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Fifth Disaster Risk Management Knowledge Centre (DRMKC) Annual Seminar

*Workshop report, 17-18
November 2021*

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Foreword & thanks

This report summarize the contents and discussion of the fifth Disaster Risk Management Knowledge Centre (DRMKC) Annual Seminar, organized on 17-18 November 2021 and held virtually from JRC Ispra.

The authors wish to thank DG ECHO B.3 colleagues who actively contributed to the design of this event and provided insightful contents to it; a big thank you as well to all moderators and speakers of the Seminar's sessions who, with their knowledge and expertise, made the Seminar a successful event.

Finally, we wish thank the Audiovisual and Conference Service of JRC, who supported the effective implementation of the two days and recording of full event.

Abstract

On 17-18 November 2021 the 5th Disaster Risk Management Knowledge Centre (DRMKC) Annual Seminar took place, after two years of break caused by the COVID-19 pandemic. Those two years brought significant changes to the risk landscape: the COVID-19 crisis was accompanied by a series of natural disasters that hit Europe and the world in particular during summer 2021. These concomitant disasters require from us to oversee, anticipate and manage these crisis in a more coordinated way.

In this evolving risk landscape science has gained a place of honor and become more central to policy making. This is the case particularly for disaster risk management where the role of Science and Policy Interface has become prominent. The 5th DRMKC took place in this context where higher ambitions are expected from Science. Compared to the previous annual seminars, where the DRMKC was progressively working towards establishing its role as the main entity at the interface between Science and Policy in the field of Disaster Risk Management, this year's seminar confirmed the place of the DRMKC as the core of the Science Pillar of the newly established Union Civil Protection Knowledge Network.

The annual seminar brought together scientists, practitioners, policy makers and civil protection authorities across Europe to launch a new phase of dialogue between Science and Policy and to start building together the knowledge base for supporting the activities and actions of the Science Pillar of the Knowledge Network. This report summarizes the outcomes of the discussions that took place in 5 sessions over two days. The results of this event, all comments and suggestions, are being carefully considered in the ongoing design of the roadmap of Union Civil Protection Knowledge Network Science Pillar.

1 Introduction: purpose of the event

The fifth Annual Seminar of the Disaster Risk Management Knowledge Centre (DRMKC), the European Commission's science and knowledge service for DRM, took place on 17 and 18 November 2021, after two years of break, due to Covid19 pandemic. They were two years of deep changes for the entire world and also for DRMKC team, and the 5th DRMKC Seminar marked a return of this yearly appointment in which the new and bigger ambitions and responsibilities for the DRMKC were shared with all participants and a call for collaboration was launched.

The annual seminars are the forum in which the different actors engaged in Disaster Risk Management are invited to sit at the same table to exchange views, identify emerging challenges and to define all together the way forward to effectively approach the changing landscape of risks to be faced.

This years' event took place in a crucial moment where the DRMKC is proposed to become the cornerstone of the Science Pillar of the newly established Union Civil Protection Knowledge Network (UCPKN). The 2019 revision to the Union Civil Protection Mechanism (UCPM) foresaw the creation of a Union Civil Protection Knowledge Network to bring together civil protection and disaster management experts and organizations, increase knowledge and its dissemination within the UCPM, and support the Union's ability and capacity to deal with disasters.

On 10 November 2021 the Commission published the Implementing Decision ((EU) 2021/1956) which formally established the Union Civil Protection Knowledge Network, with a strong Science Pillar, clearly referencing the Disaster Risk Management Knowledge Centre, DRMKC, as a core building block.

The Knowledge Network is a decisive step towards reinforcing an agile, comprehensive and sustainable EU-level disaster risk management approach under the UCPM. The Knowledge Network will be a platform for relevant national structures, centres of excellence, researchers, universities, knowledge centres, third countries and international organisations. In close consultation with UCPM Member States and Participating States, the European Commission worked for a year on the development of the Knowledge Network. Its set-up is designed to ensure a comprehensive and inclusive structure and participatory decision-making, with focus on contributions and added value of expertise, knowledge, skills and good practices of all Member States and Participating States of the UCPM.

The Knowledge Network is developed around two main pillars: the "Capacity building" and the "Science Pillar". Under the "capacity building" pillar, a wide variety of already existing activities will be further enhanced to respond to changing needs. A topical training programme, a rich selection of exercises, an exchange programme for experts will all be key to strengthen the agility and effectiveness of civil protection and disaster management, and support the UCPM and its Member States and Participating States.

The Science pillar will identify, promote and feed the needs of the civil protection and disaster management community into the national and international scientific agendas (e.g., research programmes), to enhance the use and dissemination of existing and developing scientific knowledge in all DRM phases. The Commission and the Member States recognized that the Disaster Risk Management Knowledge Centre was in an ideal position to become the nucleus of the Network's scientific pillar.

This is a major step for DRMKC and the whole DRM community connected to it, which is collaborating on the science-policy interface for the Disaster Risk Management domain since 2015. Now that the Commission DRMKC Knowledge Centre has "matured" into a stable and long-term initiative built-in in legislation, it's time to reinforce and intensify its collaboration with the scientific communities of all Member and Participating States, to co-design a Science Pillar owned by everyone and useful to everyone.

The fifth annual seminar of the DRMKC took place in this changing landscape, which implies strengthening DRMKC role as a leader of the scientific dialogue for an enhanced civil protection legislation. The annual seminar was an opportunity to launch a new phase of dialogue between civil protection authorities and the scientific community and to start building the network together. The scope was to establish the core community of scientists who can help constructing the knowledge base for supporting the future DRM activities and actions.

The fifth Annual Seminar of the Disaster Risk Management Knowledge Centre brought together a large range of DRM stakeholders, from the local to the national and international level and from different communities, i.e. scientists, policy makers and practitioners. We could count on active participation of representatives from more than 40 countries, following different sessions and engaging in lively discussions through many interesting questions and comments. Many more joined us through livestreaming. The input from the audience was extremely valuable to understand the expectations of the community and of the UCPM Member and Participating States and to guide DRMKC's challenging but exciting next steps.

The seminar addressed specific activities that can make significant impact in terms of role and mission of the Science Pillar:

- Making available and better quality risk and loss data, improving risk assessment methodology, better understanding of risk driver and harmonization of risk metrics;
- Provide scientific advice in implementing the Union Disaster Resilience Goals, measuring and monitoring them;
- Advising on strategies and policies to counter disastrous situations through the development of resilience scenarios that factor in multiple hazards and cascading effects for improved early warning systems.

The Seminar was planned before the Union Civil Protection Knowledge Network Day (7 December 2021) to kick-off the discussion with different stakeholders about the needs that the Science pillar of the Union Civil Protection Knowledge Network could address in the future. A full session of the Seminar, specifically dedicated to this, was designed and moderated by the Knowledge Network team of the Directorate General for Civil Protection and Humanitarian Aid (DG ECHO).

Back-to-back to the DRMKC Annual Seminar another appointment took place: the last meeting of the preparatory working group for the Knowledge Network. In this closed-doors meeting the representatives of Members and Participating States - exchanged their first impressions about the Seminar and closed the work of this group, in sight of the Constitutive session of the Knowledge Network Board, co-chaired by the Commission and Portugal.

2 Agenda and format

The 5th DRMKC Annual Seminar took place as a public event on Wednesday 17 and Thursday 18 November 2021 (see detailed agenda in Annex 1). Participation to the event was possible after registration and a livestreaming was also provided.

The presentations were either given live from the JRC Auditorium or from remote. Questions and comments from the audience were collected using Slido and partially answered during the Seminar. Replies to the remaining questions are provided in this report, at chapter 5, thanks to the availability of the moderators and speakers of all sessions.

3 Attendance

We had more than 200 registered participants, from more than 40 European and non-European countries.

154 subscribed participants attended the virtual event on Day 1 and 109 on Day 2. In addition, we recorded a maximum of 552 connections to the livestreaming, even though we need to consider that a viewer can generate more than one connection during the live; e.g. close and reopen the streaming page later, this counts as double connection.

Maximum number of connections were recorded from Italy, Belgium, Slovenia, Europe, Germany, Estonia on Day 1; Italy, Slovenia, Belgium, Estonia, Spain on Day 2.

See details of the connections recorded for the web streaming, and the countries represented, in Annex 2.

4 Summary of sessions

The annual seminar had the scope to establish a core community of scientists who will help constructing the knowledge base for supporting DRM activities and actions of the Union Civil Protection Science Pillar. These activities in a first phase will be shaped around the development of multidisciplinary and cross-cutting knowledge, scientific guidance and new technologies for building resilience towards complex transboundary disasters. The seminar hence addressed specific activities that can make significant impact in terms of role and mission of the Science Pillar:

- Making available and better quality risk and loss data, improving risk assessment methodology, better understanding of risk driver and harmonization of risk metrics;
- Provide scientific advice in implementing the Union Disaster Resilience Goals, measuring and monitoring them;
- Advising on strategies and policies to counter disastrous situations through the development of resilience scenarios that factor in multiple hazards and cascading effects for improved early warning systems.

The annual seminar was organised around the following sessions:

- **OPENING REMARKS** from Directors of JRC, DG ECHO and Slovenian Presidency
- **SESSION 1** - Looking back: 5 years of knowledge management
- **SESSION 2** - Research Gap: compound, cascading and concurrent hazardous events
- **SESSION 3** - Science for Scenario Building
 - o **SESSION 3A** - Foresight scenarios for prevention
 - o **SESSION 3B** - Operational scenarios for preparedness
- **SESSION 4** - Science for Union Disaster Resilience Goals
- **SESSION 5** - Co-designing the Science Pillar – Polling (slido)

Below is a summary of the main conclusions from each session. All presentations given at the event are available on the DRMKC website:

<https://drmkc.jrc.ec.europa.eu/events-news/drmkc-annual-seminars/5th-drmkc-annual-seminar>.

OPENING REMARKS

Alessandra Zampieri, Deputy Director of the “Space, Security and Migration” Directorate of the Commission’s Joint Research Centre and Head of the Disaster Risk Management Unit, opened the Seminar, as chair of the whole event. She mentioned that the DRMKC have been working already for a year hand-in-hand with DG ECHO, to design the concept and plan the first steps of the Science Pillar of the Union Civil Protection Knowledge Network. She also mention that DRMKC will need all the participant’s ideas and engagement to make it evolve into a lively tool, to make sure that science and research are fully adherent to the evolving risk and to ensure that the we are developing the appropriate tools and system to tackle Disaster Risk Management in all its phases, from prevention and preparedness to response and recovery.

Stanislav Lotrič, Deputy Director General of the Administration of the Republic of Slovenia for Civil Protection and Disaster Relief, thanked scientists and researchers of the Joint Research Centre for their dedicated work on the integration of scientific knowledge in civil protection and disaster risk management activities since the launch of the Disaster Risk Management Knowledge Centre in 2015, also mentioning his conviction that Disaster Risk Management Knowledge Centre has been, is and will be playing a crucial role, especially as the core element of the Science Pillar of the Union Civil Protection Knowledge Network. He recalled the workshop organized in July 2021, under the Slovenian Presidency, to launch the reflection process on the development of the Union disaster resilience goals in the area of civil protection, a concept which will be an important part of the emerging European resilience framework. One of the outcomes of the workshop was exactly “the need to include more science in our (DRM) work”. By making scientific data more accessible to a wider community, from civil protection practitioners to policy-makers, the Union Civil Protection Knowledge Network will be the right tool to achieve that goal.

Dan Chirondojan, Director of the “Space, Security and Migration” Directorate of the Commission’s Joint Research Centre, highlighted the tightly interlinked events of the last quarter of 2021, building momentum around climate resilience and Disaster Risk Management actions: the DRMKC Annual Seminar followed the

Copernicus Emergency Management Service Week (last week of October) and the COP26 where countries convened in Glasgow to update their Nationally Determined Contributions and the Glasgow Declaration was officially launched with the objective to raise the climate ambition of stakeholders and secure strong actions to support the global commitment to reach Net Zero as soon as possible before 2050. The Seminar also preceded the UN-led European Forum for Disaster Risk Reduction (24-26 Nov): outcomes of the Seminar were to be brought to this political and multi-stakeholder Forum, aimed at preparing the messages for the 2022 Global Platform for Disaster Risk Reduction in Bali. Finally, the DRMKC Seminar preceded the launch of the DG ECHO-led Union Civil Protection Knowledge Network (launch planned on 7 Dec), foreseen by the revised legislation of the European Union Civil Protection Mechanism.

Peter Billing, Head of Unit of “Security and Situational Awareness” ECHO.A.3 - European Commission, mentioned how the co-chairing of the annual meeting with representatives of DG JRC and DG ECHO highlights the strategic partnership between DG ECHO and DG JRC and the common goal to support and improve the nexus between the scientific community and the emergency management community throughout the full cycle of Disaster Risk Management (DRM). He highlighted the key role of science to better understand risk and hence support emergency management decision-making process to visualize the complexity of a situation, to better define potential solution and finally take evidence-based decisions. In this context, the Disaster Risk Management Knowledge Centre has already successfully contributed to reinforce internal Commission collaboration and enhance the bridge between the scientific community and the emergency management community within the Union Civil Protection Mechanism. It will further contribute to reinforce the collaboration amongst different stakeholders and integration of knowledge between sectors when growing into the foundation of the Knowledge Network Science Pillar. The KN Science Pillar will help to manage, share and create relevant scientific knowledge that will be then transformed into operational services and/or tools to support emergency management. The ERCC will contribute and use on a win-win basis the Knowledge Network Science pillar to keep the existing scientific tools and services up to date and develop new ones to improve its performance.

Julia Stewart-David, Acting Director for “Disaster Preparedness and Prevention”, ECHO.B – European Commission, thanked organizers of the event from both the JRC and ECHO for putting together an interesting agenda which will contribute to advancing discussions on many important files, such as scenario-building or the Union Disaster Resilience Goals. Thanked Peter Billing for providing an overview of the collaboration between DG ECHO and JRC in the past. Stressed that now we wish to take this collaboration to the next level, within the framework of the Science pillar of the Union Civil Protection Knowledge Network. Added that the idea of close cooperation with the Disaster Risk Management Knowledge Centre (DRMKC) was warmly received by the UCPM Member and Participating States and is enshrined in the Network’s Implementing Act. Emphasized that the work of the Science pillar will focus on supporting the use and sharing of existing and developing new scientific knowledge and on strengthening the science-policy interface. We will do so by providing more opportunities for the scientific community to engage in a constructive dialogue and collaboration with practitioners, policy- and decision-makers, and vice versa. Stressed that the ambition of the Knowledge Network is to be above all a space for sharing and learning from each other, a space for co-creation of knowledge for everyone sitting around this virtual table. Finished by inviting everyone for the (virtual) Knowledge Network Day on 7 December which will mark the official launch of the Network.

SESSION 1 - Looking back: 5 years of knowledge management

The DRMKC was launched in 2015 and has fueled interdisciplinary, cross-sectoral and transnational dialogue. The many partners of the DRMKC have contributed to and benefited from the knowledge shared and created through the Knowledge Centre, for example through more integrated research, more coherent policy, and better analysis for operations. This session looked back at what has been achieved, and which challenges are remaining.

DG HOME, DG CLIMA, UNDRR representatives shared their reflections on the works done, respectively, under to support DRR policies through research and networking under the Horizon Europe and CERIS framework; under the Mission on Climate Adaptation and, finally, in the framework of UNDRR, also in sight of the upcoming European Forum for Disaster Risk Reduction.

The list of main conclusions from this session is the following:

- The overview of what we know is quite reassuring as a quite impressive body of knowledge emerged from the exchanges.

- We should make an effort to turn knowledge into a learning experience: testing knowledge in demonstrators, e.g. in the context of the climate adaptation mission.
- We should develop tools for transboundary disasters and improve science and policy for those areas.
- We need to work with Networks and research communities also involving security space.
- Climate adaptation Mission will make sure to draw on the Knowledge and make it usable.
- UNDRR looks into Europe for leadership in the DRM and on the way to the global forum for DRR (planned in May 2022).

Since its creation in 2015, the work of the DRMKC has contributed to advance our understanding of DRM and the use of this knowledge as input to the evidence-based policy making. Several examples of tools, systems and science reviews developed within the DRMKC are a demonstration of how knowledge can be turned into learning and learning can be embedded into practice and concrete actions.

While we have realized, through the Science for DRM book series, that knowledge is abundant, gaps still exist and the DRMKC is actively contributing to map knowledge gaps to help shaping the research agendas of the new Horizon Europe and the EU missions in particular the Climate Adaptation mission.

The S4DRM book series helped identifying challenges ahead that the annual seminar attempted to address in the planned 5 sessions:

- Efforts should be devoted to improving the methods to capture indirect and intangible impacts. For that, the scope of impact analysis should be widened to accommodate cascading effects or to study compound events, considering the links of the asset studied with others, in time and space (session 2).
- we should engage in activities beyond risk analysis, such as risk identification, risk transfer, scenario building and strategic foresight for better anticipation and mitigation of crisis impacts. It is necessary that the groups engaged in risk analysis are engaged in these developing foresight scenarios (session 3).
- The cost and effect of mitigation measures should be studied after an event, paying attention to the causes and drivers that increase disaster risk. At the same time, propose measures to prevent and mitigate losses and damages that could be put in practice by citizens and the private sector (session 1 and 4).
- New emerging knowledge gaps and challenges in the area of civil protection and disaster (risk) management should be timely identified and discussed (Session 5).

SESSION 2 - Research Gap: compound, cascading and concurrent hazardous events

Dealing with compound, cascading and concurrent hazardous events remains challenging. In this session, we reviewed the current understanding and recent research findings, with a specific focus on good practices to include them in national risk assessments. The session also opened a dialogue on approaches for managing compound disaster risks.

The new UNDRR/ISC hazards definitions and classification was presented; the Disaster Competence Network Austria (DCNA) reflected on how to transfer scientific knowledge into practice, while thinking beyond borders; research challenges in drought risk assessment were discussed by a representative of NOAA Physical Sciences Laboratory at the NOAA Office of Oceans and Atmospheric Research in Boulder, Colorado; the chair of the Group of Chief Scientific Advisors, and the co-leader of the crisis topic within it, reflected on the dynamics and impact of interacting natural hazards.

The session concluded that compound events, concurrent extremes, and cascade effects are of key importance in risk assessment especially under current and future climate change conditions. However, they are not fully considered/taken into account in current approaches and methods. Efforts should be planned to advance and reach an effective integration.

Several challenges exist that would require scientific and political cooperation:

- Current hazard classification does not take into account complex events and cascade effects, an exception being 'financial shocks'.
- The human factor is usually not considered.
- There is a need to cooperate and move beyond national approaches and assessments. Events do not stop at national borders.

- Some extremes, e.g. drought, are intrinsically complex as they are non-linear, multiscale, and with temporally lagged impacts. Services targeting those extremes (and the associated risks) should be: reactive, proactive, and prospective.
- There is a need to move towards cross-sectoral resilience: this should be the way to take into account the complexity of the challenges related to compound events and cascading impacts.
- There are still issues in communicating when complex events, cascading effects, etc. are the focus.
- Reaching a multiscale approach is of key importance from local to regional and national scales.

SESSION 3 - Science for Scenario Building

The new civil protection legislation calls for the development of scenarios. This session looked at the science behind scenarios, reviewing existing methodologies and processes, and discussing uncertainty on emerging and future risks.

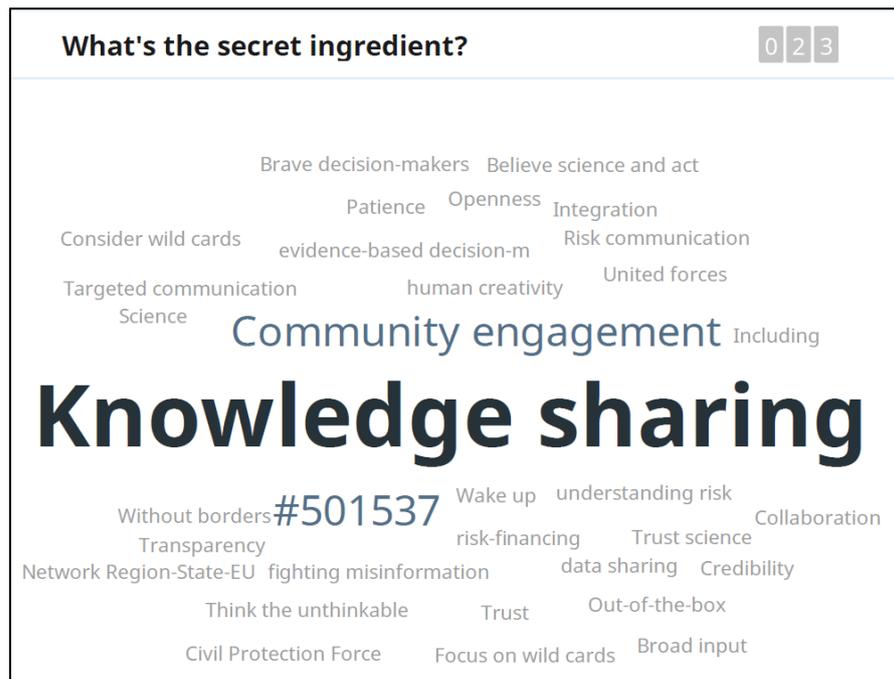
Two different types of disaster scenarios were addressed: 1) Foresight scenarios for prevention, which are of concern for long-term views of sustainable development and 2) Operational scenarios for preparedness, which consider disaster events, which trigger severe, acute impacts and human, physical, economic, and or environmental loss.

The session on foresight scenarios for prevention looked at the broader context of disaster risk management in Europe. Representatives from the European Environment Agency, the World Bank, the European Commission Secretariat General and JRC explored the main drivers in changing risk – crucial to understand what Europe, and its civil protection mechanism and humanitarian/international assistance should expect in the next 10-20 years.

Four main drivers were discussed: (1) climate hazard (2) impact (3) economics and (4) (geo-)politics. Speakers discussed how they construct/use scenarios, and what conclusions they draw on disasters and disaster management in the future.

Conclusions of this session were the following:

- The UCPM legislation foresees the development of scenarios, for setting resilience goals and for improving prevention and preparedness for disasters in the EU. We saw science-based scenarios of the future of hazards (Hans Martin Fussel, EEA), impacts (Luc Feyen, JRC), economic and financial impacts (Zuzana Stanton Geddes, World Bank), and out-of-the-box foresight scenarios (Grzegorz Drozd, SG and Fabiana Scapolo, JRC). There is a lot of good work already available.
- We heard the importance of science to make the robust, interdisciplinary and cross-sectoral to make them realistic, a narrative and appropriate language to make them heard, and a need to deliver them in a political, economic or policy making process.
- Scenarios help to give detail on plausible futures, but also on uncertainties (e.g. emission paths, vulnerability of assets and people, financial liabilities of governments).
- We also heard that better top-down scenarios are necessary and useful to inform scenario building at local level, even for citizens. They help to challenge the assumptions under which we operate, to prepare beyond the experience we have of the past. They help explain the problem.
- Scenarios help build understanding and agency to help all actors in a complex system to reveal their role: why act? How to act? When to act?
- There is a lot of good work available, useful for scenario building at Member State level, regional level or local level. The DRMKC and the Science Pillar of the Knowledge Network aim to make this work known and available to all, and stimulate the development of even more useful scenarios through science.
- Need to deliver the scenarios. This is the “secret ingredient”, according to the participants who provided their input on Sli.do:



The session on foresight scenarios for preparedness was informed by the presentations of three very different types of organizations and respective different ways of interpreting the concept of “scenario”.

The three interesting presentations looked at scenario building from different perspectives, in particular through the lenses of practitioners. The first presentation, representative from the Italian Civil Protection Department presented a tool for simulating seismic scenarios in a number of Mediterranean countries, designed in the framework of PPRD South programme. The second presentation, from ACAPS project, provided methodologies to develop scenarios based on humanitarian situations, in particular about refugee and IDPs movements. Interestingly, these methodologies are mostly based on qualitative approaches, about possible drivers for situational changes. The third presentation, made by DG ECHO, reported about the current state of reflection within DG ECHO on how to implement the requirements of the new EUCPM legislation about scenarios and the role of the scientific community in this context, in particular of the scientific expertise of DRMKC and the newly established KN. It was highlighted how there is no one single way forward and the scenario topic needs to be addressed with a broad approach, covering both internal aspects, within the Commission and with the ERCC in particular, and external aspects, with MS/PSs and other international actors.

In the interesting discussion followed a number of issues were raised, such as the qualitative vs quantitative approaches and the role of cascading effects in scenario building, the appropriate level of complexity and the possible role of chaotic systems in the process of creating disaster scenarios.

The moderator mentioned, in his conclusions, that the main success factor in designing scenarios, they should be tailored in such a way that they can be easily grasped by decision makers, avoiding over complexities and outlining instead the possible political and economic impacts.

SESSION 4 - Science for Union Disaster Resilience Goals

The new civil protection legislation calls for the development of Union Disaster Resilience Goals. In the well-defined policy context of the Union Civil Protection Mechanism, the session discussed the available science and evidence, as well as lessons learned from existing disaster resilience frameworks, systems and tools.

NATO’s representative explained their perspective on building resilience and the process followed to design and implement the resilience baseline requirements within the international context and framework of NATO. The speaker from ECHO explained the status of discussions and the steps already made in the

process of developing of the Union Disaster Resilience Goals. JRC shared information on the conceptual framework of resilience and the resilience dashboards developed in the context of the project "Building a scientific narrative towards a more resilient EU society". The local perspective on the topic was brought by the discussion around one of the key Horizon 2020 projects in this field, i.e. RESILO project -"Resilient Europe and Societies by Innovating Local Communities". Finally, resilience from the design point of view was also included in the discussion, thanks to the contribution from the School of Architecture and Urban Design RMIT University, Melbourne, Australia.

Conclusions of the session highlighted different possible types of contributions to the process of defining and developing the resilience concept:

Contribution of science:

- Science plays a key role in better understanding and communicating disaster risks, and the concept of resilience, therefore it should be closely involved in the disaster resilience related activities.
- Various scientific disciplines should contribute to resilience building, in order to encompass all relevant resilience related aspects (environmental, technical, economic, social, cultural, and others) and support a coherent cross-sectoral approach across the wide range of EU policies, legislation and frameworks that aim to increase resilience.

Development of DGRs:

- The inclusion of the Union disaster resilience goals in the revised Union Civil Protection Mechanism marks a milestone on the pathway to resilience in the area of civil protection.
- Better knowledge and understanding will be needed to help 'breakdown' the complex concept of disaster resilience into an operational and actionable framework for civil protection. Further knowledge gap emerges as regards robust evidence on achievements and gaps in different areas of resilience relevant for civil protection, as well as on measuring and monitoring of progress towards the Union DRG's.
- Besides enhanced scenario-building capability, the development of Union DRG's in the field of civil protection will also benefit from the broader Commission's work in the field of resilience (i.e. strategic foresight, dashboards). Existing methodologies and tools should be adapted, further developed for use in the field of civil protection.
- Experiences and best practices from existing international resilience frameworks, such as the Sendai Framework for Disaster Risk Reduction and NATO baseline requirements for national resilience, need to be taken into account when designing and developing Union disaster resilience goals.

Contribution of research projects:

- Contribution of research projects to operational disaster resilience concepts for different levels of governance and their translation into policy recommendations and application to practical solutions should be enhanced.
- Both disaster risk reduction and post-disaster recovery offer significant opportunities to build resilience. Systems analysis and creative design thinking – which together comprise 'systemic design' - is required to address the complexities and uncertainties to build resilient landscapes and communities.
- The emerging Knowledge Network and in particular its Science Pillar will be instrumental to support and contribute to systemic gathering on knowledge (both on the process and content) relevant for disaster risk reduction and the Union Disaster Resilience Goals.

SESSION 5 - Co-designing the Science Pillar - Polling (slido)

Around 100 individuals followed Session 5, which for the first time introduced to a wider audience the concept of the Science Pillar of the Union Civil Protection Knowledge Network (UCPKN). It was also an opportunity to launch the discussion about the needs of the scientific, operational and policy-making community that the Science Pillar could address in the future. Several initiatives and projects that are already funded by the Network or are relevant to its mandate were also presented to illustrate the potential contribution of the UCPKN to the science-policy-operations interface.

1. Welcome & Introduction

Dr Felix Bloch, Head of Unit ECHO.B3 Knowledge Network and Evidence-Based Policy, opened the session by inviting everyone to the Knowledge Network Day due to take place virtually on December 7. The event will be a celebration to mark the official launch of the UCPKN. He then introduced objectives of the session, presented key ideas behind the Science Pillar and invited the speakers to introduce relevant existing initiatives taking place within the framework of or closely related to the Knowledge Network.

2. Presentations

Dr Nicola Rebori, Senior Researcher and Project Manager at the CIMA Research Foundation (Italy), presented one of the outcomes of the ROADMAP project working to establish a European Observatory on Disaster Risk and Crisis Management Best Practices, i.e. the Solutions Explorer. The tool is meant to be an open-source web platform that hosts good practices in DRM available at different governance levels (local, regional, national and international). With time, the project consortium is planning to open the tool to external institutions and experts who will be allowed to upload other relevant solutions and good practices, following a proper ontology. ROADMAP project is funded under Knowledge Network Partnerships 2020 call.

Dr Christine Eriksen, Senior Researcher at the Center for Security Studies of the Swiss Federal Institute of Technology in Zürich, presented the background and outcomes of the study that her team conducted for the Federal Office for Civil Protection in Switzerland: “An Evaluation of Switzerland becoming a Participating State of the European Union Civil Protection Mechanism”. It was an example of how the academia can provide scientific evidence-base for political decision-making, based on long-standing partnership between the university and the authorities on different level (federal, cantonal). The study, with empirical evidence collected through national level surveys, international level interviews, operational level surveys and a systematic review of published literature, provided an overview of short- and long-term costs and benefits of Switzerland’s potential participation in the UCPM.

Dr Panayiotis Kolios, Research Assistant Professor at the KIOS Center of Excellence of the University of Cyprus, provided an overview of the ARTION project, which aims to bridge the gap between artificial intelligence (AI) scientists and disaster management experts and build capacity and competency of first responders in the use of AI technology. He referred to ongoing research activities (e.g., development of machine learning (ML) tools for key challenges identified by first responders), field exercises conducted to collect data and train ML algorithms, as well as training sessions for disaster management experts. Dr Kolios also provided a broader perspective on potential application of AI solutions in disaster management cycle, such as forecasting systems, decision-support and decision-making systems or AI-powered automated robotic devices. ARTION project is funded under Knowledge Network Partnerships 2020 call.

Lieutenant-Colonel Christophe Debray, Foreign Policy Officer at the French General Directorate of Civil Protection and Crisis Management, presented the newly launched NEMAUSUS project that aims to establish the EU centre of expertise in the area of forest/wildfires. He introduced the role of centres of expertise as a paradigm shift from empiricism to scientific evidence, an opportunity to bring different parts of the community – scientists, policy makers and practitioners – to work closer together for greater efficiency and faster response to future challenges. In its first stage, the NEMAUSUS project will focus on knowledge mapping, needs assessment and stakeholder identification, before defining organization and services to be offered by the future centre of expertise. NEMAUSUS project is funded under Knowledge Network Partnerships 2021 call.

3. Discussion

The discussion focused on the perception of the level of cooperation between scientists, practitioners and policy-makers in the speaker’s respective countries, as well as the challenges they encounter while sharing research outputs (scientists) or dealing with scientific knowledge (practitioners).

Dr Eriksen stated that one of the biggest challenges for the scientific community is insufficient feedback loop that could help improve the research process. She specified that when the scientists produce knowledge, which is then shared with the world, very little or no feedback comes back on who is reading it and who is not reading it, and why. In a similar manner, if people are reading it, it is not always known if they are using the knowledge acquired and if not, why is it the case.

Dr Nebora commented that in the case of CIMA/CI3R, some of the challenges are mitigated thanks to a close collaboration of the scientific community and the Italian Civil Protection Department. He added that long-standing dialogue helps reaching end-users and tailoring the research outcomes to their needs: it is a two-way dialogue, which requires proactive reaching out to different parts of the community.

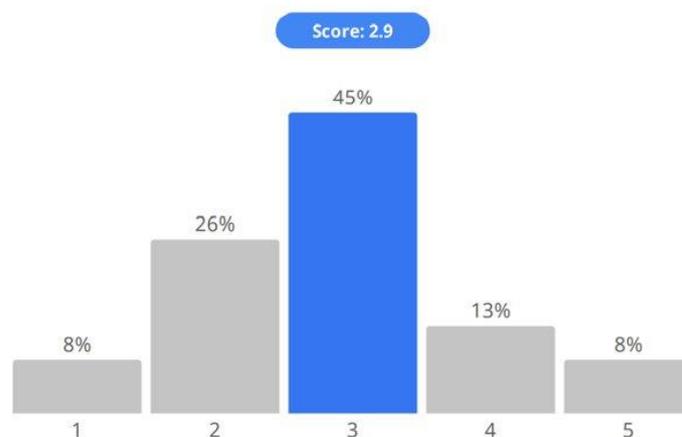
Lt Col Debray commented that from operational perspective, when faced with the huge amount of knowledge, it is difficult to access the right information at the right time, or to make a selection of what is the most relevant. He added that they are not always recipients of many project outcomes, and that a better communication on research results is needed. He emphasized the importance of dialogue with the scientific community, on different – local, national and European – levels, as the civil protection authorities need more and more scientific evidence to inform their policies. He finished by requesting the scientists to adapt their language for the purpose of efficient communication with practitioners or policy-makers.

Dr Kolios added that COVID-19 pandemic brought a unique opportunity to connect easily between different stakeholders in an online format. We should capitalize on it. In this sense, the initiative to establish a collaborative platform under the Union Civil Protection Knowledge Network could be a great opportunity to facilitate contact, share information and support inclusive approach by engaging a variety of relevant actors, from first responders, through private sector and researchers, to policy makers.

4. Audience polling: Analysis

The session was interactive and collected input from the audience on several topics, as follows.

Question 1: To what extent are you satisfied with the level of cooperation between scientists, practitioners and policy-makers in your country?



Question 2a: For SCIENTISTS/RESEARCHERS: Do you encounter difficulties in sharing your research outputs with the policy/decision-makers? What are they?

The audience identified several challenges related to sharing research outputs and their use by policy/decision-makers:

- Complexity and Uncertainty: It is difficult for the decision-makers to accept complexity of the researcher’s work, including the fact that science can carry doubts and is not always able to provide crystal-clear answers. At the same time, communicating uncertainty is challenging in itself.
- Language barrier: Scientists and policy-makers speak “different languages”, which can hinder effective communication on both the research needs and the research outcomes. Dedicated training could benefit both groups. In a similar manner, most of the body of knowledge is created in English, while many policies are implemented in local languages.
- Different speed / timeline: Research needs time, while policy agendas move very quickly. In the civil protection and disaster management field, emergencies dictate the pace of political decisions and

science input is not always ready to be shared. When it is available, it seems like the policy-makers, perhaps due to their busy schedules, have little time to listen to research outputs.

- Missing feedback loop from end-users: Scientists rarely receive feedback on who reads and uses research findings, and then why anyone does or does not read/use it and how. It is difficult to evaluate what has been successful and where improvement is needed.
- Lack of / insufficient opportunities to share knowledge: It is difficult to ensure that key findings of research outputs are known to policy/decision-makers (even if published, including in scientific journals). At times, sharing knowledge or researcher perspective is limited to closed scientific groups – there is not enough space in the public

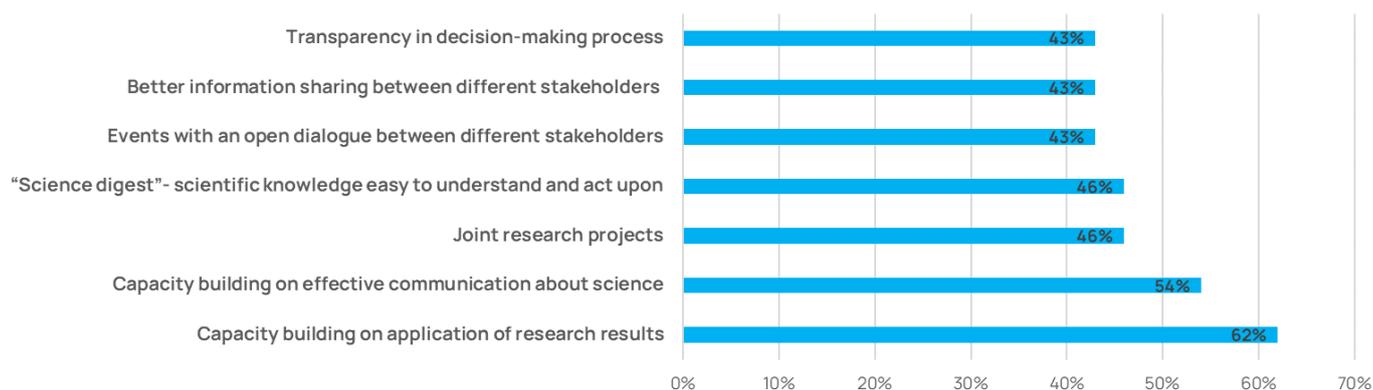
At the same time, several participants indicated positive examples of close collaboration between academia and national authorities (Italy, Sweden), where the latter facilitate exchanges with end-users but also provide feedback on the research results.

Question 2b: FOR POLICY-MAKERS/PRACTITIONERS: Do you encounter challenges when dealing with scientific knowledge? What are they?

Interestingly, the second part of the audience identified similar challenges related to the use of the scientific knowledge:

- Complexity and Language barrier: It is sometimes difficult to understand complex scientific findings, let alone communicate about them and spread them to a wider audience. Scientific results are at times too theoretical and need to be adapted to a more operational level, so that they can be easily applied by end users.
- Different speed / timeline and Accessibility: The science is often not available on short notice and “usable” enough. It takes a significant amount of time to sift through the body of knowledge and find the appropriate knowledge among all the information available. At times, existing scientific outputs are not known or accessible to policy-makers.
- Resources: Insufficient resources to engage in dialogue with researchers, due to more operational focus as a priority. Similarly, many research initiatives are project-driven and not sustainable.

Question 3: What kind of activities would facilitate the science-policy interface and help you address some of the challenges you mentioned earlier?



Majority of the audience members indicated capacity-building activities for both practitioners – on application of research results in operations and policy-making (62%) and for scientists – on effective communication about science (54%) as priority areas for the involvement of the Science pillar. Additional opportunities for collaboration (46%), dialogue and exchange of information (43%) between different stakeholders were also considered as important. In addition, event participants noted importance of providing scientific outcomes in a format easy to understand and act upon (46%) and transparency in decision-making process, as a way of knowing as to what research is needed and when (43%).

Question 4: What do you consider to be a knowledge/research gap in the area of civil protection and disaster (risk) management?

The survey participants indicated several gaps in the area of civil protection and disaster (risk) management in need of further investigation. Notably, while they covered topics across the entire DRM cycle, the biggest number of respondents indicated prevention as an area of specific interest. The topics included:

- Multi-risk approaches in disaster risk management (with a focus on risk assessment),
- Harmonized quality data and risk analysis approach,
- Establishment and quantification of compounded risks,
- Effective communication between authorities and citizens (content, channels, timeliness, accessibility, credibility, fake news etc.), especially on local level,
- Practical difficulties in application of modern and/or innovative solutions (e.g., artificial intelligence) in operational activities,
- Behavior of crowds in crisis situations,
- Impact of spontaneous volunteers and non-civil protection actors in emergency settings,
- Cooperation between different stakeholders (including with non-traditional civil protection actors) and interoperability,
- Strategies and tools to be applied for an effective local disaster response,
- Resilience as a tool to link policy/decision makers with civil protection experts, practitioners and societies.

5 Questions & answers from the audience

Questions from the audience were partly replied during the sessions. For those not replied live during the event, we summarize below the answers kindly provided by the speakers of the various sessions.

SESSION 1

Question: “What strategies exist for turning knowledge into learning? It is not that we do not know, but that we do not use what we already know”

Indeed, as emerged during the DRMKC Annual Seminar, it is not only about “knowing what we don’t know”, it is also about “learning how to use what we already know”: nowadays there is a large part of scientific information which is still not (fully) exploited due to lack of awareness, understanding and operationalization capability. The DRMKC is already moving in this direction: in the DRMKC learning corner, there are number of learning opportunities to discover. One example is the collaboration of DRMKC with the CONRIS network of universities and the Coventry University, which is hosting a series of 12 online, open-access Disaster Risk Management Training seminars between September 2021 and April 2022, to provide international, state of the art, evidence based knowledge about disaster risk management which should contribute to the quality of disaster risk management practices. As mentioned, this is only *one* example of the many more collaborations we aim to create with the interested national scientific entities in the context of the Union Civil Protection Knowledge Network’s Science Pillar. We look forward to have productive working relations ahead, supporting the elicitation of the vast DRM-related knowledge from the national scientific communities of all Member and Participating States, for the benefit of the European DRM community. In this, the sustained dialogue with the KN Board will constitute an essential element for the Science Pillar, to orient its efforts in the best possible way, i.e. replying to the MS expectations but also benefitting from their experience in translating knowledge into practice. If envisaged as useful, a calendar of appointments in which various DMR stakeholders can share their experience in operationalizing DRM knowledge could also be organized.

Question: “What pragmatic lessons for the EU policies were drawn from this year dramatic floods in Rhine river basin?”

We can refer to this paper which summarizes main lessons learnt from the floods in 2021 in EU: <https://www.mdpi.com/2073-4441/13/21/3016>

The findings are based on comparisons with findings from previous research projects carried out in the Rhein-Erft Kreis and the city of Cologne, as well as on discussions with operational relief forces after the 2021 events.

The main disaster aspects of the 2021 floods are related to issuing and understanding warnings, a lack of information and data exchange, unfolding upon a situation of an ongoing pandemic and aggravated further by critical infrastructure failure. Increasing frequencies of flash floods and other extremes due to climate change are just one side of the transformation and challenge that Germany and neighboring countries are facing. The vulnerability paradox also heavily contributes to it; German society became increasingly vulnerable to failure due to an increased dependency on its infrastructure and emergency system, and the ensuing expectations of the public for a perfect system.

SESSION 2

Question: “Today the issue of terminology resonate, as an obstacle to knowledge sharing. What the science pillar can do to disseminate a common set of definitions?”

DRMKC has worked on a preliminary reference list of terms for DRM, which was shared for review with the 12 Directorates Generals represented in the DRMKC Community of Practice last autumn. After the Annual Seminar, a first interlocution took place with UNDRR and Public Health England, as a follow up of the presentation of the “UNDRR/ISC Hazard Definitions and Classification Review and the Hazard Information Profiles”, to understand the interest for a collaboration of the topic.

Among the DRMKC plans for 2022, there is the development of a common taxonomy for Disaster Risk Management -encompassing hazard classification and the entire DRM cycle, including disaster impacts- in collaboration with DG ECHO and DG HOME (which expressed their interest in the endeavor), UNDRR, Public Health England and WHO. The possibility to join in the effort will remain open for other stakeholders.

The aim is to develop a common taxonomy that can be used across the different tools and systems developed in the context of the DRMKC and the KN: project explorer, gaps explorer, KN platform, DRMKC website, etc.

Question: “It has been said that knowledge translates in lessons learned if we experience the solutions on the field. Can science help in co-design exercises?”

It will be crucial to establish a close, coordinated and intense collaboration between the Knowledge Network Science Pillar and the Capacity Building pillar one: the lively discussion occurred at the DRMKC 5th Annual Seminar (see full video recording of the event in [DRMKC website](#)), highlighted in fact that the practitioners/science interface is not less important than the policy makers/science one, on the contrary! The managing experience of professionals, in handling an upcoming/ongoing disaster, is the only way to proof-test the usefulness of our policies and of our science and to orient all efforts based on the evidence of what worked and what not. Therefore, the answer is YES, we will work to support the design of civil protection exercises! One way could be to provide solid scientific bases to the exercise’s reference scenarios and plausible injects in terms of event’s development over time and space. Another possible collaboration could foresee, in the exercise context, the test of pre-operational services or the training on already operational ones. The JRC Crisis Room could also be fully exploited for supporting civil protection exercises of all levels: from tabletop to command post and even full scale exercises. The JRC Crisis Room is a facility that is already used by the Commission to analyze upcoming/ongoing events. The Crisis Room has just been renovated, is one of the JRC Laboratories and, as such, will be at the disposal of interested Member States to co-organize, together with JRC experts, on-site and/or virtual exercises from remote. These are just some initial ideas, but more can be conceived together with the KN Board members, as we go along.

Question: “@Roger: you said that as scientists, we have the tools & knowledge to analyse/understand complex problems. How do you communicate this complexity efficiently to decision-makers”

There is a sender and receiver perspective. What we need is a better science literacy in our society in order to understand and value what scientists are communicating (e.g. uncertainties). Scientists and experts on the other hand need to focus on developing clarity and empathy. Good communication skills deter conflict and create a sense of collective endeavor.

Question: “@Nicole&Maarja: the present covid-19 crisis indicates an important mistrust of scientifically based decision-making. How you contribute to the discussion combating complot theories and fake news?”

The fundamental problem with misinformation is that once people have heard it, they tend to believe and act on it, even after it’s been corrected. WHO for example, lists “Go Viral!” as a resource for tackling online misinformation and has featured the game in its newsletters. One way in my view to address misinformation is to encourage people to reflect on the veracity of claims they encounter, which brings me back to the need of an improved science literacy in our society.

Question: “@Nicole&Maarja: what do you think of the use of pathways and scenario to better understand compound and cascading hazards?”

I think that communicating in scenarios significantly influences decision-making and contributes largely to raise awareness, especially when the dispersion of outcomes is presented in a way that the receiver is considered and finds himself in the scenario/pathway.

SESSION 3A

Question: “We know that individual actions and changings could impact a lot. If there are now global ideas and goals, are there also some sharable todos for individuals and households? I think could be useful to involve directly the citizens avoiding lobbys.”

- This is mainly a mandate of national authorities. There are good examples of public campaigns, such as the Io Non Rischio campaign in Italy. <https://iononrischio.protezionecivile.it/en/homepage/>
- There is a lot that individuals can do across the whole "DRM cycle" meaning related to prevention, preparedness and response. For prevention - individuals can ensure to keep their homes in good condition (well-maintained), invest in making their home more resilient (e.g. making sure their drains are clean, have anti-reverse flow features, etc). For preparedness and response - there is lot of guidance such as checklists, etc (see for example FEMA https://www.fema.gov/pdf/areyouready/basic_preparedness.pdf), but it’s not just having an emergency

kit but also making sure you are informed about risks and what to do, which source of information to follow (app, etc), and ensuring those around you have this information too. For response/recovery - making arrangements ahead of disasters, such as having insurance, understanding the terms of conditions, having back up provisions, etc.

Question: "We have been talking about hazards, disasters, economics and foresights. How much was the human behavior considered in these studies? To make my question more concrete with an example: how much the resistance of large groups of people to be vaccinated was considered or should have been considered?"

- In Chapter 4 "Communicating Risk" of the DRMKC book "Science for Disaster Risk Management 2017", several authors discuss about the role of citizens and their behavior. There are concrete recommendations on how to communicate better, including "shift[ing] from a top-down, 'one size fits all' approach to a more democratic, engaged and inclusive one". Read more here: <https://drmkc.jrc.ec.europa.eu/knowledge/science-for-drm/science-for-disaster-risk-management-2017>
- Human behavior - reaction to risk information, to warnings, etc. has been studied a lot especially in the context of early warning. Scenarios often consider situations such as 30% of population will follow advice, what could be the damages/consequences. Also, often warning messages are evaluated/assessed by focus groups to understand their "effectiveness" to communicate potential impacts and actions that recipients need to make. Related specifically to vaccination - WHO provides lot of guidance to policy-makers with various reports online; specifically to COVID - there is a monitor in place which studies different reactions/hesitancy and provides specific advice to public institutions how to approach different groups of people. https://worldhealthorg.shinyapps.io/EURO_COVID-19_vaccine_monitor/

Question: "How is it possible to use scenarios not only for single hazards but also for multi-hazard analysis?"

- Scenarios are a set of assumptions on many aspects of disasters. Besides hazards, scenarios can assume differences in exposure, vulnerability or coping capacity, which are valid for any hazard. One can design a scenario, for example, where power fails for a number of days, independent on the hazard that caused it; or on co-occurrence of hazards (cyclone, during COVID-19 surge, and earthquake). See also the Chapter on multi-risk in the DRMKC book "Science for Disaster Risk Management 2017" https://drmkc.jrc.ec.europa.eu/portals/0/Knowledge/ScienceforDRM/ch02/ch02_subch0205.pdf
- There is a range of scenarios and some can be very complex and take into consideration many parameters - this is a good resource to understand different types of scenarios: https://lighthillrisknetwork.org/wp-content/uploads/DRR_DevelopingScenarios.pdf

Question: "How do we get public and politicians to accept and interact with experts?"

- In Chapter 4 "Communicating Disaster Risk Among All" of the DRMKC book "Science for Disaster Risk Management 2020", several authors discuss "how good, granular and effective communication plays a paramount role in strengthening cohesion between all the stakeholders involved in order to deal with the risks in their territories". Read more here: <https://drmkc.jrc.ec.europa.eu/portals/0/Knowledge/ScienceforDRM2020/Files/ch04.pdf>
- Personally, I think it should be made part of their mandate - institutions should have specifically part of their responsibilities interaction with scientific community - in the forms of working groups or advisory bodies, and these should be organized in a transparent and accountable manner. Also, executive trainings/workshops on important topics should be provided. For example, some countries (e.g. New Zealand) engage media and journalists specifically on disaster risk so the members of media have solid baseline understanding and can then help communicate messages of public authorities; something similar could be done also for policy-makers (See here example of media guides: <https://www.civildefence.govt.nz/media/media-resources/>)

Question: "How much is difficult to consider the cascading effects (a failure of critical infrastructure, unsolved vulnerabilities) in an analysis like this?"

It can be very difficult to consider high-impact or cascading impacts especially when linked to low probability events with very large impacts (for example nuclear industry risks). There are however several example of cascading impacts scenarios, some of these are also considered by countries' national risk

assessment profiles. It depends case-to-case, but sometimes also other decision tools may be helpful- such as "cost-effectiveness", "robust decision-making" and "what-if" scenarios may be used. Some investments can be also considered "no regret" given the potential large impact of such a failure.

See also the Chapter on multi-risk in the DRMKC book "Science for Disaster Risk Management 2017" https://drmkc.jrc.ec.europa.eu/portals/0/Knowledge/ScienceforDRM/ch02/ch02_subch0205.pdf

SESSION 3B

Question: "@Nic: how in your model you deal with hosting country policies and actions, which may greatly influence the humanitarian crisis (see a present crisis on Poland/Belorussia border)?"

Making credible assumptions on host countries, therefore having a deep knowledge about the context and the politics of the country considered. Moreover, knowledge of the place's modern history and culture is crucial. This would help you making better assumptions about what could potentially happen. Therefore, sciences like anthropology and sociology should have a voice in your scenario building process.

Question: "Have DG Echo already some idea how to consider/highlight the interconnectivity between the different scenarios? Usually analysis are quite flat and it's difficult to show the connections

DG ECHO is still in an early stage- indeed the idea would be to consider interconnectivity- right now we do not have sufficient scenarios. Will consider sub-scenarios in bigger ones. Interconnectivity can be considered from the perspective of common assets to be protected.

Question: "How do you transfer lessons learned in the Expert Group to lessons learned in practice - i.e. things change on the ground / in the country. Learning lessons in reality is very difficult"

DG ECHO has a lessons learned program, for example next week the workshop on forest fires of 2021 is scheduled. We should make an effort to translate the input from that programme into concrete actions including timeline building on the observed trends in Forest Fires and in light of the increasing impacts related to climate change : https://ec.europa.eu/commission/presscorner/detail/en/IP_21_5627

SESSION 4

Question: "Could you provide any more information on how 'vulnerable groups' are defined? Which aspects of vulnerability are considered? Thanks!"

RESILOC did an assessment of vulnerability, i.e. developed a relative vulnerability community index as a derived indicator to be integrated in the scenarios. "Community" is not only a local authority- it is a group of people with similar and common interests-process of assessing resilience. Each community can identify the targets through the platform developed in RESILOC, based on local awareness.

Question: "Resiliency might be sum total from individual - local community - region - national - EU resiliencies. Is there a plan to develop resilience dashboards for all and each of the above-mentioned levels?"

We need to have targets. However sometimes it is difficult. Sometimes we use relative approaches- participatory approach involving academia and citizens and decision makers for defining resilience, there is no political consensus on what is good/bad, what is high/low...so for indicators design we can start from a COMPARATIVE approach among countries. Over time the idea could be to extend the dashboard at country level: look at cities / at community level, but this is not foreseen in the immediate future.

Question: "for RESILOC: are you considering the possibility to study transboundary scenarios? e.g. for Gorizia it could be relevant. The EU BORIS project <https://www.borisproject.eu/> will study transboundary risk (for seismic and flood risks) for pilot area involving Gorizia. It would be good to connect"

Scenarios will include transboundary impacts- there are different political agendas across different communities.

SESSION 5

Question: "@Nicola: which is the philosophy on the background of the interoperability of your platform?"

The ROADMAP project, by developing the Solution Explorer, aims at implementing a shared and dynamic catalogue of disaster risk and crisis management good practices, in compliance with the most common standards and guidelines in matter of data interoperability among software platforms and services. The interoperability will be achieved by developing dedicated API (HTTP REST API or XML Web services

according to project requirements and constraints), published on the web and allowing authorized 'consumers' to perform actions on accessible data according to their permissions: all authorized users will be able to browse the platform catalogue and retrieve the information of interest, while only 'super users' will be able to add, update or delete the stored data. The ROADMAP platform API will also be able to interoperate with other platform (e.g. JRC platforms) in order to share a common Disaster Risk Management Knowledge framework, with common glossary and policies.

Question: "@Nicola: interoperability needs to be fed. Ho to ensure the sustainability of the tool proposed?"

The ROADMAP project will ensure the sustainability of the Solutions Explorer by 1) linking it with well established databases available within DRMKC (e.g. Gaps Explorer, Project Explorer) and related initiatives (e.g. DRIVER+ Portfolio of Solutions) and 2) Further develop it in new projects and initiatives.

Question: "@Christine: do you think that a evidence - based study and a data assessment can be sufficient for the decision making-process? In general, you can identify some others "ingredients"?"

Detailed research data that is analyzed by trained social scientists, who have an in-depth understanding of the topic they are researching, is a core part of an evidence-based study. The evidence-based study as a whole is intended to provide policy-makers and practitioners with detailed insights about - in the case I presented on - cultural, political, and systemic issues that influence their work. This can then inform their decision-making process. It is never intended to be the only piece of evidence. Rather together with the policy-makers and practitioners broader knowledge, it can lead to informed decision-making. Evidenced-based studies aim to provide a much greater level of insights into, e.g. social vulnerability and systemic hurdles, than most civil protection agencies have access to or understand through their daily work.

Question: @Christine: what do you think - will or will not Switzerland join the UCPM?"

Time will tell.

Question: "@Liutenant Debray: do you think that it can be possible that the establishment of centres of expertise can create a sort of competition between Authorities, with negative effects ("I collaborate and I will be part of the network only if the Centre is in my territory")"

This is an identified risk that we will address during the NEMAUSUS project as part of the partnership search. We insist during our advocacy on the European dimension of the centers of expertise and their integration as part of the knowledge network of the UCPM. This seems to be very well understood by the actors we met for the moment. On the other hand, the center of expertise will be connected to other facilities in the member states that will volunteer and some actions could be carried out in these countries under the umbrella of the center and the knowledge network. It will therefore be a question of creating a network within the Union, with its center of gravity in one of the Member States.

6 Key messages from the discussion

During the Annual Seminar, we could count on active participation of representatives from more than 40 countries, following different sessions and engaging in lively discussions through many interesting questions and comments. Many more joined us through livestreaming. The input from the audience was extremely valuable to understand the expectations of the community and of the UCPM Member and Participating States and to guide our challenging but exciting next steps.

*DRMKC will work to become the reference knowledge center for all Members and Participating States, engaging with them to **co-design a Science Pillar which will be owned, implemented and productively used by all***

The Implementing Act of the Knowledge Network put DRMKC at the core of its Science Pillar. We are already at work to make this transition happen: from a mainly internal knowledge center of the Commission, co-chaired by JRC and DG ECHO and coordinating the DRM efforts of 12 policy directorates general, the DRMKC is ready to become the reference knowledge center for all Members and Participating States. We look forward to have productive working relations ahead, supporting the elicitation of the vast DRM-related knowledge from the national scientific communities across the UCPM, for the benefit of the European DRM community.

Only by proactively sharing our respective knowledge and know-how, collaboratively mapping our standing needs and jointly creating new synergies, we will be able to build a Science Pillar which will be owned and productively used by all of us.

*It is not only about "knowing what we don't know", it is also about **"learning how to use what we already know"***

As emerged during the Annual Seminar, it is not only about "knowing what we don't know", it is also about "learning how to use what we already know". Nowadays there is a large part of scientific information which is still not (fully) exploited due to lack of awareness, understanding and operationalization capability.

We are already trying to move in this direction. For instance, DRMKC collaborates with the CONRIS Network for Risk, Safety & Security Studies and the Coventry University, which is hosting a series of [12 online, open-access Disaster Risk Management Training seminars](#) between September 2021 and April 2022. They provide international, state of the art, evidence-based knowledge, which should contribute to the quality of DRM practices. As mentioned, this is only one example of the many more collaborations we aim to create with the interested national scientific entities in the context of the Knowledge Network's Science Pillar.

Finally, it will also be crucial to establish a close collaboration with the Capacity Building Pillar of the Knowledge Network. The discussions during the Annual Seminar highlighted the fact that the practitioners/science interface is equally important as the policy makers/science one. The experience of professionals in handling disasters is the only way to proof-test the usefulness of our policies and scientific concepts and orient all future efforts.

The local level is where science and policies meet reality. It is crucial to have local communities represented and engaged in the work of the Science Pillar.

It is crucial to have local communities represented and engaged in the work of the Science Pillar. Failing to address the local dimension of Disaster Risk Management and Reduction means failing to translate

science and knowledge into practice. Therefore, we will treasure the contribution of local stakeholders to the debate and exchanges within the Science Pillar!

At the Annual Seminar, for example, we made sure to have this point of view represented among the invited speakers. In the session “Science for Union Disaster Resilience Goals” we had the project coordinator of “Resilient Europe and Societies by Innovating Local Communities” (RESILOLOC) sharing how the project is helping to translate global concepts and frameworks, like the Sendai Framework targets, into something applicable and useful at local level, to assess and improve the resilience of local communities.

Some of the DRMKC tools are already being adapted to address the local level. The [INFORM risk index](#), a global, objective and transparent tool for understanding the risk of humanitarian crises and disasters, is updated into a subnational version for Caucasus and Central Asia (8 countries) and for South Eastern Europe (3 countries). It will help develop a common understanding of the root causes of risk and improve DRR strategies at the regional and national level for a long-term risk reduction perspective.

Another example is the [Risk Data Hub](#), a geographic web platform that presents pan-European data and methodologies for disaster risk and vulnerability assessment. It is designed to include in the analysis also local data and, to a limited extent, it already does so: by clicking on a country in the web platform, one can focus on its administrative divisions. There is also a possibility for customization under a profile with restricted access: each interested user from national authorities can acquire such type of access and make use of the Risk Data Hub in its own way. By uploading their data, they can then visualize and analyze it in conjunction with all those that are already present in the platform, as, for example, Austria did in the past.

Need to “deliver” scenarios and, in general, DRM knowledge. This is the secret ingredient!

At the core of the Knowledge Network Science Pillar, DRMKC will facilitate the engagement of all DRM stakeholders interested in contributing to its development and to further developing the partnership pillar.

Starting from the existing products and services, the aim is to expand the Science Pillar into an open community where each and everyone can suggest additional components, trigger new scientific debates and, collectively, shape its future development, for example:

- supporting the development of the Disaster Resilience Goals for the Union, assisting in their the implementation in measuring and monitoring them,
- identifying and analyzing causes and drivers of risks, enhancing early warning systems,
- developing realistic future risk scenarios.

The above are all current challenges where the role of Science is fundamental and where the Science Pillar can make a significant difference.

7 Conclusions

The 5th Annual Seminar was for us only the beginning of a sustained dialogue. The outcomes of this event, all comments and suggestions, are carefully considered in the ongoing design of the roadmap of Union Civil Protection Knowledge Network Science Pillar.

At the seminar, we discussed some of the current hot-topics for DRM, like the definition of the Union Disaster Resilience Goals and the design of transboundary, cross-sectorial, challenging scenarios to test them against in the coming years. In this, **we should be guided by the idea of “thinking the unthinkable”**: we should not stop at what we have experienced in the past, we should go beyond and reason around what this new society, with its new threats – and combinations of them – might bring us to cope with in the future.

Both COVID-19 pandemic and the developments of the climate change impacts are clear signs for the need to go beyond what is considered probable, to be prepared also for what is only plausible. However, **to be so visionary, we need everyone’s engagement.**

We are building our first ideas for the roadmap of the Science Pillar around the results of the DRMKC Annual Seminar. But we also hope it to be **a continuous exchange with the scientific community, the practitioners and the policy makers, with opportunities to co-shape it as we go along.**

8 Annex – details of the agenda

Below is the detailed agenda of the two days. The event was recorded and videos of the two days are available on the DRMKC website: <https://drmkc.jrc.ec.europa.eu/events-news/drmkc-annual-seminars/5th-drmkc-annual-seminar>.

Wednesday, 17 November 2021

9:30 - 10:00

Opening remarks from Directors of JRC, DG ECHO and Slovenian Presidency

Chair: Alessandra Zampieri

Head of "Disaster Risk Management" Unit, JRC.E.1 - European Commission

Introductory remarks from the co-chairs of the Disaster Risk Management Knowledge Centre, the Joint Research Centre and DG European Civil Protection and Humanitarian Aid Operations, as well as the Slovenian Presidency, contextualizing the Annual Seminar in the roadmap to implement the Civil Protection legislation.

Stanislav Lotrič

Deputy Director General of the Administration of the Republic of Slovenia for Civil Protection and Disaster Relief

Dan Chirondojan

Director for "Space, Security and Migration", JRC.E.1 - European Commission

Peter Billing

Head of Unit of "Security and Situational Awareness", ECHO.A.3 - European Commission

Julia Stewart-David

Acting Director for "Disaster Preparedness and Prevention", ECHO.B - European Commission

SESSION 1

10:00 - 11:30

SESSION 1 - Looking back: 5 years of knowledge management

Moderator: Liviu Stirbat

Deputy Head of "Adaptation" Unit, CLIMA.A.3 - European Commission

The DRMKC was launched in 2015 and has fueled interdisciplinary, cross-sectoral and transnational dialogue. The many partners of the DRMKC have contributed to and benefited from the knowledge shared and created through the Knowledge Centre, for example through more integrated research, more coherent policy, and better analysis for operations. This session will look back at what has been achieved, and which challenges are remaining.

Setting the scene: "Overview of what we know" and of "what we know we don't know"

Christina Corbane

Leader of the "Disaster Risk Management Knowledge Centre" team, JRC.E.1 - European Commission

Supporting DRR policies through research and networking - Horizon Europe and CERIS

Philippe Quevauviller

Research Programming and Policy Officer, HOME.DDG2.B.4 - European Commission

Building a climate-resilient Europe through the Mission on Climate Adaptation

Johannes Klumpers

Senior Expert for "Adaptation", CLIMA.A.3 - European Commission

Science related activities of UNDRR and expectations of the European Forum for Disaster Risk Reduction

Sebastien Penzini

Regional Deputy Chief at United Nations Office for Disaster Risk Reduction

Panel Discussion

Q&A

SESSION 2

11:30 - 12:45

SESSION 2 - Research Gap: compound, cascading and concurrent hazardous events

Moderator: [Andrea Toreti](#)

Leader of the "Droughts" team, JRC.E.1 - European Commission

Dealing with compound, cascading and concurrent hazardous events remains challenging. In this session, we review the current understanding and recent research findings, with a specific focus on good practices to include them in national risk assessments. The session will also open a dialogue on approaches for managing compound disaster risks.

UNDRR/ISC Hazard Definitions and Classification Review and the Hazard Information Profiles

[Virginia Murray](#)

Member of Integrated Research on Disaster Risk (IRDR) Scientific Committee

Thinking beyond borders: multi-hazards, national borders, transferring scientific knowledge into practice

[Christian Resch](#)

Managing Director of Disaster Competence Network Austria DCNA

Research challenges in drought risk assessment including confounding factors

[Roger Pulwarty](#)

Senior Scientist in the NOAA Physical Sciences Laboratory at the NOAA Office of Oceans and Atmospheric Research in Boulder, Colorado

Science Advice Mechanism: a systemic approach to providing advice for crisis management

[Nicole Grobert](#)

chair of the Group of Chief Scientific Advisors

[Maarja Kruusmaa](#)

co-leader of the crisis topic within the Group of Chief Scientific Advisors

Panel discussion

Q&A

12:45 - 14:15

Lunch Break

SESSION 3

14:15 - 17:00

SESSION 3 - Science for Scenario Building

The new civil protection legislation calls for the development of scenarios. This session will look at the science behind scenarios, reviewing existing methodologies and processes, and discussing uncertainty on emerging and future risks. Two different types of disaster scenarios will be addressed: 1) Foresight scenarios for prevention which are of concern for long-term views of sustainable development and 2) Operational scenarios for preparedness which consider disaster events, which trigger severe, acute impacts and human, physical, economic, and or environmental loss.

Session 3 a: Foresight scenarios for prevention

Moderator: [Tom De Groeve](#)

Deputy Head of Unit of "Disaster Risk Management", JRC.E.1 - European Commission

New EEA interactive report in cooperation with C3S provides up-to-date information on Europe's changing climate hazards

[Hans-Martin Füssel](#)

Expert - Climate change vulnerability and adaptation, European Environment Agency (EEA)

PESETA IV scenarios of disaster risk in the EU

[Luc Feyen](#)

Project Officer - Scientific Research in "Economics of Climate Change, Energy and Transport", JRC.DDG2.C.6 - European Commission

Economics of Disaster Prevention and Preparedness

[Zuzana Stanton-Geddes](#)

Disaster Risk Management Specialist with the World Bank's Europe and Central Asia region

2021 Strategic Foresight Report: Enhancing the EU's long-term capacity and freedom to act

[Grzegorz Drozd](#)

Team Leader Foresight, European Commission Secretariat General

[Fabiana Scapolo](#)

Deputy Head of Foresight, Modelling, Behavioral Insights & Design for Policy Unit, European Commission Joint Research Centre

Panel discussion

Q&A

Break

Session 3 b: Operational scenarios for preparedness

Moderator: [Peter Billing](#)

Head of Unit of "Security and Situational Awareness", ECHO.A.3 - European Commission

The SEIS-MEC WebGIS platform: real-time seismic scenarios supporting disaster risk management

[Agostino Goretti](#)

International Relations and Activities Unit of the Italian Civil Protection Department

Scenario building for humanitarian crisis

[Nic Parham](#)

Senior Analysis Advisor at ACAPS - Assessment Capacities Project

Scenario building under the recently revised UCPM legislation - A systematic foundation for evidence-based decision making

[Phillip Frank Vilar Welter](#)

Policy Officer in the Civil Protection Horizontal Issues Unit, ECHO B.1 - European Commission

Panel discussion

Q&A

Thursday, 18 November 2021

SESSION 4

09:00 - 11:00

SESSION 4 - Science for Union Disaster Resilience Goals

Moderator: [Milena Dobnik Jeraj](#)

Representative from the Slovenian Presidency of the Council of the EU 2021

The new civil protection legislation calls for the development of Union Disaster Resilience Goals. In the well-defined policy context of the Union Civil Protection Mechanism, we will discuss the available science and evidence, as well as lessons learned from existing disaster resilience frameworks, systems and tools.

Building Resilience Through Civil Preparedness: a NATO Perspective

[Khan Jahier](#)

Staff Officer, Enablement and Resilience Section Defence Policy and Planning Division International Staff, NATO HQ

Status of the work/discussions on the Union Disaster Resilience Goals - policy needs and context

[Birgit Snoeren](#)

Policy Officer in "Prevention and Disaster Risk Management", ECHO.B.2 - European Commission

Overview of Resilience tools

[Peter Benczur](#)

Project Officer - Scientific Research in "Finance and Economy", JRC.DDG2.B.1 - European Commission

Resilience at regional or local level

[Karsten Uhing](#)

Resilient Europe and Societies by Innovating Local Communities (RESILOOC) project coordinator

Design for Disaster Resilience

[John Fien](#)

School of Architecture and Urban Design RMIT University

Panel Discussion

Q&A

Break

SESSION 5

11.00 - 12.30

SESSION 5 - Co-designing the Science Pillar - Polling (slido)

Moderator: Felix Bloch

Head of "Knowledge Network and Evidence-Based Policy" Unit, ECHO.B.3 - European Commission

The seminar will conclude with an interactive session to co-design the priority actions for the Science Pillar of the Knowledge Network. It is an opportunity for the Member States, Participating States and other stakeholders of the Knowledge Centre to shape the Science Pillar. We will listen to what you think will make a difference in the world of science for disaster risk management, and how the DRMKC and Science Pillar can contribute.

Solutions explorer: a tool for searching and browsing good practices in DRM

Nicola Rebora

Senior Researcher & Project Manager, CIMA Research Foundation

Evidence-based decision-making, civil protection, and climate change in Switzerland

Christine Eriksen

Senior Researcher, Center for Security Studies, ETH Zürich

AI in disaster management: Current use and future outlook

Panayiotis Kolios

Research Assistant Professor, KIOS Center of Excellence of the University of Cyprus

The future is now: The role of EU centers of expertise

Lieutenant-Colonel Christophe Debray

Foreign Policy Officer, French General Directorate of Civil Protection and Crisis Management

Panel Discussion

Q&A

Conclusion

12:30-13:00

Conclusion and Outlook

Moderator: Alessandra Zampieri

Head of Unit of "Disaster Risk Management", JRC.E.1 - European Commission

Wrap-up from moderators of the 5 sessions.

Preparatory Working Group

14:00-16:00

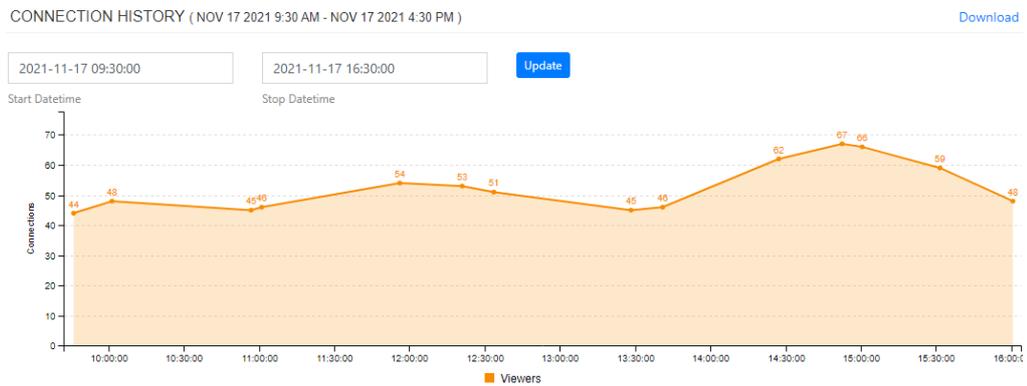
Preparatory Working Group 7th Meeting - closed session, only for invited Member States representatives

Dedicated discussion on the governance of the Science pillar (only with invited representatives of the MS/PS) within the framework of Preparatory Working Group of the UCPM Knowledge Network.

9 Annex – details of the connections to the livestreaming

Day 1

- Total connections: 552 (a viewer can generate more than one connection during the live; e.g. close and reopen the streaming page later, this counts as double connection)
- Peak viewers: 67 (max simultaneous unique viewers at a specific moment in time)
- Graph with the number of simultaneous viewers in time:
(shows the evolution of simultaneously connected (unique) viewers throughout the duration of the event, i.e. viewers connected and actively watching the Live)



Countries:

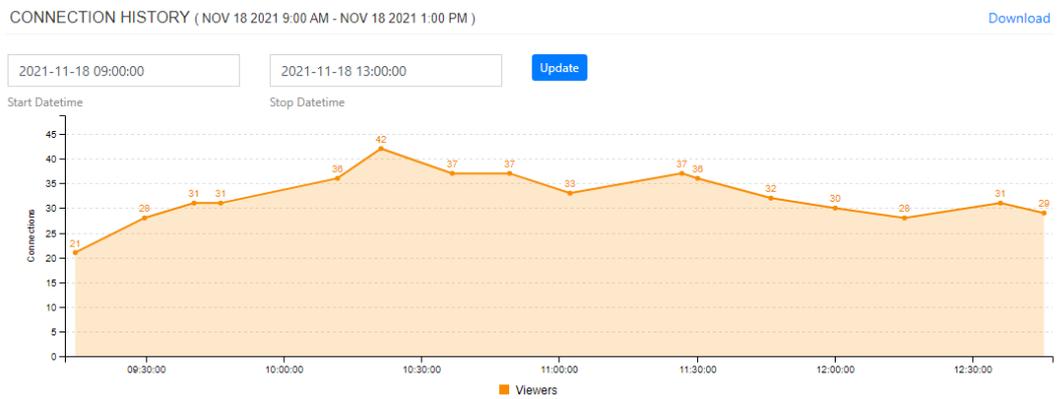
TOP COUNTRIES

Location (Show All)	Viewers
Italy	229
Belgium	43
Slovenia	29
Europe	22
Germany	22
Estonia	22

	Denmark	DK	16
	Egypt	EG	11
	Netherlands	NL	10
	Finland	FI	10
	Bulgaria	BG	8
	Montenegro	ME	8
	Poland	PL	7
	Internal	INT	6
	Croatia	HR	5
	Turkey	TR	5
	Greece	GR	5
	Romania	RO	4
	Sweden	SE	4
	Hungary	HU	4
	France	FR	3
	Cyprus	CY	3
	Latvia	LV	3
	Slovakia	SK	3
	Portugal	PT	2
	United Kingdom	GB	2
	Armenia	AM	1

Day 2

- Total connections: 165 (a viewer can generate more than one connection during the live; e.g. close and reopen the streaming page later, this counts as double connection)
- Peak viewers: 42 (max simultaneous unique viewers at a specific moment in time)
- Graph with the number of simultaneous viewers in time:
(shows the evolution of simultaneously connected (unique) viewers throughout the duration of the event, i.e. viewers connected and actively watching the Live)



Countries:

TOP COUNTRIES

Location (Show All)	Viewers
Italy	46
Slovenia	17
Belgium	14
Estonia	14
Internal	11
Spain	11

	Germany	DE	8
	United Kingdom	GB	7
	Greece	GR	7
	Europe	EU	6
	Austria	AT	5
	Poland	PL	4
	France	FR	3
	Sweden	SE	3
	Netherlands	NL	3
	Finland	FI	2
	United States	US	2
	Croatia	HR	1
	Ecuador	EC	1

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