESSO project (Enhancing synergies for disaster prevention in the European Union), a Coordination and Support Action funded by DGRESEARCH under the H2020 Programme. ESPRESSO's aim is to contribute to a new strategic vision on disaster risk reduction (DRR) and climate change adaptation (CCA) in Europe and the promotion of new ideas on what should be a future roadmap and agenda for natural hazard research and policymaking over the next 10 years. See more at www.espressoproject.eu.

The project focuses on three main challenges in order to propose ways to mitigate differences, to identify gaps, and to overcome barriers in the context of disaster management, risk reduction and prevention in the EU:

- Challenge 1: Integrating Climate Change Adaptation and Disaster Risk Reduction, to propose ways to create more coherent national and European approaches to DRR, CCA and resilience strengthening;
- Challenge 2: Integrating Science and Legal/Policy issues in DRR and CCA, to enhance risk management capabilities by bridging the gap within these domains at local and national levels in six European countries;
- Challenge 3: Improving national regulations to prepare for trans-boundary crises, to address the issue of efficient management of crises requiring a coordinated effort from two or more countries in the EU, and/or the support of the EU Civil Protection Mechanism.

This deliverable is the final one in Work Package 4, which concerns the The ESPRESSO Action Database, or "ADB". The ADB is a database of initiatives and projects addressing disaster risk reduction (DRR) and climate change adaptation (CCA) created as part of the EU Horizon 2020 ESPRESSO project.

This report outlines the entries made on the ADB platform and presents them as a selection of proposals for overcoming the three ESPRESSO Challenges and also lists a number of good cases that can serve as inspiration. The objective and purpose of this report is to ensure that all the inputs from the ADB are fed into the two main outputs of the ESPRESSO Project, namely the Risk Management Capacity Guidelines (deliverable 5.4) and the Vision Paper (deliverable 5.5).

Keywords: ADB, good cases, CCA, DRR

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Introduction

This report summarizes solutions extracted and compiled from the ESPRESSO Action Database (henceforth, “the ADB”). As stated in deliverable 4.1 “The ADB in English – UPGRADE”¹, the ADB is described in the following way:

“The ESPRESSO Action Database, or ESPRESSO-ADB, is a database of initiatives and projects addressing Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) created as part of the EU Horizon 2020 ESPRESSO project. The word “action” is meant to serve as a generic term to encompass a wide variety of activities, from legislation to research projects. Actions are input into the database (accessible at <http://adb-esspresso.brgm.fr>) via a questionnaire asking the user to evaluate the effectiveness of an action of his/her professional experience. Effectiveness is approached from an angle that closely aligns with accomplishing the goals of the Sendai Framework.”

Many of the ADB entries are also based on inputs gathered from stakeholder perspectives, voiced during the three ESPRESSO Think Tanks that were held in Berlin, Germany, on October 12th 2017 (Challenge 1), in Zürich, Switzerland on January 21st, 2018 (Challenge 3), and in Naples, Italy, April 24th, 2018 (Challenge 2). During these three events, project members and stakeholders played exercise simulation board games prepared and designed to stimulate discussions about each of the three challenges, which was then followed up by discussion workshops.² Following these events, ESPRESSO team members collected stakeholder perspectives and entered them into the ADB.

The purpose of this deliverable is to serve the Deliverable 5.4 “ESPRESSO Guidelines for Risk Management Capabilities” and Deliverable 5.5 a “ESPRESSO Vision Paper on future research strategies following the Sendai Framework 2015-2030” with inputs of good practices and solutions for overcoming the three ESPRESSO challenges. More concretely, the report presents insights gathered on the ADB platform, and puts them into a number of tables for each of the three challenges. The report is structured into three main chapters and a conclusion. Each chapter contains a short introduction provided by ESPRESSO partners who have been responsible for writing the chapters. This is followed by a table that lists proposed solutions and good practices. In the process of analysing the ADB entries, the solutions and examples of good practices have been compiled and grouped together, and have been related to issues, gaps and needs identified throughout the ESPRESSO project. As such, entries from the ADB have been reformulated in order to fit the context and style of this report.

¹ ESPRESSO. 2017. 4.1 “The ADB in English – UPGRADE”. URL: http://www.espressoproject.eu/images/deliverables/ESPRESSO_D4.1_BRGM_ADB_ENG.pdf

² ESPRESSO. 2018. “Report on existing methodologies for scenario development and stakeholders knowledge elicitation.” URL: http://www.espressoproject.eu/images/deliverables/ESPRESSO_D3.2.pdf

Challenge 1: Integrating Climate Change Adaptation and Disaster Risk Reduction

Prepared by partners University of Huddersfield (HUD) and Eidgenössische Technische Hochschule Zürich (ETH).

Climate change adaptation (CCA) and disaster risk reduction (DRR) originated and developed as separate practices and continue to be managed by two separate communities. DRR is the practice of reducing existing and future risk of disasters, both natural and man-made (UNISDR, 2017), while CCA looks to make adjustments to actual or expected changes in climate only, in order to minimise harm or take advantage of beneficial opportunities (IPCC, 2012). Although the two fields and related practices have different focuses, there are several similarities between the two. Firstly, they have similar aims, with the primary aim of both reducing vulnerability and increasing the resilience of society. CCA and DRR share common and complementary practices and methods, for example they both focus on work at the community level and finally and fundamentally, climate change is a key driver of disaster risk (Venton and La Trobe, 2008). The significance of these overlaps between CCA and DRR means that benefits can be realised by approaching the two practices in a cohesive manner. Due to similarities in the work of CCA and DRR, independent working can lead to duplication of work, but through collaborating on shared projects, CCA and DRR communities can save both human and financial resources. DRR actions that do not consider climate change may contribute to mal-adaptation, or create avenues for duplication of effort, but through working together the two communities can share information and learn from one another, contributing to making both practices more effective and efficient (Shaw et al., 2010).

Many DRR actions support CCA while many CCA actions support DRR. Despite this, there are several challenges that prevent effective integration and the realisation of associated benefits. These challenges exist at all governance levels, from international to local, both horizontally and vertically. For example, at international level there are different frameworks for both CCA (Paris Agreement) and DRR (Sendai Framework for Disaster Risk Reduction). At national level CCA and DRR are often managed by different government departments that do not always communicate regularly, and at local level, significant resource constraints mean CCA and DRR actions are not always effectively implemented. Other challenges include uncertainty in climate change predictions, varying levels of political attention and funding issues. Such factors act to maintain separation between CCA and DRR and prevent them from coming together more effectively.

This section presents potential ways to address the dominant challenges facing CCA and DRR integration at different levels of governance in Europe, along with existing cases of best practice. A lack of coordination and cooperation between the two communities is an issue that runs through many of the challenges and often, solutions cannot be successfully

implemented without significant, targeted collaboration. Thus, many solutions revolve around creating a more holistic, inclusive and collaborative environment for CCA and DRR to be integrated. Many best practice cases exemplify how progress has been made by providing means to bring relevant actors together, creating platforms for engagement. Although there is no ‘one size fits all solution’, it is hoped that these examples provide a starting point for European countries wishing to identify their own solutions to synergise CCA and DRR practices.

Key issues	Gaps/needs	Possible solutions and good practices
<p>1. Silo-ed approach to CCA and DRR/ Horizontal coordination</p>	<p>1.1 CCA and DRR are managed by different government departments at national level, institutionalizing separation. In general, CCA and DRR are approached separately by different organizations and agencies. As a result, there is limited communication between the two communities and a lack of awareness of the actions of others. With two communities working on similar topics organisations can often be seen to ‘compete’ with one another.</p> <p>1.2 There are also ‘gaps’ between CCA and DRR. For example, there is a gap between the international, often non-binding agreements for CCA and the national, regional and local often binding legislation for DRR.</p> <p>1.3 Furthermore, climate adaptation policies are still not effectively in place in many countries whereas DRR is often more well established through civil protection. Thus, integrating new CCA with well-established DRR policies can be challenging.</p> <p>1.4 There are many different stakeholders involved in DRR and CCA activities, with many not experts in either CCA or DRR. Consequently, different stakeholders define DRR and CCA concepts as per their knowledge spectrum and</p>	<p><u>Possible solutions:</u></p> <p>Organisational structure: implement an organizational structure with strong leadership and clarity of coordination and responsibilities. The creation of an agency for the integration of DRR and CCA is a possible solution to address the issue of separate government agencies.</p> <p>Adoption of a cross-sectoral, multi-scale and integrative approach: CCA and DRR can be linked through a cross-sectoral, multi-scale and integrative approach and could be mainstreamed into other activities on sustainable development. DRR and CCA could also be brought together through integration into the Urban Development Planning process.</p> <p>Establish multidisciplinary working groups: Multidisciplinary working groups within organisations and ministries to develop a coherent set of norms and goals for CCA and DRR.</p> <p>Develop alliances and collaborations between CCA and DRR communities. Enhance multidirectional collaboration and communication through events and conferences.</p> <p>Revise DRR standards and laws taking into account climate change relevant issues. Revise DRR standards and laws respecting their enhancement of long-term sustainability and taking into account climate change relevant issues.</p> <p><u>Good cases:</u></p> <p>Klimawandel und Anpassung im Katastrophenschutz: The German working group “Klimawandel und Anpassung im Katastrophenschutz” (“climate change and adaptation in disaster protection”) brings together a wide range of actors working in DRR and CCA on joint projects.</p> <p>Vand i Byer Network: a growing number of networks and conference events include both practitioners, university academics and other relevant stakeholders, such as the Danish Water in Cities (‘Vand i Byer’) network. Water in Cities is co-financed by the Danish Agency for Research and</p>

	<p>perspectives. This has created many diverse terminologies for both DRR and CCA and varying views on how integration should be pursued.</p>	<p>Innovation and brings together knowledge institutions, public authorities, utilities and private companies.</p> <p>Revision of DRR standards in France: DRR standards in some places have been revised to include CCA. For example, new coastal zoning (from 2011) in France has to take into account Sea Level Rise. However, resulting areas are not yet legally binding and only used as information.</p> <p>German Adaptation Strategy: the German Adaptation Strategy to Climate Change provides an example of the successful application of DRR as a crosscutting issue within CCA. The Strategy was found to have been successful in initiating cooperation and collaborative initiatives in Germany. This German example can be identified as a potential way forward to integrate CCA and DRR.</p> <p>Promote common terminology: promotion of the use of common terminology for CCA and DRR would allow the two communities to communicate more effectively.</p> <p>Promote common strategies to deal with extreme events: an important concern for both CCA and DRR is the management of extreme events. Promoting joint strategies for extreme events could be one way to connect the two communities on a common topic.</p>
<p>2. Vertical Coordination</p>	<p>2.1. There is a lack of communication and coordination between government levels. This can result in decisions being made at national level that do not reflect the needs of the local level. As geographical regions can often be diverse it can be difficult to maintain a national framework/agenda.</p>	<p>Possible solutions:</p> <p>Increase bottom up communication from the local to the national/ federal level: engage relevant local stakeholders in national decision making through stakeholder forums.</p> <p>Make use of local knowledge: community level knowledge (e.g. from local response services and local communities) should not be neglected and should be integrated in risk assessment maps (bottom-up and top-down integration).</p> <p>Flexibility in national frameworks: national frameworks/ agendas should have flexibility to allow the regional/local level to adapt the framework to their specific needs.</p> <p>Promote the local level as a key actor: CCA/DRR activities often have improved longevity if promoted and taken ownership by the local government (but the ability of local authorities to do this depends on funding availability, see section on funding).</p> <p>Good cases</p> <p>The Netherlands Delta Programme: the programme aims to protect the Netherlands from flooding, now and in the future and brings together stakeholders from the central government, provincial and municipal authorities, water boards and civil society organisations, demonstrating how various levels of governance can be brought together on a common topic. The programme explicitly acknowledges itself as a potential model</p>

		<p>of good practice and is keen to share water management expertise with others.</p> <p>German model: the German model provides a useful example of successful governance between different political levels in a decentralised system. The strategy includes a guided national risk assessment procedure and alliances between the Länders to ensure a coordinated approach.</p>
<p>3. Local Level Capacities</p>	<p>3.1. CCA and DRR are predominantly the responsibility of local authorities, however local authorities often lack the expertise and capabilities to integrate and implement CCA and DRR.</p> <p>3.2. International frameworks such as the Sendai Framework for Disaster Risk Reduction are often perceived to be of little use to local stakeholders for synthesizing CCA and DRR as statements are of a very broad nature. Local levels often lack the capacity to translate and adapt such frameworks to the local context.</p> <p>3.3. Disappearing local knowledge base: privatization of utilities and critical infrastructure creates new dilemmas. Often infrastructure is old and starting to fail but there is no money to repair them, as the situation is exacerbated through Climate Change.</p> <p>3.4. When utilities are privatized, official reports are replaced by consultants` reports, then knowledge of municipalities is lost, so there is no synthesis-leading to a disappearing knowledge base. Massive investment is needed to re-establish data.</p>	<p>Possible solutions</p> <p>Clear identification of overlaps: the clear identification of overlaps between CCA and DRR will allow resources to be allocated efficiently and reduce duplication of work, thus reducing strain on local resources.</p> <p>International links to tackle DRR and CCA: bringing actors together from around the world through joint international projects can help actors learn from one another, allowing them to develop their own plans through example.</p> <p>Increase availability of funding for local authorities for CCA and DRR: local authorities require greater financial support from central government to be able to implement CCA and DRR strategies.</p> <p>Engage the Private Sector: engaging the private sector to investing in joint CCA-DRR programmes could relieve resource strain at the local level.</p> <p>Horizontal coordination between local authorities: communication and coordination between local authority regions/municipalities would allow for joint learning and resource sharing.</p> <p>Capacity and awareness building: investment from federal governments in capacity and awareness building at the local level would help with the harmonisation of CCA and DRR.</p> <p>Good cases</p> <p>Resin H2020 (2015-2018): RESIN is an interdisciplinary, practice-based research project investigating climate resilience in European cities. Through co-creation and knowledge brokerage between cities and researchers, the project is working on developing practical and applicable tools to support cities in designing and implementing climate adaptation strategies for their local contexts. The project is working with European standardisation organisations with a view to contributing to the formal standardisation of adaptation tools and approaches. This will allow cities to share and compare knowledge and capabilities and for cities to support one another in developing their capacity for resilience.</p> <p>Basel-Stadt's Kantonalen-Krisen-Organisation (KKO): in Switzerland, the KKO coordinates trans-boundary disaster risk drills with cross-border counterparts. The strong framework for</p>

		<p>cooperation under DRR could in theory be expanded to incorporate CCA issues in time.</p> <p>Integrated emergency planning for extreme events: in cities exposed to repeatedly high impact weather events, the municipalities prepare new emergency management strategies to deal with CCA and DRR (for example in Genova, North-Eastern Italy).</p> <p>City networks and collaboration: City networks • Covenant of Mayors for Climate and Energy; C40 Cities; UNISDR Making Cities Resilient campaign and Rockefeller 100 Resilient Cities (Mysiak et al., 2018).</p>
<p>4. Climate Change uncertainty</p>	<p>4.1. Uncertainty in the progression of future climate change can make decision making difficult. Decisions are often delayed in a 'wait and see' approach and proactive action is not taken. Additional uncertainty is added via a lack of climate change data at local levels.</p>	<p>Possible solutions</p> <p>Eco-system Based Approaches: eco-system based approaches provide a low regrets option for CCA as they present immediate benefits as well as adaptation to a range of climate change futures. Such approaches also provide co-benefits for DRR, for example restoration of coastal salt marsh provides protection against rising sea levels but also against storm surges and coastal flooding. Nature-based solutions (NBSs) are a prime example of means for simultaneously reducing natural hazard risks and boosting societal resilience that address both CCA and DRR. (Mysiak <i>et al.</i> 2018),</p> <p>Develop the observational network: develop the observation network to increase knowledge on local effect of climate change and to complement the information provided by existing monitoring systems.</p> <p>Good cases:</p> <p>Coastal Salt Marsh Restoration around the UK: managed realignment schemes have been implemented in various locations around the UK. Coastal Salt Marsh has been restored which protects the coast line and means expensive engineered sea defences are not required or can be built on a smaller scale (and less expensively) inland.</p> <p>Climate Change Centre Austria (CCCA): the CCCA does not actively conduct research but coordinates climate research in Austria. CCCA provides society and policymakers with scientifically sound information and advice on climate relevant topics.</p>
<p>5. Funding</p>	<p>5.1. The way in which funding is appropriated can create disparities between CCA and DRR. Funding for CCA/DRR comes from many different sources and the scope of the funding may be limited by the interests of the donor organisation (i.e. CCA or DRR, not both). Overall there is a lack</p>	<p>Possible solutions</p> <p>Greater coherency and efficiency in funding mechanisms: promote multi-institutional funding which includes CCA and DRR funding in the same programme through the creation of new funding schemes.</p> <p>Flexible funding schemes: creation of flexible funding schemes that shift from short-term and project-oriented financing to the support of forward-oriented strategies that</p>

	<p>of coordinated funding for joint CCA/DRR activities.</p>	<p>ultimately lead to long-term sustainability. Funding would be flexible and could be shifted from one year to another. Funding for a specific disaster could also be used to promote CCA in the region.</p> <p><u>Good cases:</u></p> <p>Public-private partnerships (PPPs) for hazard risk transfer: PPPs provide vehicles for joint bearing of responsibilities and efficient risk sharing enabling insurability and financial backing for low-probability/high-impact risks. Examples of longstanding insurance-related PPPs include the Spanish Consorcio de Compensación de Seguros (CCS), the French Catastrophes Naturelles (CatNat) and the Flood Reinsurance Scheme (Flood Re) in the UK (Mysiak <i>et al.</i> 2018).</p> <p>Financing for Nature based solutions: European Investment Bank's Natural Capital Finance Facility (NCFF) is an example of a new instrument which aims specifically at financing projects which apply nature-based solutions to adaptation measures. NCFF sets out to generate a revenue stream or achieve cost savings in order to pay back the investment; the instrument typically includes an equity-type component to reduce risk, and a technical assistance component. (Mysiak <i>et al.</i> 2018).</p>
<p>6. Data on risk and vulnerability</p>	<p>6.1. Risk assessments are often based on hazards, rather than vulnerabilities and on damages to material assets rather than on social and psychological forms of vulnerability. Such assessments are not adequate to address the challenges of future disasters and climate change impacts.</p>	<p><u>Possible solutions</u></p> <p>Risk and vulnerability assessments that consider social vulnerability: clear identification of risks and vulnerabilities allows CCA-DRR programmes to be targeted and specific.</p> <p>6.b. Regular review of risk assessments: risk assessments need to be frequently reviewed to account for the potential for changing risks with climate change and rapidly changing demographics.</p> <p><u>Good cases</u></p> <p>6.c. UK National Risk Register: the UK has the National Risk Register of Civil Emergencies, which is a five-yearly review of potential disasters that could impact the country. Reviewing the risk assessment every five years allows changing risks with climate change to be accounted for.</p>
<p>7. Lack of good practice examples that are accessible</p>	<p>7.1. As implementation of intentional joint CCA and DRR schemes is limited there is a lack of good examples from which to learn from.</p> <p>7.2. Adaptation is in most cases still at an early stage, with relatively few concrete measures on the ground,</p>	<p><u>Possible solutions</u></p> <p>Identify best practice examples for fostering the coherence between CCA and DRR actions: as the full potential of integrating CCA and DRR has yet to be exploited, it could be useful to identify and review existing actions. Although these actions are presently relatively rare, they hold great potential for transferable lessons learned.</p>

	<p>monitoring and evaluation is proving to be difficult, particularly as indicators and monitoring methodologies have hardly been developed.</p>	<p>Coherent monitoring of implemented schemes: coherent and coordinated monitoring of the effectiveness of implemented CCA-DRR schemes would allow for comparisons to be made and lessons to be learned.</p> <p><u>Good cases</u></p> <p>PreventionWeb Knowledge Base: prevention Web Knowledge Base provides a searchable database of DRR news, events and published articles. Users can also filter by 'climate change' topics. However, this database is primarily designed for the DRR community.</p> <p>International Campaigns such as 100 Resilient Cities and UNISDR Making Cities Resilient Campaign: these campaigns bring cities around the world together to increase resilience at the city level. Cities can interact, share knowledge and learn from one another.</p>
<p>8. Awareness and political issues</p>	<p>8.1. CCA and DRR are not at the forefront of the political agenda in most cases. This may be due to lack of awareness among decision makers of the importance of CCA and DRR.</p> <p>8.2. Due to short term political cycles, political attention is usually focused on short term action, but this does not support the long-term thinking required for CCA. Decisions made directly after a disaster are often made urgently, which stands in tension with the actual need of thinking long term for building back better, prevention, protection and adaptation. As such, these decisions often lack consideration for climate change.</p> <p>8.3. The public are often not aware of their own vulnerabilities meaning they do not actively support CCA-DRR action.</p>	<p><u>Possible solutions</u></p> <p>Promote resilience and sustainable development: one method suggested frequently is to shift the focus from the notion of separate CCA and DRR practices to a more holistic, long-term notion, such as resilience or sustainable development. This provides a more holistic focus point, rather than DRR and CCA concepts which may appear abstract to decision makers who lack relevant knowledge.</p> <p>Promote public awareness: Raising awareness in the public and engaging them with the issue and building support can often influence decisions at higher levels.</p> <p>Promote education and web-based knowledge portals for communities: Local government investments in society and education is important as at the national policy level there is often too much bureaucracy. These administrative and cultural barriers can present a barrier to DRR and CCA integration. Education allows communities to make their own decisions and makes them aware of the dangers and their vulnerabilities.</p> <p><u>Good cases</u></p> <p>Ministry for Social and Ecological Transition (France): France now has a ministry for social and ecological transition, and for the first time in a long time, there has been a ministerial change that addresses these issues. There is beginning to come a change in France where there is more cross-cutting concern about social and natural sustainability. This governance approach has to do with many areas: health, pollution, agriculture, etc.</p> <p>UK Environment Agency's community approach: The UK Environment Agency house activities, such as community flood awareness efforts, within existing community structures</p>

		<p>(for example church halls) which helps to engage communities through existing community groups.</p> <p>The EU Floods Directive (EFD): The EFD required EU member states to undertake comprehensive flood risk assessments, produce flood risk maps and to develop flood risk management plans for the identified hazardous zones. In making countries take action the EFD raised awareness of flood risk. Requiring members to review their risk assessments every six years keeps the issue of flood risk at the forefront of peoples' minds.</p>
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Challenge 2: Bridging the gap between science and policy for DRR

Prepared by partners University of Copenhagen (UCPH) and Analisi e Monitoraggio del Rischio Ambientale S.c.ar.l. (AMRA).

Disaster Risk Reduction (DRR) is a vastly complex and knowledge-dependent process and is only continuing to be so in our current knowledge and information dependent societies. Successful DRR is depending on the production of new knowledge, continuous development of innovative methodologies, tools and concepts; and on a thriving connection between the scientific and political communities.

Yet, the story of integrating science and policy in the context of DRR is perplexing.

Technical scientific knowledge, more than ever, feed into decisions, and thereby qualifies and forms the general basis on which crucial societal decisions are made. That is, we have witnessed an urgent need for, and demand after, scientists to provide input into policy in terms of evidence, possible solutions, impact and risk assessments. While this new role of science testifies to the increasing importance of expert knowledge and its growing influence on policy process, it also brings new separate challenges. With this increasing influence, an organizational and societal reshuffling of roles, tasks and responsibilities between scientists and practitioners takes place.

This special emphasis for the role of science in the disaster context is relevant, not only to the disaster response, but all phases of disaster management. That is, wrong or just misinterpreted scientific input potentially leads to disastrous losses for the community in question. The need for accurate knowledge, a shared understanding of the form, and interpretation of this knowledge is crucial.

This chapter highlights a number of recommendations, solutions and good practices for integrating science and policy for disaster risk management and reduction.

Key Issues	Gaps/needs	Possible solutions and good practices
<p>1. Transferring research into policy</p>	<p>1.1. Lack of ways to translate research into salient, credible and legitimate knowledge and evidence than can inform policy.</p>	<p><u>Possible solutions</u></p> <p>Develop a new pathway or network to disseminate academic research findings/innovation</p> <p>Identification of problem and examples of good practices: employees with skills that can act as intermediaries and translators between academia and policy should be a priority, which in France have been called “mediators of science”.</p> <p><u>Good cases</u></p> <p>Mobilar Lab: In Switzerland, the recognition of this gap gave rise to the creation of The Mobiliar Lab for Natural Risks in 2013, a private/public partnership hosted at University of Bern to bridge the interdisciplinary gap between science and application.</p> <p>The Natural Hazards partnership: a public-sector collaboration across the UK for natural hazard disaster risk reduction. The Natural Hazards Partnership, established in 2011, provides authoritative and consistent information, research and analysis on natural hazards for the development of more effective policies, communications and services for civil contingencies, governments and the responder community across the UK. The NHP is primarily a forum for the sharing of knowledge, ideas and best practice. They also provide a daily overview of potential hazards in the UK. the NHP also provides support for the production of the UK’s National Risk Assessment, a document providing evidence of natural hazards facing the UK in the coming five years. They also aim to create an environment for the development of new services for disaster response. For more information see: Hemingway R. and O. Gunawan (2018)</p>
<p>2. Interdisciplinary approaches to disaster research</p>	<p>2.1. An overwhelming amount of research in DRR and CCA are carried by the natural and technical sciences.</p> <p>2.2. Social science and the humanities have a hard time making an impact on policy.</p>	<p><u>Possible solutions</u></p> <p>Interdisciplinary research for the understanding of risks and in disaster management and preparedness need to be developed. Here platforms for connecting different strands of the</p> <p><u>Good case:</u></p> <p>The COHERENT project on coastal flood adaptation in different municipalities in Denmark represent a good example of ways to integrate different types of disciplines and actors into DRR projects. The COHERENT in Denmark project will bring researchers, municipalities, emergency preparedness, authorities, consultants and a number of small businesses together</p>

		<p>in an ambitious project, ranging from technical and scientific coverage of coastal floods, to the detection of injuries, social efforts, warning systems and technologies. Our project will be confronted with user needs from day one, and we therefore have case studies in Aabenraa, Ringkøbing-Skjern and Skive municipalities, so we can identify various problems in the Baltic Sea, the North Sea and the fjords. Experience and business development also go beyond Denmark's borders, and therefore the project includes a research team and a case study from Germany. The project's integrated approach will create new models and a digital platform for coastal protection and preparedness. The platform will enable a comprehensive presentation of threats and solutions and can be used for warning and prediction of floods in coasts and for testing of technological solutions and preparedness by authorities and civil society. Project partners build on many years of experience with flood models, injury reports, and strengthening authorities and community readiness. Business partners contribute practical solutions for disaster relief in terms of planning and technologies.</p>
<p>3. Investing in knowledge</p>	<p>3.1. Lack of long-term investments in science platforms for DRR and CCA, and a lack of support for scientists to disseminate their research.</p>	<p><u>Possible solutions</u></p> <p>Develop and use databases to acquire information on past events</p> <p>Invest in impact-based forecasts and forecasting systems for short-term perspectives</p>
<p>4. Public involvement and risk awareness raising</p>	<p>4.1. Lack of improvements in public understanding of risk probabilities.</p> <p>4.2 Lack of awareness of risks, even for people living risk zones.</p> <p>4.3. Definition of clear responsibility, increasing systemic efficiency and understanding (also by communities) of rules, rights and duties of all the actors.</p>	<p><u>Possible solutions</u></p> <p>Effectively implicate public at the decision-making level through the use and spread use of participatory approaches.</p> <p>Manage and analyse risks alongside with the population. Citizens should be part of the risk planning process</p> <p>Fully include urban/town planning into DRM and DRR, which can increase local resilience and ownership of DRR projects.</p> <p><u>Good cases</u></p> <p>Water in Cities network in Denmark: A growing number of networks and conference events include both practitioners, university academics and other relevant stakeholders, such as the Danish Water in Cities ('Vand i Byer') network. Water in Cities is co-financed by the Danish Agency for Research and Innovation and brings together knowledge institutions, public authorities, utilities and private companies.</p>

<p>5. Integrate science insights across the CCA and DRR divide</p>	<p>5.1. Use of standards in risks assessments</p> <p>5.2. The role of ecosystem services in climate change adaptation and disaster risk reduction.</p>	<p>Possible solutions</p> <p>Ecosystem based approaches provide a low regrets option to climate change adaptation as they have benefits in the present as well as for under a range of future climate change scenarios.</p> <p>Good cases</p> <p>Salt marsh restoration UK: Ecosystem -based initiatives also have co-benefits for disaster risk reduction, for example the restoration of salt marsh in the UK combats both rising sea levels and reduces wave energy during coastal flooding events, reducing erosion and provides an area in which to store flood water.</p> <p>German Climate Consortium: In Germany, the DKK (German Climate Consortium) has brought together several scientific institutions since 2008 to synthesize scientific findings on climate change and has provided joined assessments.</p>
<p>6. National platforms for DRR</p>	<p>6.1 Lack of standards and synergies between national platforms and frameworks for DRR and CCA.</p>	<p>Possible solutions:</p> <p>Enhancing exchange between the members of the national platforms can help identifying knowledge gaps, promoting future research and funding and shaping public policies on DRR</p> <p>Good cases:</p> <p>Analyzing differences between national platforms: Since the Hyogo Framework for Action in 2005 many national platforms emerged in order to enhance scientific exchange between the various stakeholders working in the field of disaster risk reduction. Approximately 80 national platforms exist worldwide. UNISDR analyzed the existing platforms in Europe in 2014. Structures between the various national platforms differ. The different backgrounds of the members, however, can be an opportunity to open new perspectives for research and the elaboration of public policies.</p>
<p>7. Using scientific knowledge to enhance cross-border crisis management</p>	<p>Use of standards in risks assessments. For example open access.</p>	<p>Good cases</p> <p>Project INCA under the French National Research Agency: A decision support framework for Improving Cross-border Area resilience to disasters. The objective of the project is to contribute to understanding and improving the resilience of cross-border territories to the risks of disasters. Scientific knowledge and decision makers' practices will be improved through an approach.</p>

		<p>The aim of the project is to contribute to understanding and improving the resilience of cross-border disaster risk zones by studying two topics, in particular the resilience of medically dependent citizens and the management of volunteers during the onset of crises in a cross-border region. Scientific knowledge and the contribution of public and private actors will be strengthened with an interdisciplinary approach combining conceptual and empirical research, development of a decision support environment and an experimentation campaign.</p>
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Challenge 3: Strengthening transboundary crisis management in the EU

Prepared by partners Helmholtz Zentrum Potsdam Deutsches Geoforschungszentrum (GFZ) and Bureau de Recherches Geologiques et Minières (BRGM).

The issue of trans-boundary crises due to natural and man-made disasters is of great importance to Europe. This becomes clear when one considers that some 20% of the population of Europe (115 million citizens) live within 50 km of a national border, while around 70% of the continent's fresh water bodies form at least part of a trans-boundary river basin (e.g., the Rhine forms part of the border between Switzerland and Austria, Germany and Liechtenstein, and some between Germany and France). Along the course of the ESPRESSO project's consideration of this challenge, a recurring theme, and probably the most important, is communication. This means communication at all levels of governance, and between governments, extra-governmental and supra-governmental bodies. In the following, the key issues associated with this challenge, the gaps and needs, and some solutions to those points that are seen as hindrances to effective trans-boundary crisis management, will be presented.

One point raised during the Think Tank was the belief that there is no need for specific regulations or directives at the EU level (points 1 and 2 in the accompanying table). It was commented that crises could be better dealt with by bi- and multi-lateral national and local agreements (formal and informal), which are thought to offer a degree of flexibility that would enhance cross-border disaster management. Any developed strategy that allows countries to coordinate their response requires common policies, procedures, the integration of local governments, and agreeing on what the common problems and issues are. Examples of practical considerations include issuing visas and work permits more efficiently, or even waiving the need for such documentation, and the recognition of qualifications (technical, medical, etc.) to allow foreign personal to be immediately active. All of this requires a great deal of transparency so as each state and level of government understands exactly what is at stake and what is required. Included in this is the need for pre-emptive communication and coordination (point 6). To enhance these points, local and cross-border emergency training is essential, especially important when considering language issues.

Such bi- or multi-lateral planning also requires assurance that climate change adaptation policies and activities within a trans-boundary area are at least consistent between each country (point 3). This is an example where not only is communications at the governance levels required, but also between the respective scientific communities. This carries over to industrial and infrastructure facilities, especially in those regions where a great deal of cross-border economic activity occurs (the theme of the 2nd Think Tank, points 4 and 5).

It must be remembered that States are very careful to preserve their sovereignty, with any decision to request or accept assistance being their decision, and theirs alone. This extends to the EU, as a supra-national entity, which would only be able to act or contribute if requested. However, as part of the communication between the EU and the states, the EU needs to have plans for what activities are to be prioritized in advance of any crises within the context of both the Civil Protection Mechanism (UCPM) and the Solidarity Fund (point 7). Furthermore, the EU will need to decide (after consultation with the states) in advance how to prioritize which activities. This will help in reducing the discrepancies that may arise when investing in disaster risk response and disaster risk management.

This brings about the role of NGOs in disaster risk management and response (points 8 and 9). The issue is that in many countries, NGOs are often not officially included in crisis management (and prefer not to be, desiring to maintain their independence), and are not present at the local level. In particular, they are excluded from the European Coordination Mechanism. This may lead at times to inefficiencies and duplication of efforts. However, coordination of at least the more important NGOs by national authorities (as well as by the EU) may be important, given they are quicker and more flexible than governments and. A strong presence at the local level may also potentially strengthen the organization itself, with the competences of national NGOs being expanded to support them.

Accompanying any efforts to coordinate and manage crises across borders is the need to agree on the standards, thresholds and methodologies employed when undertaking hazard and risk assessment (points 10 and 11). This includes how to communicate to the public the crisis situation, informing them as to the risk they are exposed, and what measures can be made to reduce or respond to it. Included in this is the sharing of data and information, in particular between scientists and decision makers. This includes the defining of worse case scenarios, the probability of occurrence of damaging events of different levels, and the expected losses and disruptions. Again, the local areas need to be involved, for example, to develop a shared memory of disasters that have occurred that crossed borders, while understanding the local vulnerability to such events. However, due consideration will need to be paid to the fact that some information may have security or commercial value, again returning to the issue of the nation state's sovereignty.

Key issues	Gaps/needs	Possible solutions and good practices
<p>1. Legislative framework between nations</p>	<p>1.1 Need to ensure good political relations and agreements between countries. Trans-boundary crises should be 'above' other international issues;</p> <p>1.2 Coordination and communication between countries at all levels.</p>	<p>Possible solutions:</p> <p>Define a strategy at the international level, upon which both countries (bi-lateral agreements) can prepare for and coordinate a tactical response to any disaster.</p> <p>Local government needs to take a shared global view ('think globally, act locally'). This will mean local authorities communicating and coordinating with their cross-border counterparts (multiple bi-lateral agreements, formal and informal), between local and national levels, and with NGOs (see below).</p> <p>Need to identify areas where common policies can be implemented (including for climate change adaption, see below), and establish a framework allowing for the maximum possible flexibility in response, again at all levels.</p> <p>Develop common actions for responding and safe guarding regions affected by the same types of hazards (also common data, alerts and information exchange, see below).</p> <p>Transparency in existing policies and procedures will allow countries to better understand how each other operates, in terms of operational response (see information exchange below).</p> <p>Pre-emptive communication and coordination between governments (all levels) can allow the correct policies to be in place and ready for when required.</p> <p>Coordinate long term policies not only between a country's local and national levels and between countries at these levels, but between all of these levels and the EU.</p>
<p>2. Climate Change Adaption policies between counties.</p>	<p>2.1. Compatibility of climate change adaption when considering trans-boundary regions.</p>	<p>Possible solutions</p> <p>Any trans-boundary policies need to also consider the CCA policies of each country (e.g., biodiversity), and ensure that employed policies are at least compatible, and best complementary (involvement of all levels of governance, scientists and community groups).</p> <p>Localize the scale of climate change within EU and identify how DRR needs to itself adapt to the magnitude of expected climate-related hazards.</p>
<p>3. Infrastructure and industrial facilities</p>	<p>3.1. Public/private responsibility for critical infrastructures and industry; 3.2 Prioritization of what facilities are to be protected/recovered.</p>	<p>Possible solutions</p> <p>Define a legal framework to specify responsibilities in case of a crisis (including insurance sector). Will also need to incorporate stakeholders such as the insurance industry.</p>

		<p>Involvement of local governance on both sides of a border regarding the actual presence of major industrial facilities.</p> <p>Ensure compliance with the Industrial Accident Convention, which aims to identify hazardous activities and facilitate discussion between neighboring countries. The discussion includes accident notification systems, mutual assistance and exchange of information and technology.</p> <p>Need to prioritize what and how facilities are to be protected and repaired (see recovery below).</p>
<p>4. Response capacity between countries</p>	<p>4.1 Different response country capacities and procedures between countries.</p>	<p>Possible solutions</p> <p>Overcome bureaucratic hurdles (e.g., accept qualifications, waive customs tariffs) that negatively impact upon the speed of response and a country's capacity.</p> <p>Frequent exercises to harmonize methodologies and practices.</p> <p>Establish liaison personal to smooth the cooperation between national (and NGO) response groups.</p> <p>The sovereignty of an affected country must be remembered, and any actions taken need to be either agreed upon prior operational planning or with permission of the affected country(ies).</p>
<p>5. Recovery of trans-boundary region</p>	<p>5.1 Setting of priorities for recovery.</p>	<p>Possible solutions</p> <p>In case of Build Back Better, a careful prioritization of which assets to recover is needed due to limited funds (see infrastructure and local input).</p> <p>Reduce discrepancy in investment for DRR and DRM by EU government. Need careful corporation and coordination with all levels (national, local).</p> <p>EU bodies should decide in advance how they will prioritize activities when different states are affected (e.g., the EU Solidarity Fund, and the Civil Protection mechanism).</p>
<p>6. Coordination of NGOs (e.g., prefer their independence, possible conflicting agendas between groups).</p>	<p>6.1 Synergies and coordination with NGOs and the EU; 6.2 Synergies and coordination of NGOs with national and local authorities.</p>	<p>Possible solutions</p> <p>Inclusion of representatives of the most important NGOs within coordinating institutions at the EU level. The purpose is to coordinate with NGOs, not to dictate their activities.</p> <p>Competences of national NGOs should be expanded to support NGOs in local areas.</p> <p>Strengthening the coordination of NGOs at the local level will help avoid the duplication of efforts of NGOs. This in turn will help to reduce competition for resources.</p> <p>Task oriented volunteering and solutions should be promoted for cross-border cooperation.</p>

<p>7. Sharing of information data and hazard and risk assessments</p>	<p>7.1 Different standards between countries; 7.2 Lack of common assessment methodologies.</p>	<p>Possible solutions</p> <p>Standardization of thresholds and alerts among countries for what is defined as a disaster.</p> <p>Standardize communication between responsible agencies (e.g., river gauge information, rainfall reports, etc.).</p> <p>Standardize communications of warnings to all parties, in particular to infrastructure operators and the general public. NGOs will need to be brought into these discussions.</p> <p>Standardization of available data and information (hazard maps, exposure and vulnerability) while ensuring security and commercial concerns are still met.</p> <p>Create a disaster risk memory across borders.</p> <p>Investigate the scale and type of hazards that may be expected both individually, for the future (CCA) while still considering a multi-hazard approach despite its difficulty (again communications between agencies). This will require a wide cross-disciplinary approach, while calling for extensive communications not only between local and national governance, but within the governance (different departments, ministries).</p> <p>Use of probabilistic models to support decision-making process (allow DRM choices based on the available knowledge).</p> <p>Improved communications between scientists and decision makers, analyzing worst and best-case scenario, their probability of occurrence and expected impacts (then decision makers make their DRM choices based on the available knowledge);</p>
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Conclusion

In this deliverable, a number of issues, gaps, needs, possible solutions, good cases and practices related to the three ESPRESSO challenges have been outlined.

As the purpose of this report is to present these possible solutions in order to feed them into deliverables 5.4 and 5.5 in ESPRESSO, the importance and relevance lies in its contribution to the future and final work of the project.

Overall, a number of good cases and possible solutions have been presented for each of the three challenges. As stated in the introduction, more possible solutions have been entered in the ADB for challenge one than the other two. Yet many of the proposals in challenge number one are still of a high relevance for the other two challenges.

Furthermore, a number of the possible solutions and good cases correlate quite well with what has been discussed during each of the three ESPRESSO Think Tanks in Berlin, Zürich and Naples. This testifies the fact that what has been entered into the ADB, and summed up in this report, resonates with what stakeholders and partners of ESPRESSO have reported as issues and solutions for strengthening the future of DRR initiatives and policies in Europe.

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