



European  
Commission

# DRMKC BULLETIN #19

May 2020

 **D**isaster  
**R**isk  
 **M**anagement  
**K**nowledge  
 **C**entre



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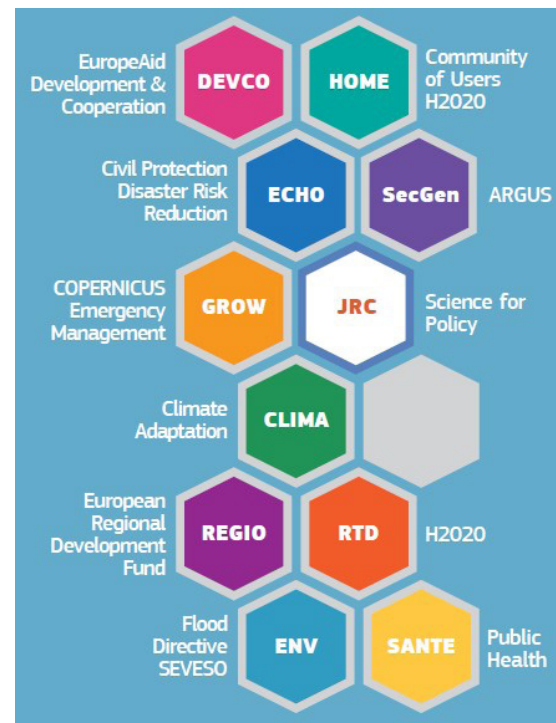
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## About this issue



As the Knowledge Centre of the European Commission that serves to support EU Member States in responding to emergencies and preventing and reducing the impact of natural and man-made disasters, the Disaster Risk Management Knowledge Centre (DRMKC) provides a networked approach to the science-policy interface in the field of disaster risk management, across the Commission, EU Member States, and relevant bodies within and beyond the EU. The DRMKC Bulletin (formerly known as the DRMKC Newsletter) is a regularly produced publication that supports the DRMKC key aims of strengthening networks and partnerships, promoting better use of available research and knowledge, and advancing technologies and capacities in DRM, by providing a regular synopsis of the latest policy-related evidence from relevant scientific activities and initiatives, carried out by the Commission and other international organisations.

The DRMKC, which is supported and coordinated by a number of Commission Services, including the Joint Research Centre (JRC), in partnership with a key network of Member States, addresses EU policy priorities such as humanitarian aid and civil protection, climate action, sustainable development, and the European neighbourhood policy (ENP) among others.

Since the start of the Coronavirus pandemic, the European Commission has been working on all fronts with unprecedented actions at national and EU level to help tackle the crisis. This wide-ranging response covers the areas of public health, travel and transportation, research and innovation, fighting disinformation, jobs and the economy, crisis management and solidarity, and digital technologies. The latest issue (i.e. #19) of the DRMKC Bulletin includes a few selected examples of that response, based on the latest information reported on a regular basis through official Commission

press releases, the DRMKC on-line news section and other sources (see web-links below).

Amongst the many other news articles featured in issue #19 of the DRMKC Bulletin, are reports on the European Commission's 2020 Evidence for Policy School on Disaster Risk Management, recent developments of the Copernicus Emergency Management Service's two on-demand mapping modules (i.e. Rapid Mapping and Risk & Recovery Mapping), the Commission's various activities in the area of wildfire management in Europe and Australia, and in the field of European and international standards and policies for the construction sector; and the latest news from the EU Horizon 2020 project PLACARD (Platform for Climate Adaptation and Risk Reduction).

We wish you an informative and enjoyable read of the latest issue of the DRMKC Bulletin!

The DRMKC Bulletin Editorial Team

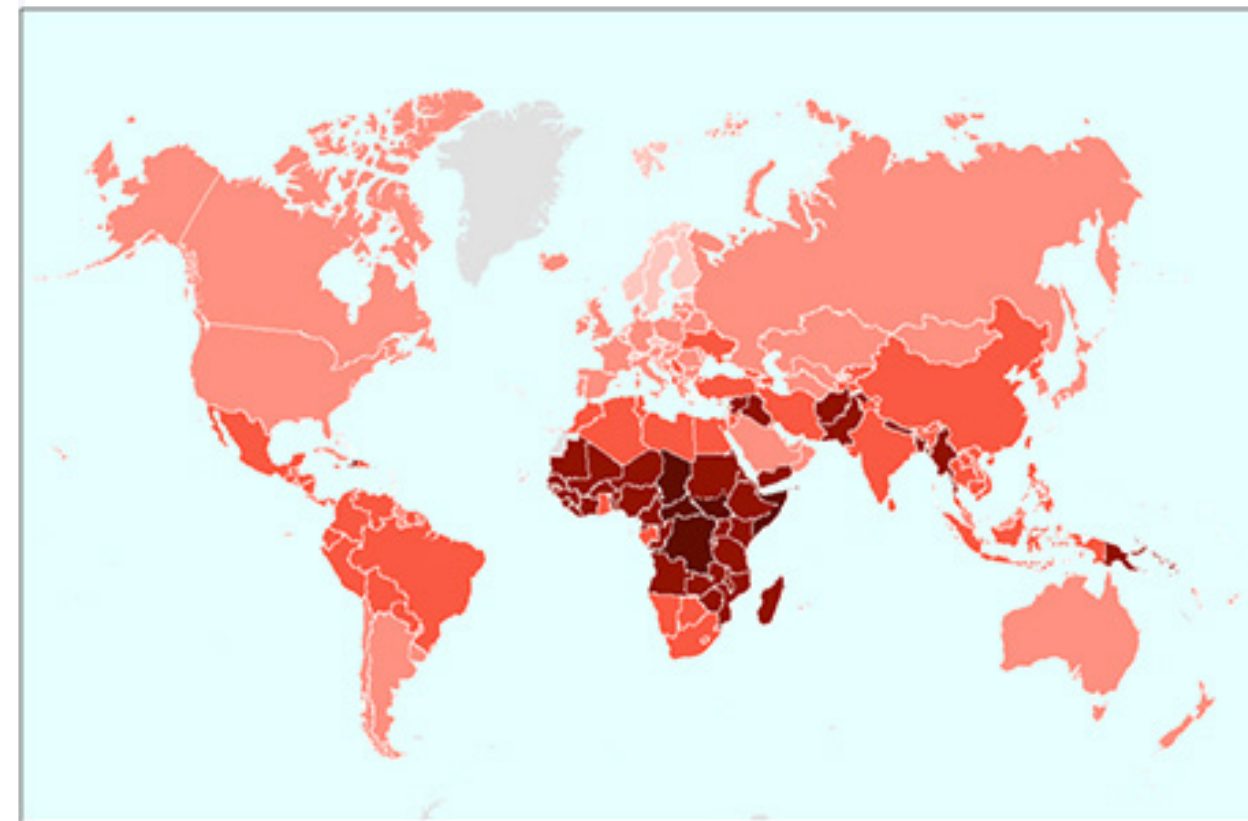
For more information:

[https://ec.europa.eu/info/live-work-travel-eu/health/coronavirus-response/overview-commissions-response\\_en](https://ec.europa.eu/info/live-work-travel-eu/health/coronavirus-response/overview-commissions-response_en)  
<https://drmhc.jrc.ec.europa.eu/overview/COVID-19>  
<https://drmhc.jrc.ec.europa.eu/overview/Newsletter>



## JRC implements experimental INFORM COVID-19 Risk Index

Developed by the European Commission's Joint Research Centre (JRC), the **Index for Risk Manage-**



Very Low Low Medium High Very High Not included in INFORM

**ment (INFORM) Global Risk Index (GRI)** is a widely recognized and valuable tool for multi-hazard risk assessment that identifies countries at risk of humanitarian crisis and disaster. A prototype version of the hazard-dependent INFORM GRI, the **INFORM Epidemic Risk Index**, was developed under the JRC's technical lead in close collaboration with the World Health Organization, in order to assess the risk of countries to epidemic outbreak that would exceed the national capacity to respond to the crisis. The INFORM Epidemic Risk Index has been adapted to reflect better the COVID-19 pandemic.

The INFORM Epidemic Risk Index is based on the traditional "epidemiologic triad" (i.e. an external agent, a susceptible host, and an environment that brings agent and host together), and covers four groups of infectious diseases: (a) zoonoses (i.e. naturally transmitted between animals and humans), (b) vector-borne (e.g. transmitted by biting insects), (c) person-to-person, and (d) food- and water-borne. Since the COVID-19 pandemic is dominated by human-to-human transmission, the "hazard and exposure" risk dimension of the INFORM Epidemic Risk Index was narrowed down to just the person-to-person (P2P) component. The adapted index is called the INFORM Epidemic P2P Risk Index.

An experimental implementation of the adapted index - the **INFORM COVID-19 Risk Index** - aims to identify countries at risk from health and humanitarian impacts of COVID-19 that could overwhelm current national response capacity, and lead to a need for additional international assistance. The new index can support prioritization of preparedness and early response actions for the primary impacts of the pandemic, and identify countries where secondary impacts are likely to have the most critical humanitarian consequences.

The primary scope of the index is for global and regional risk-informed resource allocation, where a comparable understanding of countries' risk is important. It is not designed to predict the impacts of the pandemic in individual countries.

This news item is based on a report on the European Commission's Disaster Risk Management Knowledge Centre (DRMKC) web-site, on 23 April 2020 (see web-links below).

Niall McCormick

European Commission, Joint Research Centre (JRC)

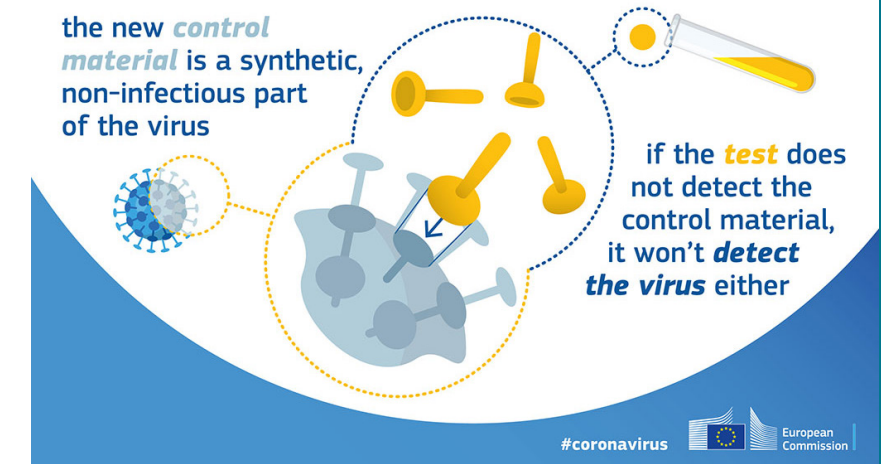
More information:

<https://drmhc.jrc.ec.europa.eu/overview/News#news/432/details/19689/new-inform-covid-19-risk-index>

<https://drmhc.jrc.ec.europa.eu/inform-index/INFORM-Epidemic>



## New positive control material developed by JRC scientists to help prevent coronavirus test failures



Timely and accurate laboratory testing is an essential part of tackling the COVID-19 pandemic. A survey of 47 laboratories in 30 EU and European Economic Area (EEA) countries, published in mid-February 2020, identified a lack of positive control materials as one of the top three challenges faced by the laboratories for the reliable implementation of coronavirus tests. On 1st April 2020 it was announced that scientists at the European Commission's Joint Research Centre (JRC) - which is one of the major developers and producers of reference materials in the world - had designed a **positive control material** to facilitate the quality control of the detection of SARS-CoV-2 (the virus strain that causes COVID-19) in testing laboratories.

In practice, the JRC-designed control material is a synthetic, non-infectious part of the virus, which allows companies producing coronavirus tests and testing laboratories to check their testing kits: if their test does not detect the control material, it

The INFORM Epidemic Risk Index, which was developed by the European Commission's Joint Research Centre (JRC) in collaboration with the World Health Organization (WHO), assesses the risk of countries to epidemic outbreak that would exceed the national capacity to respond to the crisis. The risk score ranges from zero to 10, where 10 is the highest risk. © European Commission.

The new control material, which will enable the verification of up to 60 million coronavirus laboratory tests throughout the EU, was developed in the laboratories of the European Commission's Joint Research Centre (JRC) in Geel, Belgium. ©EU 2020



will not detect the real virus either. The control material will enable the harmonisation of coronavirus tests in Europe, ensuring their high quality to avoid false negatives. Because the new control material is based on the part of the virus that has remained stable after the virus has mutated, it is fully compatible with the official methods to detect the presence of SARS-CoV-2 that are recommended by the World Health Organization and applied in the EU, Asia and the USA. The material can also be used to benchmark and validate the numerous test kits currently developed worldwide.

The control material was manufactured by a German biotech company based on a JRC design, and then validated by JRC laboratory experts. Initially 3000 samples were prepared, to be dispatched to testing laboratories across the EU, including the major reference virology centres as well as hospitals. The 3000 samples are highly concentrated, making it possible to check up to 60 million tests in the EU. Samples will also be made available to the wider EU testing community, with priority given to government-appointed laboratories, as well as the research community.

This news item is based a press release of the European Commission on 1 April 2020 (see web-link below).

**Niall McCormick**  
European Commission, Joint Research Centre (JRC)

More information:  
<https://ec.europa.eu/jrc/en/news/new-control-material-developed-jrc-scientists-help-prevent-coronavirus-test-failures>



## JRC study: Initial impacts of global risk mitigation measures taken during the combatting of the COVID-19 pandemic

A recently published study, led by the European Commission's Joint Research Centre (JRC), presents an analysis of risk mitigation measures taken by countries around the world facing the current COVID-19 outbreak. In the study, the risk mitigation measures to contain and limit the spread of

the SARS-CoV-2 virus (known to cause COVID-19), were collated and clustered (using harmonized terminology). The overview gathers lessons learnt, providing an update on the current knowledge for authorities, sectors and first responders on the effectiveness of said measures, and may allow enhanced prevention, preparedness and response for future outbreaks. Various measures such as mobility restrictions, physical distancing, hygienic measures, socio-economic restrictions, communication and international support mechanisms were clustered and reviewed in terms of the nature of the actions taken and their qualitative early-perceived impact. At the time of writing, it is still premature to express the quantitative effectiveness of each risk mitigation cluster, but it seems that the best mitigation results are reported when applying a combination of voluntary and enforceable measures.

The JRC analysis shows that the world was not well prepared for the pandemic, scientific warnings were not picked up quickly enough, and there were confusing messages from various sources. Many countries gradually moved from advice, to recommendations and ultimately enforceable actions. The process of risk perception in the population and the translation to compliance also took time. This under-estimation of the scale and danger and the lack of trust resulted in a loss of precious time in jointly implementing the best risk mitigation practices.

The pandemic has shown that many health systems lack mechanisms and materials to respond adequately to a quickly spreading infection, and have to rely on societal and economic improvisation. This applies to both rich and poor countries. Several risk mitigation measures have proven effective in slowing down the spread of COVID-19. The analysis clusters them into various categories according to their main objective and reports early signs of effectiveness. Since the rules and policies adopted by many countries differ - as well as their healthcare systems and societal and population structure - the mitigation measures are likely to lead to a range of different results. However, applying a combination of measures is the most effective.

The experts' recommendations for countries included the following:

- Invest early in preventive risk mitigation resources to limit the spread of the virus. These measures comprise physical distancing and hygienic measures. The issue of masks is controversial in many countries but the correct wearing of appropriate facemasks is beneficial when physical distancing cannot be ensured.
- Detection capacities and screening programmes need to be improved and scaled-up, along with appropriate registration of the number of hospitalizations and deaths. Contact tracing is important and new technologies could be applied in this respect;
- A clear and coordinated communication strategy for effective risk mitigation is crucial for building trust with citizens in a quickly evolving situation. Furthermore, combatting fake news and disinformation can directly help save people's lives.



The JRC-led study (Bruinen de Bruin et al., 2020) recommends that a combination of measures is most effective in slowing down the spread of an outbreak, including physical distancing and hygiene. ©Anon, Adobe stock 2020.

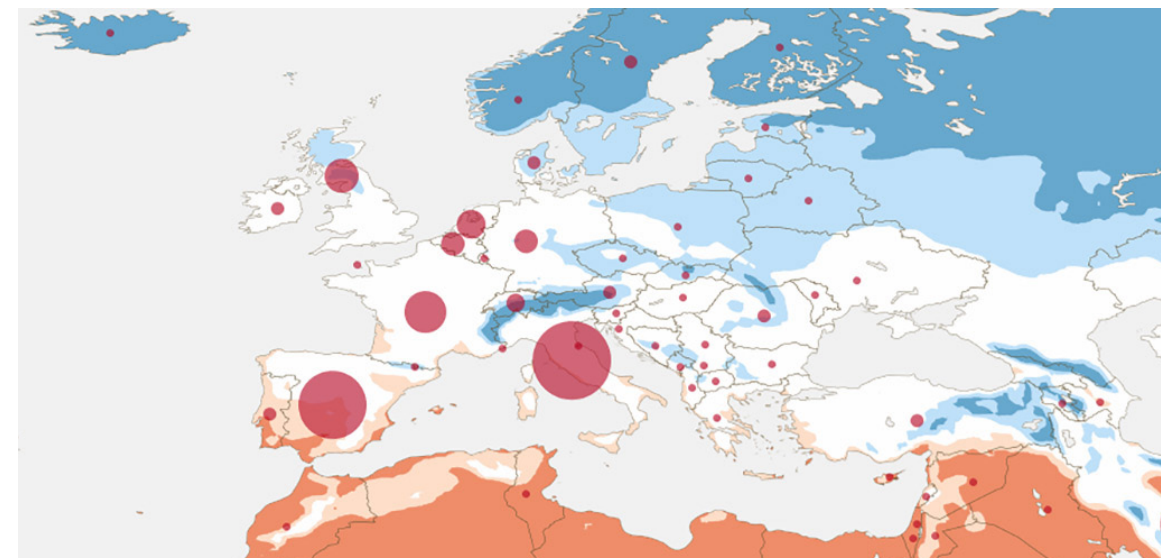
The delay in imposing risk mitigation measures is crucial and can make a huge difference between a local outbreak with few cases, and a pandemic with countless sick and deceased citizens. The window of opportunity for full containment, especially in case of asymptomatic transmission, is limited to a very low number of infected people. The article recommends developing better early warnings systems with quick detection capacities in order to lower the intervention time. Such a mechanism should be based on a response time of hours, rather than days.

Intensified multilateral cooperation, building on existing global health mechanisms and networks, is essential at times like this, and the article recommends strengthening these networks. For example, several partner countries of the EU Chemical, Biological, Radiological and Nuclear Risk Mitigation Centres of Excellence (CBRN CoE) initiative are reporting to have greatly benefited from the inter-sectoral structures put in place, and the mechanism has been found very useful by some countries in mobilizing a coordinated response.

For further information about the JRC study, see the reference information below. This news item is based on a European Commission news report on 8 May 2020 (see web-link below).

**Niall McCormick**  
European Commission, Joint Research Centre (JRC)

More information:  
<https://ec.europa.eu/jrc/en/news/learning-lessons-pandemic-combining-risk-mitigation-measures-tackle-covid-19>



## Copernicus provides vital information about climate and atmosphere to advance COVID-19 research

Amid the on-going COVID-19 crisis, there is widespread interest in up-to-date information about the climate and atmosphere. The Copernicus Atmosphere Monitoring Service and the Copernicus Climate Change Service are two of the six thematic information services of Copernicus - the EU's programme providing information services based on satellite Earth Observation (EO) and in situ (non-space) data, which is coordinated and managed by the European Commission. The two services, which are implemented by the European Centre for Medium-Range Weather Forecasts (ECMWF) on behalf of the European Commission, are helping researchers, policy-makers and citizens alike with quality-assured data and tools. As is described below, the Copernicus Atmosphere Monitoring Service is providing updated European air quality information on a daily and weekly basis, in support of the COVID-19 crisis, while the Copernicus Climate Change Service has developed an application that allows health authorities and epidemiology centres to explore whether temperature and humidity affect the spread of the coronavirus.

The Copernicus Atmosphere Monitoring Service (CAMS) already monitors atmospheric conditions around the world on a daily basis, and now operates a dedicated micro-site (see web-link below) that provides updated European air quality information on a daily and weekly basis, in support of the COVID-19 crisis. This site includes maps, time-series and animations of nitrogen dioxide (NO<sub>2</sub>) and fine particulate matter (PM<sub>10</sub>) for 50 major European cities. Based on satellites, ground observations and state-of-the-art numerical models, CAMS' monitoring of the atmosphere makes it possible to see what the current levels of air pollution across Europe are, including the effects of lockdown measures against COVID-19 on air quality.

Screenshot of a new Copernicus Climate Change Service application, showing COVID-19 mortalities mapped against temperature. © Copernicus Climate Change Service (C3S); ECMWF.

This is quite complex, as continual changes in the weather and types of emissions can cause large variations in the surface concentrations of pollutants. Nevertheless, CAMS has already detected a reduction of NO<sub>2</sub> levels over Northern Italy since the lockdown. Furthermore, CAMS is looking into other effects that air pollution might have on COVID-19. Although there is no evidence yet that air pollution is playing a role in spreading the new coronavirus, CAMS is working together with medical research teams to look into this. However, air pollution does affect cardio-pulmonary health and immune response, which may aggravate COVID-19 symptoms in, for instance, allergy sufferers or residents of big cities where the air quality is poor.

The Copernicus Climate Change Service (C3S) has worked with environmental software experts (B-Open) to develop an application that allows health authorities and epidemiology centres to explore whether temperature and humidity affect the spread of the coronavirus. This application is freely accessible from the C3S Climate Data Store (CDS, see third web-link below). C3S provides information on past, present and future climate variables, such as temperature, humidity, and ultraviolet radiation at ground level. Researchers can use the application to map this data against the locations of COVID-19 deaths for January, February and March 2020 provided by Johns Hopkins University. The application also shows how temperature and humidity around the world are likely to change over the next months. If a solid relation between virus spread and weather should be confirmed, then having information about the expected climate conditions for the coming month would help inform the governments about the most suitable interventions.

This news item is based on a report on the web-site of the Copernicus Climate Change Service (C3S) on 1 April 2020 (see web-link below).

**Niall McCormick**  
European Commission, Joint Research Centre (JRC)

More information:  
<https://climate.copernicus.eu/copernicus-provides-vital-information-advance-covid-19-research>  
<https://atmosphere.copernicus.eu/european-air-quality-information-support-covid-19-crisis>  
<https://cds.climate.copernicus.eu/apps/c3s/app-c3s-monthly-climate-covid-19-explorer>



## Coronavirus: Commission receives first preliminary application for support from the EU Solidarity Fund for health emergency from Italy

On 27 April 2020, the European Commission received its first preliminary application – from Italy – for financial support from the European Union

Solidarity Fund (EUSF), to address the coronavirus outbreak and its effects. The EUSF was created in 2002 to respond to major natural disasters. During 2002-2019 it provided over €5.5 billion to assist 24 countries in the aftermath of 88 natural disasters, including floods, forest fires, earthquakes, storms and drought. From 1 April 2020, the scope of the EUSF was extended to encompass major public health emergencies, as part of a package of measures (the “Coronavirus Response Investment Initiative”) aimed at quickly directing €37 billion of European public investment to address the impacts of the Coronavirus crisis.

For 2020, the EUSF has €800 million at its disposal to provide the EU countries worst affected by the Coronavirus crisis, with financial aid for immediate response measures, such as provision of medical assistance and purchase of medical equipment, support to vulnerable groups, measures to contain the spreading of the disease, strengthening preparedness, and more. The European Commission will collect all Coronavirus-related applications until 24 June 2020, and assess them in a package in order to ensure an equitable treatment of all cases. It will then submit a proposal for financial aid to the European Parliament and the Council. This news item is based on a press release of the European Commission on 27 April 2020 (see web-link below).

**Niall McCormick**  
European Commission, Joint Research Centre (JRC)

More information:  
[https://ec.europa.eu/commission/presscorner/detail/en/IP\\_20\\_753](https://ec.europa.eu/commission/presscorner/detail/en/IP_20_753)



## Report on the European Commission's 2020 Evidence for Policy School on Disaster Risk Management

“It is difficult to make decisions between the roaring of the crowd and the whisper of the scientist”. This statement from Mr. Thomas Peter of the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), might well sum up a key



Participants at the 2020 Evidence for Policy School on Disaster Risk Management, in Florence, Italy. © European Commission, 2020.

challenge faced by practitioners and policy-makers when responding to disasters – challenge that was addressed head-on by the European Commission's Joint Research Centre (JRC) at the Evidence for Policy School on Disaster Risk Management, which took place on 13-15 January 2020 in Florence, Italy.

In a world flooded with information from a multitude of sources, collecting, managing, making sense of and communicating knowledge (or evidence) is highly challenging. With scientific controversies, post-fact politics and societal challenges to the use of evidence in public policy, evidence-informed policy-making needs advocates and skilled practitioners, both in scientific and policy bodies. This applies none more so than in the field of disaster risk management (DRM) – a key strategic area for the future of Europe.

The aim of the 2020 Evidence for Policy School – which was organised by the JRC (within the framework of the Commission's Disaster Risk Management Knowledge Centre or DRMKC) and the Commission's Directorate General for European Civil Protection and Humanitarian Aid Operations (DG ECHO), in collaboration with the Italian Civil Protection Department, the International Network for Government Science Advice (INGSA) and the University of Florence (UNIFI) – was to help researchers in DRM to have more impact, and to support DRM policy-makers in translating evidence into policy solutions.

The event gathered 71 mid-career scientists, policy-makers and practitioners involved in DRM, from 22 countries. Over the three days, each participant attended five of the nine organised interactive “Master Classes” that were conducted by top facilitators from national authorities (Italy, Greece),

local authorities (Caicais in Portugal), Climate-KIC (the European Institute of Innovation and Technology's knowledge and innovation community addressing climate change), BBC Climate Action, universities, the United Nations and the European Commission.

As stated by Charlina Vicheva, acting Director General of the JRC, in her opening speech: “We have to increasingly engage with citizens... to bridge the gap between what we as policy-makers, practitioners and scientists think, and what the citizens think. The DRMKC is the embodiment of the partnership approach to the science-policy interface”. Johannes Luchner, Director of “Emergency Management and rescEU” at DG ECHO, added: “We need the knowledge broker that can transmit the knowledge between scientists and policy-makers. Because let's be honest: policy-makers do not have time to search for the knowledge – and the scientists do not have time to explain”.

Jaroslav Mysiak, Director of “Risk assessment and adaptation strategies” at the Euro-Mediterranean Centre on Climate Change (CMCC), concluded: “What unites us is the accountability: Scientists are accountable for the knowledge they produce and on the policy side, it is simply no longer acceptable that some communities do not have a risk assessment.”

Agostino Miozzo, Director at the Italian Civil Protection Department, therefore challenged participants to cross the “last mile between developing solutions and applying them in practice”. Alessandra Zampieri, Head of the Disaster Risk Management Unit at the JRC, moderated a high-level panel that set the scene for the 2020 Evidence for Policy School.

The European Union Solidarity Fund (EUSF) operates in complementarity with other EU instruments addressing disaster risk management (DRM), especially the European Structural and Investment Funds, and the DRM policies driven by the Commission's Joint Research Centre (JRC) and the Directorate-General for European Civil Protection and Humanitarian Aid Operations (DG ECHO). © European Commission.



Global Mountain Safeguard Research programme: Inter-linking international frameworks with research spheres and socio-environmental needs, thus facilitating practical implementation. © GLOMOS.

With classes tackling proactive and reactive disaster management, links with climate change, operational scientific support, liability and ethics, communications and visualisation, a broad set of topics and skills were taught. The interaction of participants in the Master Classes brought about a collision of expertise, sparking enriching conversations, quick learning, and original framings of complex and “wicked” problems. Ranging from philosophical and theoretical thinking to practical training on tools, simulations and exercises, hands-on work and team challenges, the Master Class facilitators and expert students created a unique learning environment.

The main outcomes of the 2020 Evidence for Policy School are summarised below:

**1. Increased awareness amongst participants about DRM actors, the risk landscape in Europe and globally, and the important role of science:** This outcome is fully in line with the objectives of the Knowledge Network of DG ECHO, and directly contributes to article 3, paragraph 1 (e) of the EU’s Union Civil Protection Mechanism legislation (as amended by Decision No. 2019/420): “to increase the availability and use of scientific knowledge on disasters”.

**2. Learning of skills for the science-policy interface, such as risk communication, visual communication, briefings for high level elected officials or crisis management meetings, as well as participatory processes at local level:** This outcome is in line with the ambition of the European Commission President, **Ursula von der Leyen** – and the mandate of the European Commission Vice-President for Interinstitutional Relations and Foresight, **Maroš Šefčovič** – to strengthen our culture of evidence-based policymaking.

**3. A new network of ambassadors for science for policy:** Many participants presented their thoughts on how they will promote science for policy in their own organisations, and help their colleagues to use more science in policymaking, breaking down silos or bridging the gap between scientific disciplines, practitioners and policymakers at local, national and EU level.

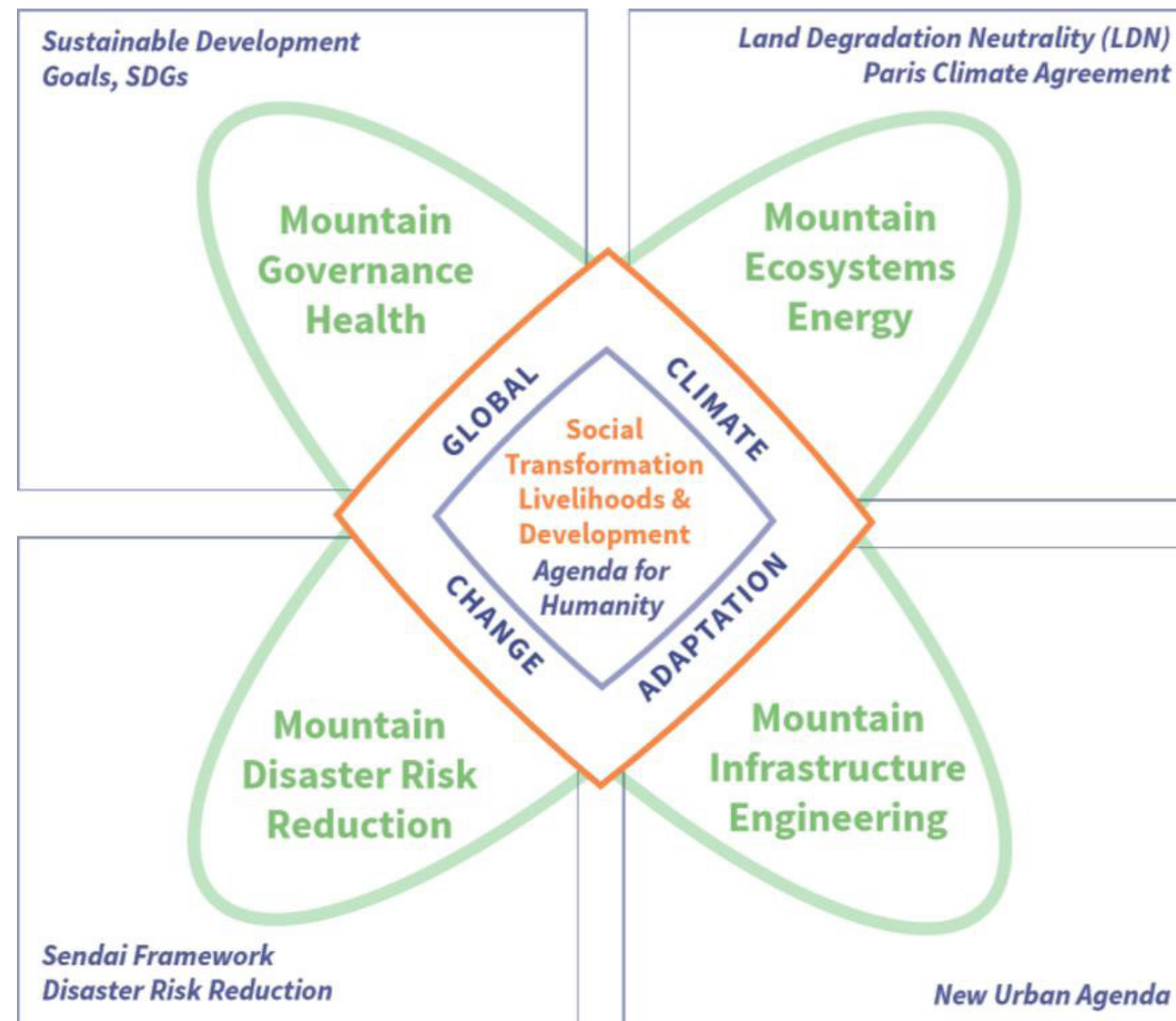
In conclusion, the 2020 Evidence for Policy School represented the first occasion that such an event – focusing on the interface between science, policy, and practice – was held in the DRM sector, further confirming the DRMKC as a cornerstone for the science-policy interface in Europe. Given the positive feedback, look for similar events in the future!

**Tom De Groeve, Lene Topp and Marzia Santini**  
European Commission, Joint Research Centre (JRC) (M. Santini – formerly Italian Civil Protection Department / Seconded National Expert at JRC)

For more information:  
[https://ec.europa.eu/jrc/sites/jrcsh/files/programme\\_evidence-for-policy-school\\_disaster-risk-management.pdf](https://ec.europa.eu/jrc/sites/jrcsh/files/programme_evidence-for-policy-school_disaster-risk-management.pdf)



## News from the GLOMOS (Global Mountain Safeguard Research) programme of UNU-EHS and Eurac Research



Last year (2019) marked the operational start of the Global Mountain Safeguard Research programme. Better known by its acronym “GLOMOS”, this joint programme is a scientific collaboration between the United Nations University – Institute for Environment and Human Security (UNU-EHS; <https://ehs.unu.edu/>) and Eurac Research ([www.eurac.edu/](http://www.eurac.edu/)). GLOMOS focuses on mountain safeguards and sustainable development by promoting research on current and future challenges for mountain socio-ecological systems – with a particular emphasis on the so-called “Global South” (or developing countries). By doing so, GLOMOS represents the continuation of UNU’s engagement in supporting mountain communities facing hazards and challenges for sustainable development and the protection of biological and cultural diversity, initiated some

40 years ago. GLOMOS has the maxim to bring science into action, a target that is supported by the unique position of GLOMOS at the interface between academia and the United Nations (UN) community.

GLOMOS works on identifying risks, challenges and opportunities in mountain regions, which is done from global and local perspectives, allowing to see both the bigger picture as well as unique characteristics and needs of each mountain region around the world. Its purpose of strengthening research

knowledge gained from the conference provided the basis for the official launch of GLOMOS, in July 2019.

It is especially through its strong connection to the United Nations System, that GLOMOS brings forward research on specific mountain contexts in relation to existing international frameworks. At the UN Climate Change Conference (COP25) in December 2019 in Madrid, GLOMOS has organized the side-event “Nature-Based Solutions on the Ground (SDG 15): UN Support to People and Landscapes”. For this event, developed in close collaboration with UN Education, Scientific and Cultural Organization (UNESCO) and agencies of the UN Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD), GLOMOS invited as keynote speakers Mr. Ibrahim Thiaw, Executive Secretary of the UN Convention to Combat Desertification (UNCCD), and Ms. Norma Kassi, Co-Research Director of the Canadian Mountain Network, and spokesperson of the Vuntut Gwich’in First Nation in the northern Yukon in Canada.

By building effective synergies with other UN agencies and with international scientists and stakeholders, GLOMOS underlines its role as an interface between the UN System and international research communities. This highlights the GLOMOS interest to work for resilient mountain communities, biological and cultural diversity, and to support adaptive solutions and sustainable transformation processes of highly sensitive mountainous social-ecological systems.

**Jörg Szarzynski**, United Nations University – Institute for Environment and Human Security (UNU-EHS),  
**Stefan Schneiderbauer**, UNU-EHS and Eurac Research, **Paola Fontanella Pisa**, UNU-EHS.

For more information:  
<https://ehs.unu.edu/about/departments/glomos#overview>



## Report on the joint training on disaster risk management at Coventry University, in February 2020

A training course on disaster risk management (DRM) was hosted by Coventry University on 25-27 February 2020, under the auspices of the university’s courses on disaster management and emergency planning. The training event, which was co-organised with the European Commission’s Disaster Risk Management Knowledge Centre (DRMKC), addressed the need for collaboration between academics and professionals in the preparations for DRM, in order to understand the factors that can enhance disaster resilience and capacity (i.e. to cope, adapt, and transform in case of a disaster). The training was developed to train bachelor’s degree students who aim to work in the fields of



disaster management, emergency planning, humanitarian assistance and community resilience.

The focus of the training on DRM was on the mitigation, response and recovery from nuclear and flood disaster events. Speakers also shared their knowledge of the technologies for monitoring geohazards and the tools for disaster risk communication. Students were given the opportunity to consider a variety of DRM strategies from other European perspectives, thereby further enhancing their appreciation of the differing approaches to the key elements of DRM.

The training on DRM took place at the Simulation Centre of Coventry University. Speakers were drawn from the DRMKC, the European Commission's Joint Research Centre (JRC), and the DCNA (Disaster Competence Network Austria; [www.dena.at](http://www.dena.at)), and also included professors from Berlin School of Economics and Law ([www.hwr-berlin.de/en/](http://www.hwr-berlin.de/en/)) and from the universities of Coventry, Florence (Italy), Pavia (Italy), Saxion (the Netherlands), and Vives (Belgium).

Participants at the DRM training event consisted of 70 students from both Coventry University and Vives University of Applied Sciences. Methods of delivering the training included in-class lectures and table-top exercises. In order to respond to the outbreak of the Coronavirus disease 2019 (COVID-19) in Italy, the training event also utilised on-line lectures. A high degree of interaction between the speakers and participants was observed during the training workshop, which has also received positive feedback from students. The pedagogy (or teaching methods) of the DRM training will be shared with the universities that were involved in delivering the training.

**Yung-Fang Chen and Leanne Hunt**  
School of Energy, Construction and Environment, Coventry University, UK

For more information:  
[www.coventry.ac.uk/study-at-coventry/faculties-and-schools/engineering-environment-and-computing/energy-construction-and-environment/](http://www.coventry.ac.uk/study-at-coventry/faculties-and-schools/engineering-environment-and-computing/energy-construction-and-environment/)

Some of the participants at the joint training on disaster risk management, held at Coventry University on 25-27 February 2020.  
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## Report on the international conference Austrian Disaster Research Days 2019 (ADRD19)



Disasters are becoming more frequent and intense, as a result of climate change. Related impacts lead to high economic losses and affect the whole of society. To reduce the vulnerability of economy and society a "nexus" between science and decision-makers from the public and private sector is needed. The international conference Austrian Disaster Research Days 2019 (ADRD19), which took place at the Technical University of Graz, Austria, on 14-15 October 2019, was focused on disaster prevention and response by implementing findings from scientific research in disaster risk reduction (DRR). ADRD19 was held as the annual conference of the Disaster Competence Network Austria (DCNA), and was attended by nearly 200 participants across all sectors.

On the 1st day of the event, Harald Kainz (Chairman of DCNA and Rector of Technical University Graz), as well as Elmar Pichl (Federal Ministry of Education, Science and Research), and Hermann Schützenhöfer (Governor of the state of Styria) welcomed the audience. In the opening session, keynote speaker Alexander Siegmund (European Science & Technology Advisory Group / E-STAG, of the UN Office for Disaster Risk Reduction) highlighted the role of science and technology for DRR. Key issues in the plenary session, addressing state-of-the-art challenges of government authorities, were the EU Civil Protection Knowledge Network, how to increase societies' crisis resilience, as well as challenges in managing disasters in urban areas such as the city of Graz.

Reflecting disaster risks in its various facets was the focus of several Breakout Sessions. One part of the afternoon's 1st block of parallel sessions focussed on **meteorological hazards**, with presentations covering weather warning systems, flood forecasts and the influence of climate change on extreme weather events. The 2nd part addressed **technological hazards**, with talks on challenges in protection, safety analysis of critical infrastructure, and strategies how to prepare and how to act in

crises.

In the 2nd block of parallel sessions, the main topics were **systematic perspectives of disaster risks and hydrological hazards**. Emphasis was on risks in the analogue and digital area, risk analysis in disaster management and public involvement in risk identification. The session on flooding addressed the risk of surface discharge and "fluvial" solid processes, "now-casting" of floods, risk-zoning, and loss of inundation areas and its consequences. A banquet given by Governor of Styria complemented the 1st day.

The 2nd day of ADRD19 included scientific findings from a multi-disciplinary field of **geophysical hazards**, covering landslides, avalanches and earthquakes. Challenges for avalanche warning systems, geo-monitoring of landslides and numeric models as monitoring system were discussed. Particularly impressive was a report about the preparation for, survival and recovery from a recent disaster: hurricane Dorian in the Bahamas – a testimony. The day's 2nd parallel session focused on **industrial hazards** and their impact due to natural hazards, cyber-attacks seen from the scientific point of view, and the experience with industry insurance.

A very diverse Closing Session included talks of all involved stakeholders, providing food for thoughts and further exchange. The role of public authorities in providing geo-services was highlighted, followed by gender and diversity-based DRR as well as the challenges of hybrid threats in the context of disaster response and the final on ways for **closing the protection gap**.

The ADRD19 conference was held as a contribution to the 2019 International Day for Disaster Risk Reduction ([www.unisdr.org/disasterreductionday](http://www.unisdr.org/disasterreductionday)) – observed every year on 13th October – which in 2019 was focussed on Target (d) of the Sendai Framework: reduce disaster damage to critical infrastructure and disruption of basic services.

**Christian Resch, Silke-Silvia Drexler**  
Disaster Competence Network Austria (DCNA)

For more information:  
[www.dena.at/index.php/austria-disaster-research-days-2019.html](http://www.dena.at/index.php/austria-disaster-research-days-2019.html)

### SAVE THE DATE

The next conference in the series – Disaster Research Days 2020 (DRD20) will be held at the University of Innsbruck, Austria, on 12-13 October 2020, and will focus on cross-border aspects and a European dimension.

DRD20 will include an exhibition and call for abstracts ([www.dena.at](http://www.dena.at)), starting in January 2020.

Visit the DRD20 web-site for more details:  
<http://www.dena.at/index.php/disaster-research-days.html>



## Successful conclusion of EU-funded programme on Disaster Risk Assessment and Mapping in the Western Balkans and Turkey (IPA DRAM)



Map showing the IPA DRAM partner countries, comprising the EU accession candidate countries of Montenegro, Serbia, North Macedonia, Albania, and Turkey, and potential candidates Bosnia and Herzegovina and Kosovo. (Graphic from: [www.bbc.com/news/world-europe-50100201](http://www.bbc.com/news/world-europe-50100201)).

The EU-funded regional programme Instrument for Pre-Accession Assistance – Disaster Risk Assessment and Mapping (IPA DRAM), which has been implemented in the countries of the Western Balkans (Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia) and Turkey from 2016 to 2019, officially ended on 30th November 2019. The overall objective of IPA DRAM was to improve effective, coherent and EU-oriented national systems for disaster loss data collection, risk assessment and mapping, and alignment and integration into the Union Civil Protection Mechanism (UCPM) in the Western Balkans and Turkey. Partners in IPA DRAM were civil protection agencies and disaster risk management (DRM) institutions in the seven countries. The programme was led by a Consortium from four EU Member States, with the Swedish Civil Contingencies Agencies (MSB) as lead agency.

After three years of implementation, the capacity development Programme achieved the results outlined below, for the three technical components: disaster loss data (DLD), risk assessment, and risk mapping.

National systems for DLD collection have been further developed and improved based on EU Good Practices and in line with the Sendai Framework. Most Partner Countries have introduced the Des-Inventar-Sendai database system ([www.desinventar.net](http://www.desinventar.net)) and strengthened systemic capacity to collect disaggregated data at different levels that can contribute to disaster risk assessments and to inform policies and planning. In that aspect, the UN Office for Disaster Risk Reduction (UNDRR) has been an important international partner throughout implementation. IPA DRAM has also facilitated reporting to the Sendai Framework Monitor (SFM).

National risk assessments following EU guidelines and good practices and as required by UCPM, in



Status of the obligatory use of Eurocodes structural fire design "Parts" in national regulatory frameworks. Map based on the JRC's database of the Nationally Determined Parameters adopted in the 30 EU and European Free Trade Association (EFTA) countries implementing the EN Eurocodes. Web-link: <https://eurocodes.jrc.ec.europa.eu/show-page.php?id=37>

particular including identification of risks of cross-border and regional aspects, have improved. The accomplishment of national risk assessments should lay the foundations for improving national risk management planning and risk management capabilities assessments. The large majority of Partner Countries now report their national risk assessments in line with their UCPM commitments. On a regional level, priorities for preventing seismic risks have been laid out and a regional working group, consisting of DRM organisations and academic institutions, has been established.

IPA DRAM has further improved national and regional risk mapping, developing "Guidelines for Data Experts", with a list of around 40 themes proposed as priorities, and cartographic advice for regional usage. The technical output of the Risk Mapping component was development of the Electronic Regional Risk Atlas of IPA DRAM (ERRADRAM), implemented with a specific approach to DRM (Basic, Hazard, Exposure, Vulnerability, Risk). National and regional inter-institutional processes on geospatial data sharing protocols and regulations remain a challenge. In the immediate future and until the complete design of the process of sustainability, the Disaster Preparedness and Prevention Initiative for South Eastern Europe (DPPI SEE) will coordinate activities of ERRADRAM.

The strong ownership in Partner Countries has led to improved inter-institutional processes and cooperation, through productive working groups, which will have long-term and sustainable effects. IPA DRAM has contributed to an increased understanding of cross-cutting issues such as the importance of gender mainstreaming and environmental aspects in disaster risk management. A great added value has been the exchange of information and experiences for regional cooperation and partnership.

"Disasters know no borders. Given the changing risk landscape and increasing disasters, it is clear that long-term regional and international cooperation is vital to mitigate risks and strengthen resilience at national, regional and EU level. As lead implementing partner, MSB has been proud to lead this successful regional programme," says Jakob Wernerman, Head of Operations, MSB.

On behalf of the IPA DRAM Programme Team: **Hanna Norell** (Swedish Civil Contingencies Agency / MSB and IPA DRAM Programme Director), **Carl-Johan Breitholtz** (MSB), and **Marco Massabo** (CIMA Research Foundation, Italy)

For more information:

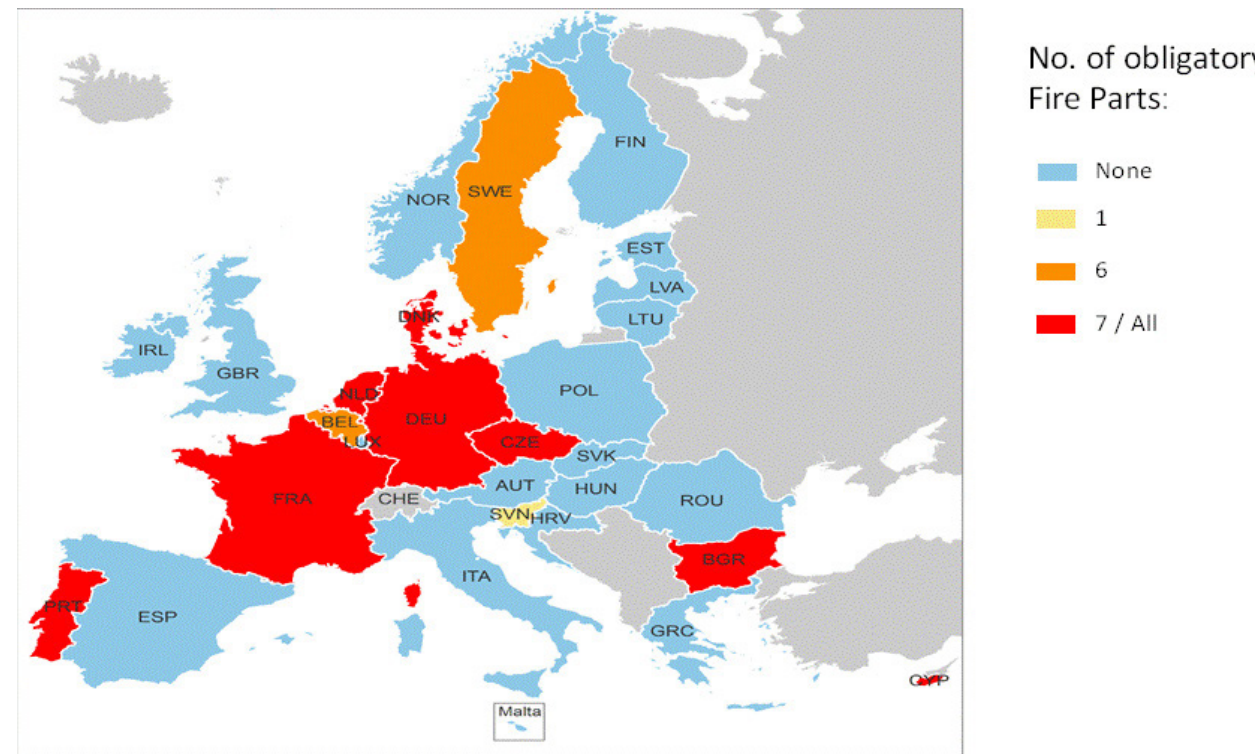
[www.ipadram.eu](http://www.ipadram.eu)

[www.ipadram.eu/successful-regional-ipa-programme-concluded-in-the-western-balkans-and-turkey/](http://www.ipadram.eu/successful-regional-ipa-programme-concluded-in-the-western-balkans-and-turkey/)

[www.youtube.com/watch?v=24Tr8ufjHSE](https://www.youtube.com/watch?v=24Tr8ufjHSE)



## Report on the activities of the European Expert Network on Fire Safety Engineering



This article provides an overview of the activities of the European Expert Network on Fire Safety Engineering. The Expert Network was set up in 2019 by the European Commission's Joint Research Centre (JRC), within the framework of the activities on European standards and policies for the construction sector carried out by Unit E.4 ("Safety and Security of Buildings") of the JRC's Directorate on Space, Security and Migration. The Expert Network has wide representation, and includes experts from the relevant Technical Committees (TCs) of the European Committee for Standardization (CEN) and the International Organization for Standardization (ISO): namely, ISO/TC 92 - Fire safety; CEN/TC 127 - Fire safety in buildings; and CEN/TC 250 - Structural Eurocodes. The Expert Network also includes fire safety experts from the construction industry, academia, research institutions and representatives of firefighters.

The Fire Safety Engineering Expert Network held its first meeting at the JRC in Ispra, Italy, on 12-13 November 2019. The meeting aimed to share views and to make proposals for advancing the development of a fire safety engineering approach, to be incorporated in the fire safety regulations of the EU Member States. At the meeting, the experts discussed the possibility to have a future European standard or standards, incorporating fire engineering principles, in a manner analogous to the Eurocodes.

The Eurocodes are ten state-of-the-art EU-wide

European standards (EN) for the design of buildings and other construction works, which were developed by CEN at the request of the European Commission (see web-link below). The ten Eurocodes, covering various subjects related to construction, are further divided into 58 "Parts" addressing specific aspects of each subject. The Eurocodes provide common rules to design safe and sustain-

able buildings, but offer flexibility in national implementation, as the safety level remains a choice of the EU Member State through "nationally determined parameters". At the Expert Network meeting it was agreed that it is feasible to have a European Fire Safety Engineering framework standard, having synergies with the on-going work by the related ISO and CEN Technical Committees, and based on countries' experience in fire safety engineering.

Assessment of the state of implementation of fire safety engineering in the EU Member States, and the needs for standardization, will be based on an enquiry planned for 2020. The enquiry will also address issues related to the guidance and training needs on fire engineering at the EU and national levels. The results of the enquiry will be analysed in a JRC Technical Report, planned for publishing in late 2020.

The work on fire safety of the JRC's Unit E.4 builds upon past activities, training events and publications related to structural fire design and fire safety in buildings. This includes JRC Technical Reports on the needs for improved fire protection in buildings, and JRC European training events and a manual with worked examples on the structural fire design using the Eurocodes. The first meeting of the Fire Safety Engineering Expert Network proved to be a fruitful and dynamic event, with many interesting discussions taking place, and the Work Plan until the second meeting - to be held during 2020 - being set.

The Fire Safety Engineering Expert Network also supports the Fire Information Exchange Platform (FIEP) initiative, created in 2017 by DG GROW (the European Commission's department responsible for EU policy on the single market, industry, entrepreneurship and small businesses) following discussions by the European Parliament (see web-links below). The FIEP aims to share best practices and lessons learned between EU Member States and relevant stakeholders in the area of fire safety. The FIEP addresses five areas for cooperation, each led by a specific project team, including one - led by the JRC - on the use of fire engineering principles for setting regulatory requirements. At the project team's first meeting, planned to take place during 2020, the Fire Safety Engineering Expert Network will provide input and share its views.

**Silvia Dimova, Adamantia Athanasopoulou, and Luisa Sousa**

European Commission, Joint Research Centre (JRC)

For more information:

<https://eurocodes.jrc.ec.europa.eu/>

<https://firesafeeurope.eu/fiep/>

<https://firesafeeurope.eu/the-european-commission-announces-next-steps-for-fire-information-exchange-platform-fiep/>



## EU research leads to new international standard for the seismic design of precast buildings

Precast concrete technologies are widely used in construction, due to their advantages in terms of economy, quality control, speed in erection and architectural flexibility. Precast structures are used in most industrial facilities, and in many shopping centres, schools, gyms and public buildings. Despite their widespread use, the design of precast concrete structures is only partially covered in the current version of Eurocode 8 - one of the Eurocode series of European standards (EN) related to construction, which describes how to design structures in seismic zones - and in many national design codes. This news article describes how EU research results have played an important role in the recent release of a new international standard - namely, ISO 20987:2019 ("Simplified design for mechanical connections between precast concrete structural elements in buildings") - filling an important gap between previously existing standards. The derived design rules are being implemented in the ongoing revision of Eurocode 8.

Some concerns about the seismic safety of such precast industrial buildings have been expressed in the past, mainly after the problems highlighted by recent earthquakes (Bournas et al., 2014). Whereas it has been demonstrated that precast solutions can offer the same (if not superior) safety



of ordinary “cast-in-situ” constructions, the need to develop design rules for the connections between precast elements has been stated by the industry sector and by the related research community.

This problem was addressed by a dedicated 7th Framework Programme for EU research (FP7) project called SAFECAST (Performance of Innovative Mechanical Connections in Precast Buildings Structures under Seismic Conditions), which ran from 2009 to 2012, and in which many European experts participated, also collaborating with Chinese laboratories. The precast construction industry – represented by five National Associations of precast concrete producers – played a key role in the SAFECAST project, which was coordinated by ASSOBTETON (the National Italian Association of Precast Concrete Producers).

The problem of reliably designing, dimensioning, installing and maintaining appropriate connection devices between the structural elements, able to guarantee predefined levels of performance under different loading situations, is the fundamental prerequisite for precast structures to be fully competitive in terms of safety and reliability of behaviour and performance.

The activities of the SAFECAST project included a large numerical and experimental campaign on existing and new / improved connections, culminating in the testing programme conducted at the European Laboratory for Structural Assessment (ELSA) at the European Commission’s Joint Research Centre (JRC) in Ispra, Italy, on a large building mock-up – quite possibly the largest building ever seismically tested to failure (see Figure). The size of the mock-up was motivated to the need to include in the test many different solutions as for the design of connections.

The results of the ELSA tests (which are described by Negro et al, 2013), complemented by the findings of the experimental activities performed in other European and Chinese laboratories and by the numerical studies conducted by the Consor-

tium, resulted in a set of guidelines for the seismic design of connections, both traditional and innovative. The duty of translating those guidelines into standardized norms was undertaken by the JRC. A dedicated Working Group was set up within the relevant Technical Committee of the International Standard Organization (ISO). After the necessary technical discussions at international level, in October 2019 a new ISO Standard – namely ISO 20987:2019 (“Simplified design for mechanical connections between precast concrete structural elements in buildings”) – was released.

At present, several partners of the SAFECAST project are working on the implementation of the derived design rules into the revision – currently under way – of Eurocode 8 (Design of structures for earthquake resistance). Rules for the correct dimensioning of connections between precast elements could be drafted directly into the European design codes, or as a reference to ISO 20987.

**Antonella Colombo**, ASSOBTETON (Italian Association of Precast Concrete Producers) and **Paolo Negro**, European Commission, Joint Research Centre (JRC)

For more information:  
<https://www.iso.org/standard/69686.html>  
<https://ec.europa.eu/programmes/horizon2020/en/news/improving-safety-concrete-buildings-earthquake-zones>  
<https://ec.europa.eu/jrc/en/research-facility/elsa>

## News from the Rapid Mapping module of the Copernicus Emergency Management Service (CEMS)

Towards the end of 2019, on 30th October, the Rapid Mapping module of the Copernicus Emergency Management Service (CEMS) was activated for the 400th time. This was a special moment in the history of the 365-days-a-year, 7-days-a-week, 24-hours-a-day CEMS Rapid Mapping module, which since April 2012 has been providing satellite-based information on the impact of (mostly) natural disasters, to European and global emergency response actors.

CEMS (<https://emergency.copernicus.eu/>) is one of six core services of Copernicus – the EU’s Earth observation programme – and is jointly managed by three European Commission Directorate-Generals (DGs): European Civil Protection and Humanitarian Aid Operations (DG ECHO), Defence Industry and Space (DG DEFIS) and the Joint Research Centre (JRC). The JRC is the technical coordinator of CEMS, and uses Framework Contracts with consortia from European industry and academia for its implementation.

CEMS Rapid Mapping – which is one of the two on-demand mapping modules of CEMS (the other being CEMS Risk & Recovery Mapping) – can be directly activated by one of the thirty-two “focal points”:

one in each EU Member State, plus the Copernicus participating countries of Iceland and Norway, European Commission services and the European External Action Service (EEAS). Non-authorised users (i.e. other national, regional or local organisations) can also activate the service through the Authorised Users.

The entry point for all CEMS Rapid Mapping activations is DG ECHO’s Emergency Response Coordination Centre (ERCC) in Brussels, which validates each request and forwards it to the consortia, which then order satellite imagery, analyse them and prepare the final products in form of digital data and ready-to-print maps. With some exceptions, all products are made available on the public portal (see below). The activating user is constantly informed about progress, and the public is informed through the portal and the CEMS Twitter account. Follow our Twitter feed – @CopernicusEMS – where maps and vector data are posted automatically in near real-time!

Since it started in April 2012, CEMS Rapid Mapping has been activated more than 400 times for different kinds of disaster events – mostly natural disasters – happening all over the world. Figure 1 shows the global distribution and type of all analysed events, 60% of which were disasters occurring in Europe.

Figure 2 shows the number of activations per event type during the past seven years. As can be seen, CEMS Rapid Mapping has seen a significant increase in activations during the past three years, and this trend is continuing. The past two-and-a-half years alone have seen as many activations as the previous four-and-a-half years, underlining the service’s relevance and usefulness.

The European Commission – together with the CEMS Rapid Mapping users, the service providers, and the European Space Agency (which ensures fast data access to a number of satellite missions, including the Sentinels) – is continuously striving to improve the service and adapt it to changing user needs. In 2019 the service’s portfolio was revised, and it now offers faster delivery of the products,

including one additional fast post-event product (“First Estimate”) and more efficient delivery and dissemination modes, with web services for a more interactive viewing of the results including the imagery about to be released.

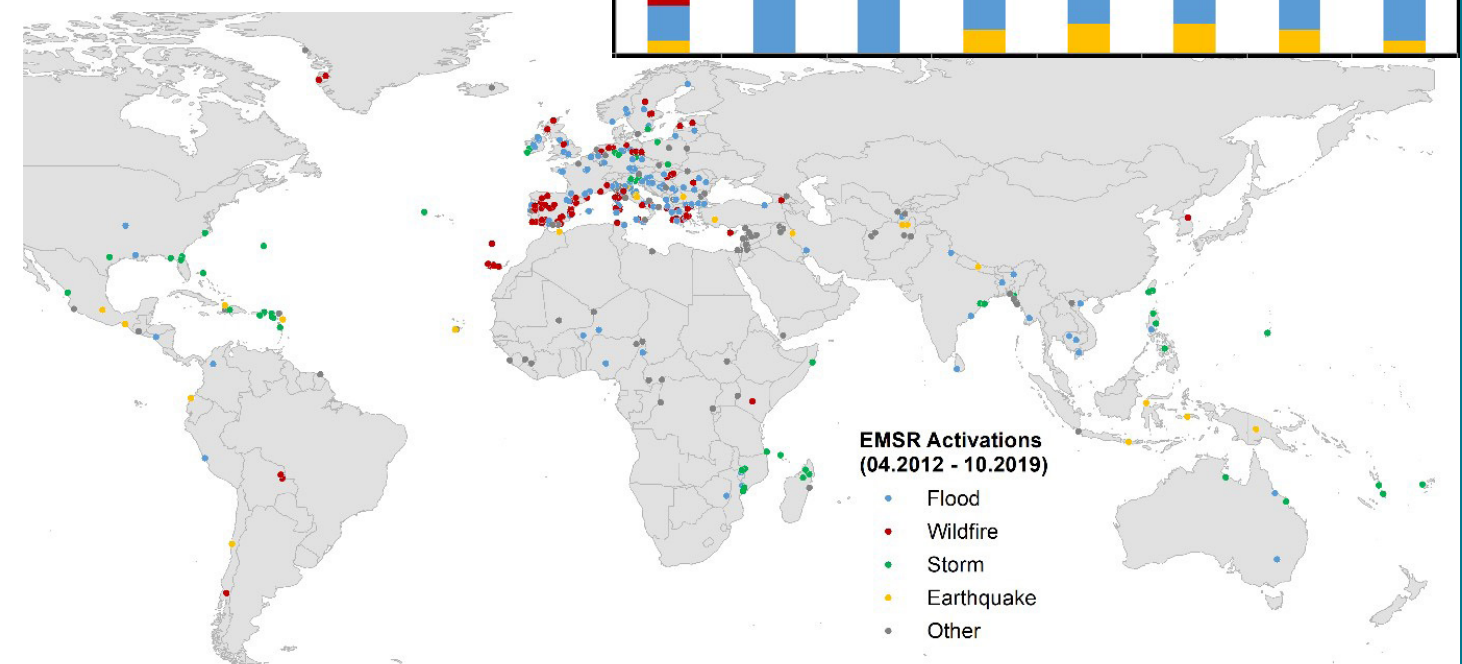
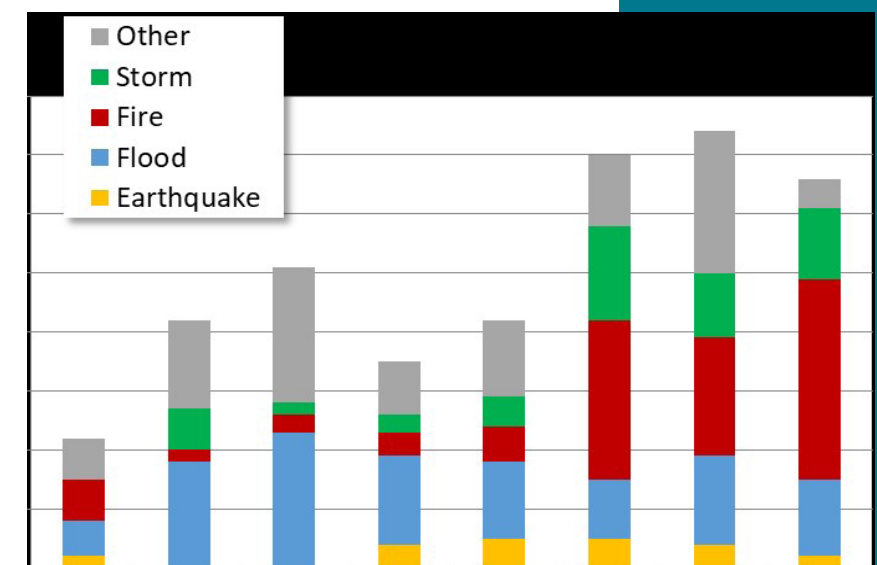
The 400th activation of CEMS Rapid Mapping was launched by the ERCC, following up on a request from the United Nations Development Programme (UNDP) to provide information on the severe flooding which was occurring at that time in Bangui, Central African Republic. The list of all service activations and the released maps are available at the second web-link below.

**Annett Wania and Simone Dalmasso**, European Commission, Joint Research Centre (JRC),  
**Inès Joubert-Boitat**, Unisystems, Italy, External Consultant for European Commission, JRC

For more information:  
<https://emergency.copernicus.eu/mapping/ems/rapid-mapping-portfolio>  
<https://emergency.copernicus.eu/mapping/list-of-activations-rapid>  
<https://erccportal.jrc.ec.europa.eu/>

Figure 1: CEMS Rapid Mapping activations between April 2012 and October 2019. Location and type of disaster analysed.

Figure 2: CEMS Rapid Mapping – number of activations per event type and activating entity since 2012 (status end of October 2019).







## News from the Risk & Recovery Mapping module of the Copernicus Emergency Management Service (CEMS)

The Risk & Recovery Mapping (RRM) module of the Copernicus Emergency Management Service (CEMS) is one of two on-demand mapping modules of CEMS (the other being CEMS Rapid Mapping). CEMS RRM consists of the on-demand provision of digital data, analyses and maps in support of activities dealing with the preparedness, prevention, recovery, and reconstruction phases of disaster risk management. CEMS RRM can be used to request information on the exposure, vulnerability, resilience and risk of people and buildings, for different hazards. For example, CEMS RRM can complement a post-disaster needs assessment and assist in the development of recovery plans. By comparing remote sensing images taken at different times, the progress of donor-funded reconstruction and recovery projects and programmes can be monitored.

CEMS RRM operates globally and is designed to allow users to request a range of products, based on their needs. In particular, CEMS RRM supports EU Member States with risk and recovery products, in the context of the Union Civil Protection Mechanism and the Sendai Framework for Disaster Risk Reduction. By providing information at local scale, CEMS RRM products are relevant at city and regional levels, and can support processes such as cost-benefit analysis of major investment projects

for disaster prevention and climate change adaptation, and help to guide effective investments under the European Structural and Investment Funds. As is described in the CEMS RRM product portfolio (see web-link below), users have the possibility to request one of two sub-categories of products: CEMS RRM FLEX - for tailor-made studies, and CEMS RRM STD - for a predefined set of standardized products. The CEMS RRM workflow is summarized in Figure 1.

Using CEMS RRM FLEX, users can formulate a tailored request containing all elements relevant to their requirements, which can be related to natural or man-made hazards, and include studies to support the different phases of the emergency management cycle. Figure 2 shows examples of the map products for a CEMS RRM FLEX activation by the United Nations Educational, Scientific and Cultural Organization (UNESCO) section on Earth Sciences and Geo-Hazards Risk Reduction. The purpose of the activation was to generate comprehensive knowledge through performing a pre-disaster situation analysis concerning a number of natural hazards (earthquakes, floods, tsunamis and landslides) for three cities: Arica in northern Chile; Tacna in southern Peru; and Maputo, the capital of Mozambique.

CEMS RRM STD offers a set of standardized products, which are complementary to those of CEMS RRM FLEX, in order to guarantee the provision of geospatial information in support of the disaster management activities. The standardized products - each with a detailed methodology - can be requested separately or in combination with other products, depending on the user's needs. The full list of standardized products includes: digital surface model; reference dataset; land use

and land cover dataset; flood delineation; modelled flood extent for major events; temporal analyses of occurred flood events; wildfire delineation and grading; detailed damage assessment analyses over affected areas; reconstruction monitoring; city growth analyses (urban sprawl); human footprint dynamics of cities through nightlights; ground deformation analyses; ready to print maps and map books for field campaigns; impact assessment / exposure analyses on asset and population; detailed impact assessment / exposure analyses on selected aspect; post-disaster soil erosion risk assessment; post-disaster landslide risk assessment; human settlements mapping (formal / informal); population displacement location and monitoring; detailed reference dataset for high-importance areas.

Peter Spruyt,

European Commission, Joint Research Centre (JRC)

For more information:

<https://emergency.copernicus.eu/mapping/ems/risk-and-recovery-mapping-portfolio>

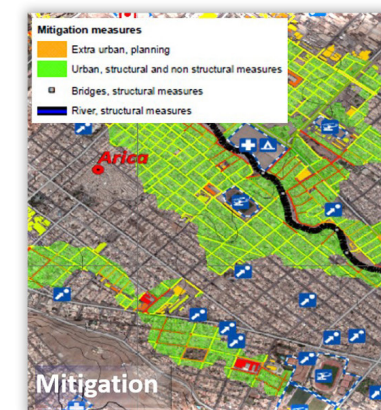
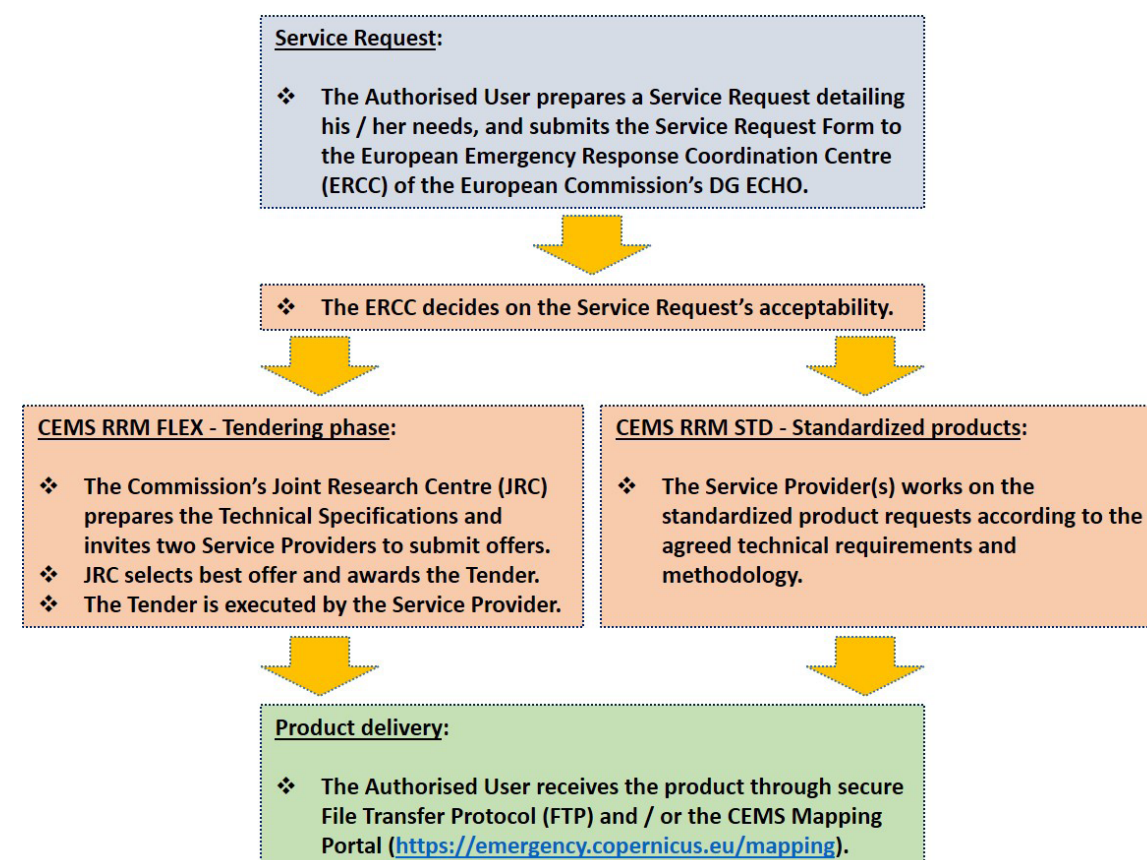


Figure 1: Overview of the workflow for the CEMS Risk & Recovery Mapping (RRM) module.



## JRC study: Measuring the performance of Natech risk management over time and across countries

Industrial facilities and critical infrastructure are vulnerable to the impact of natural hazards. These impacts can trigger so-called Natech (Natural Hazard Triggering Technological Disasters) accidents and the release of toxic substances, fires and explosions, potentially resulting in health effects, environmental pollution and economic losses. This article presents some results of a study by the European Commission's Joint Research Centre (JRC) that considered in detail the most important factors driving Natech risk, proposed a set of indicators to help measure a country's level of Natech risk reduction, and provided targeted recommendations on how to close persisting gaps related to Natech research and policy challenges.

Natech risk is expected to increase in the future, because of both climate change and human development leading to more industrialization and urbanization. It is therefore important to continue efforts at reducing Natech risk. Since there is no reliable point of reference for comparing levels of Natech risk, the JRC has proposed a set of high-level indicators to measure the performance of Natech risk management over time. Countries can use these indicators as a simple self-assessment of their status, while at the same time providing a baseline against which future progress can be gauged. The indicators also facilitate the comparison of Natech risk reduction levels between countries at the same point in time.

Many hazardous industrial activities, such as refining, oil and gas production and transport, nuclear power generation or the preparation of rare specialty chemicals, provide society with indispensable goods and services. Unfortunately, past events show that these activities are vulnerable to Natech accidents, causing releases of hazardous substances, fires and explosions. Natech events continue to occur, even in countries with generally high levels of preparedness and advanced capacity for disaster risk management.

To provide a measure of progress in Natech risk management, qualitative indicators can be used as proxies. These proxies should relate to human, financial and physical resources, as well as to the legal and administrative infrastructure available. The following eight high-level indicators are considered key elements for judging the level of Natech risk reduction in a global context:

- **Awareness:** Awareness of Natech risk.
- **Legal framework:** Existence of a legal framework for Natech risk reduction.
- **Data collection:** Collection of accident data.
- **Natural hazards:** Natural hazards considered.
- **Industrial activities:** Type of activity that

Figure 2: Examples of the products for CEMS RRM FLEX activation # EMSN037, concerning a multiple hazards risk assessment for three cities in Chile, Peru, and Mozambique, as requested by UNESCO's section on Earth Sciences and Geo-Hazards Risk Reduction.



considers Natech risk.

- **Risk assessment:** Assessment of Natech risk.
- **Risk maps:** Availability of Natech risk maps.
- **Preparedness:** Extent of Natech preparedness.

The choice of the proposed eight indicators is based on expert judgment, and assumes that basic information on technological and natural hazards already exists (e.g. industrial facility registers including type of activity, type and amount of hazardous substances present, industry location; natural hazard information).

The proposed indicators are high-level markers on a four-tier scale ("none"; "low"; "medium"; "high") that can consist of one or more sub-indices. For example, the indicator on **Awareness** can include risk communication and dissemination of information on Natech risks between stakeholders. The indicator on **Legal framework** could comprise components such as application of land use and emergency planning, or a requirement for a periodic review of safety levels, in particular in view of climate change. The indicator on **Data collection** should also consider near misses and success stories, e.g. effective prevention and mitigation measures, to be even more useful for lesson-learning studies. Sub-components of the indicator on **Preparedness** could include Natech scenarios in emergency-response drills, training of on- and off-site first responders, or the availability of response equipment adequate for natural disaster situations.

The proposed performance indicators can be aggregated into a composite index to represent a country's overall level of Natech risk reduction, or alternatively, the individual indicators can be compared separately, as shown in the Figure below. Full details of the JRC study on Natech risk drivers and risk management performance indicators, are provided in Krausmann et al. (2019).

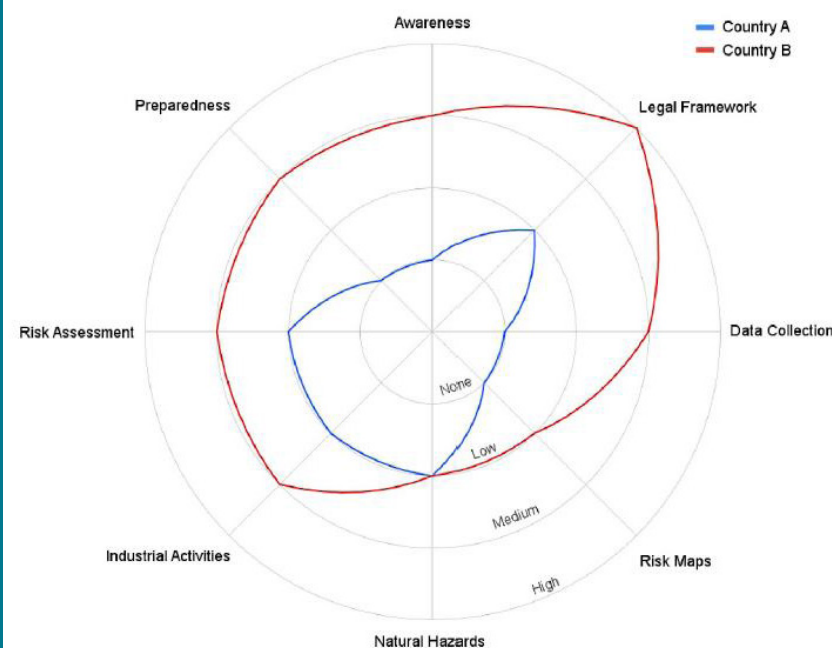
Elisabeth Krausmann

European Commission, Joint Research Centre (JRC)

#### References:

Krausmann, E., S. Girgin, and A. Necci. 2019. Natural hazard impacts on industry and critical infrastructure: Natech risk drivers and risk management performance indicators. *International Journal of Disaster Risk Reduction*, Volume 40, 101163. <https://doi.org/10.1016/j.ijdrr.2019.101163>

Example visualization of the proposed qualitative Natech risk reduction measures for two countries. From: Krausmann et al. (2019).



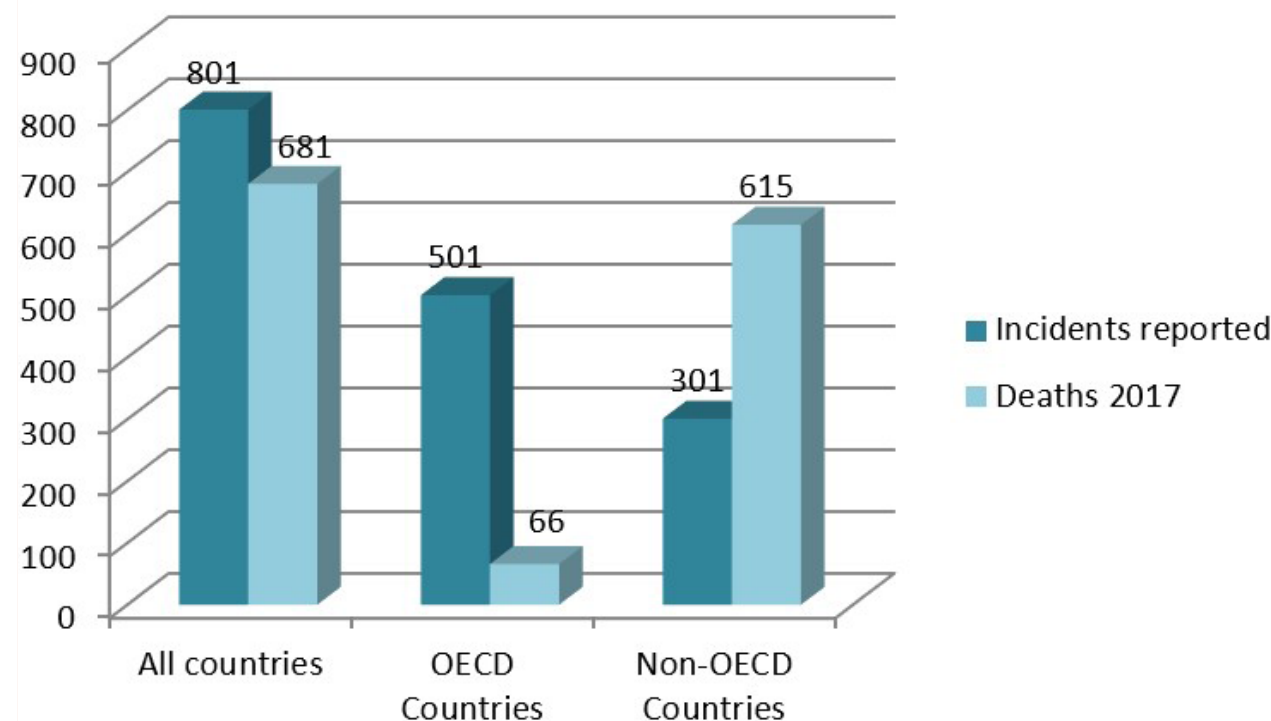
## JRC study: Challenges and opportunities for assessing global progress in reducing chemical accident risks

Significant chemical accident hazards are present in a wide variety of industries, with vast differences in the substances, processes, technology and equipment that create the risk. Recently there has been increased reflection at international level on how to measure the impacts of regulation of chemical accident risk, and its effectiveness in reducing the risk. This article describes a study by the Major Accident Hazards Bureau (MAHB) of the European Commission's Joint Research Centre (JRC) that addresses the widespread lack of data for assessing chemical accident risk globally, and offers insights to national and international governments on what kinds of data could be useful in understanding what geographic regions might be vulnerable to such disasters.

As is highlighted by the study, at present there are very limited data collected for assessing the status of chemical accident risk globally. Some sources of data on chemical accidents in government and industry can be used to quantify the frequency and severity of some types of events, but they fall far short of covering all chemical accidents in industry and commerce globally. The heterogeneous nature of chemicals, the infinite ways in which chemical engineering transforms chemicals into products, and the vast infrastructure of road, pipelines, ships and railways, facilitating product distribution, are intrinsic to the challenge of assessing global chemical accident risk and predicting the next catastrophe.

The study provides several conclusions, as a starting point for discussions about how countries can improve their knowledge about their vulnerability to chemical accident risk:

- An assessment of chemical accident risk reduction is imperative, to improve policy decision-making in and allocation of resources to this policy area. However, there is still a long way to go in establishing appropriate measures and collecting the required data.
- Further international dialogue may be needed to consolidate knowledge and experience, make recommendations to countries still lacking assessment methods, and test some ideas.
- Substantial reflection and coordination at an international level will be required to identify measures that are applicable in a broad range of countries with varying levels of industrial activity, institutional arrangements and practices for governing industrial risk, and cultural and social characteristics.
- Particularly in the last decade, innovative ideas have emerged that can form the basis for international recommendations for data collection and development of implementation models.
- The complexity of improving risk management can be a daunting task for emerging economies, and systematic measurement can help them prioritize and target problematic areas.
- Risk assessment must cover all hazard sources (fixed facilities, transport, pipelines, and offshore facilities), as well as non-chemicals industries using dangerous substances that require hazard control.
- The low frequency of severe chemical accidents in many developed countries means that incident data for any one country or industry, or across several countries and sites, are not a reliable indicator of underlying risk, particularly



in locations where a certain level of risk control already exists. These data are a starting point but must be coupled with data and information representing leading indicators.

- It will take some years to establish, test and implement these recommendations so that more countries are encouraged to establish and implement their own assessment strategies. The many countries that are already leading the way could perhaps hasten the process, by way of example.

Full details of the JRC study on global progress in reducing chemical accident risks, are provided in Wood and Fabbri (2019).

Maureen Wood and Lucciano Fabbri  
European Commission, Joint Research Centre (JRC)

For more information:  
<https://minerva.jrc.ec.europa.eu/en/minerva>



## News from the Horizon 2020 project SHELTER: Sustainable Historic Environments Holistic Reconstruction through Technological Enhancement and Community-Based Resilience

Due to the effects of climate change, during the last decades an increasing number of climate-related hazards has had impacts on Cultural Heritage, posing new challenges for conservators and heritage managers. The Horizon 2020 project SHELTER (Sustainable Historic Environments Holistic Reconstruction through Technological Enhancement and Community-Based Resilience), which was launched in June 2019, aims at developing a data-driven and community-based knowledge framework that will bring together the scientific community and Cultural Heritage managers, with the objective of increasing resilience, reducing vulnerability and promoting better and safer reconstruction in historic areas.

The first step in enhancing resilience is an improved understanding of the direct and indirect impacts on historic sites and buildings of climatic and environmental changes and natural hazards, by linking concepts commonly used in disaster risk management (DRM) and climate change adaptation with Cultural Heritage management, in order to provide inclusive and informed decision-making. Comprehensive DRM plans need to be prepared, based on the specific characteristics of Cultural Heritage and the nature of the hazards within a regional context, taking into account the diverse heritage typologies as well as the specific socio-economic conditions, which directly affect the vulnerability of such systems.

Through a deep understanding of the hazard, expo-

#### Reference:

Wood, M.H. and L. Fabbri. 2019. Challenges and opportunities for assessing global progress in reducing chemical accident risks. *Progress in Disaster Science*, Volume 4, 100044. <https://doi.org/10.1016/j.pdisas.2019.100044>

Number of chemical incidents occurring in 2017, based on reports in the global media. From: Wood and Fabbri (2019).



sure and vulnerability of the historic area, the local dynamics, and the provision of innovative governance and community-based models, it is possible to provide useful methodologies, tools and strategies to enhance resilience and secure sustainable reconstruction.

Due to the complexity of the information and the diverse sources of data, the operational framework for SHELTER will be implemented as a multi-scale, multi-source, data-driven platform, able to provide community- and evidence-based support to local authorities, urban planners, conservation practitioners, first responders, Cultural Heritage owners and managers. This will serve to guide historic areas in transforming towards a more resilient, circular, smart and inclusive historic environment, taking advantage of the window of opportunity provided by the awareness, adaptation and preparations against hazards.

The SHELTER operational knowledge framework will include a set of tools and methods, comprising: Shelter Information Models and Databases (data lake and multi-scale data model and best / next practices observatory); Shelter Services (systemic cross-scale resilience assessment and resilience ID generation incremental strategy); Shelter Tools (data-driven platform, resilience dashboard - early warning systems; rapid damage assessment; crowd-sourcing solutions - and strategic resilience decision support system). Such tools will leverage on diverse approaches

such as: (a) A data lake for heterogeneous data (e.g. satellite imagery, sensor data, geo-environmental and social Big Data, existing building and disaster databases and crowd-sourcing). (b) A multi-scale data model to structure all information from case studies. (c) A "Best / Next Practices Observatory" that will link the portfolio of sustainable and cost-effective solutions for adaptation and reconstruction, governance schemes, co-creation processes, blueprints, and resilience financing and business models.

All of the SHELTER project's developments will be validated in five "open labs", representing the main climatic and environmental challenges in Europe, and different heritage types: the World Heritage Site of the Santa Croce church and archeological area in Ravenna (IT); the coastal district of Seferihisar (TR); the old town of Dordrecht and its island (NL); the Baixa Limia - Serra do Xurés natural park in Galicia (ES); and the trans-boundary Sava River Basin.

Elizabeth Nerantzis,  
Alpha Consult s.r.l., Italy

For more information:

<https://shelter-project.com/>

<https://en.unesco.org/fieldoffice/venice/historicenvironments>

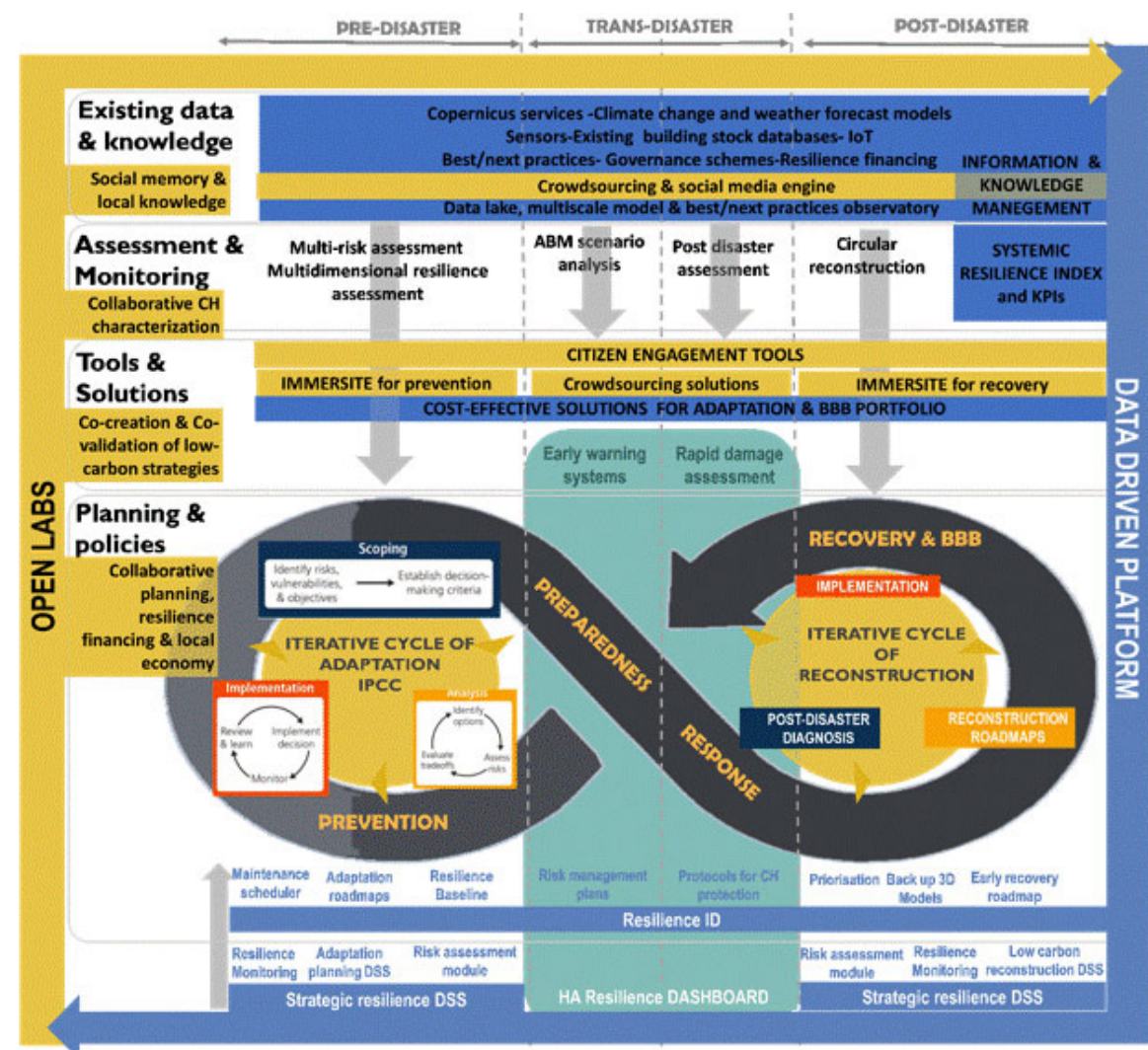


Illustration of the  
SHELTER operational  
knowledge framework.  
© SHELTER project,  
2019.



## News from the PLACARD Project: Innovative Climate Change Adaptation and Disaster Risk Reduction financing for the European Green Deal

The European Green Deal, which was unveiled by European Commission President Ursula von der Leyen on 11 December 2019, contains a set of strategic measures with the overall aim of transforming Europe into a "climate-neutral" continent (i.e. having an economy with net zero emissions of greenhouse gases) by 2050. To achieve this, the Sustainable Europe Investment Plan (SEIP) - the investment pillar of the Green Deal - should mobilise at least €1 trillion in sustainable investments over the next decade.

A recently published report (Sushchenko and Schwarze, 2020) on Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR) financing, which was prepared as part of the PLACARD (Platform for Climate Adaptation and Risk Reduction) project ([www.placard-network.eu](http://www.placard-network.eu)), argues for an updated version of the road map to the Green Deal. This refined document should enhance the "EU Taxonomy" (i.e. the unified EU classification system for sustainable activities) and the "EU Green Bond Standard" (EU-GBS), with more emphasis on CCA and DRR aspects.

According to the SEIP, the main financial support for implementing the Green Deal should be provided by the EU budget and the European Investment Bank (EIB). But there is a significant investment gap - 180 billion EUR per year, as estimated by the European Commission - between what should and can be done. For this reason, the EU financial market must receive a clear signal to deliver further resources to facilitate implementation of the Green Deal measures. Unfortunately, the existing framework for disclosure regarding non-financial information, labelling of the debt financial instruments, and identification of green projects does not sufficiently cover CCA and DRR aspects. This is a missed opportunity. By updating the Green Deal and related measures (particularly the EU Taxonomy) we could significantly improve the efficiency of related CCA and DRR investments, by lowering transaction costs and avoiding expensive duplications of efforts.

The main problem in mobilising sufficient green finance is the high transaction costs, mostly related to the need for reliable and high-quality information, making access to the green financial market very expensive in terms of time and cost, for small and medium businesses. IT solutions could help to collect process and store the information, so reducing these transaction costs.

Available mechanisms for mobilisation of CCA and

DRR finance range from self-financing tools to risk transfer mechanisms, where IT solutions play an important role in implementation of the so-called "3D Nexus" (de-risking, digitalisation and decentralisation), which grants collection, processing and storage of reliable and frequently updated climate-related data.

For example, **distributed ledger technology (DLT)** - using independent computers (nodes) to record, share and synchronize transactions in their respective electronic "ledgers", without a centrally coordinating entity - is crucial in allowing small farmers to collect information about their financial flows and adjust it to the weather conditions. As a result, they can save money in times of ideal weather conditions and increased productivity, and use the saved money when extreme weather events or natural disasters occur.

DLT also plays an important role in providing crisis or contingent financing. **Forecast-based financing (FbF)** is an example where DLT could facilitate an immediate provision of financial support to every citizen in case of natural disasters or extreme weather events. Use of FbF combined with DLT could speed up financial recovery, delivering repayment within minutes.

Climate-related risks and extreme events have immense negative economic and social impacts, and resulting damages can be very high for insurance companies, requiring implementation of public mechanisms to cover the risks. Existing examples (such as the "Blockchain Climate Risk Crop Insurance" - a digital platform for standardized crop insurance for smallholder farmers in Africa) show that DLT-based **climate insurance pools** or **sovereign insurance funds** could deliver solutions in these cases.

The **European Stability Mechanism** was created following the European debt crisis that started in 2009, to reduce systemic risk and counteract speculative transactions on the financial market. At the same time, climate change is widely acknowledged at EU level as a systemic risk, requiring a systemic approach for protecting not only the economy, but also the financial system and society. The share of alternative capital on the reinsurance market for climate-related risks has seen steady growth, outpacing growth rates in the traditional part of the reinsurance market. Here, collateralised financial instruments play an important role in further developing this area of reinsurance. Moreover, according to the recommendations of **Solvency II** (the EU Directive on EU insurance regulation) innovative and synthetic insurance derivatives (versus traditional insurance) can be considered best for managing the risks.

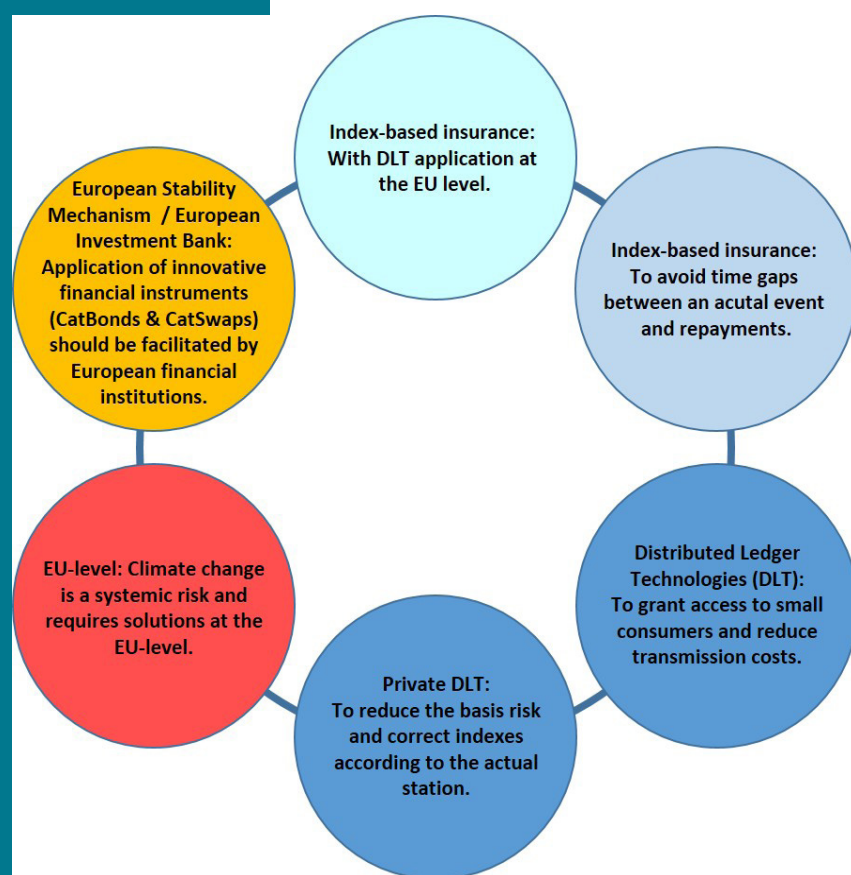
As a result, establishing a "European Risk Transfer Mechanism" (or ERTM) is essential, which could avail of the facilities of the European Stability Mechanism, and the opportunities of DLT. Using the ERTM, the sovereign insurance funds could transfer their climate risks to the financial market through catastrophe bonds and swaps. DLT could speed up collecting of the necessary information from the sovereign insurance funds, and use it to manage

### References:

Sushchenko, O. and R. Schwarze. 2020. *Economics and finance of disaster risk reduction and climate change adaptation: Main gaps identified in arising alignment opportunities for the EU Green Deal*. PLACARD project, FCIências.ID, Lisbon.



Components of the new risk transfer scheme, in combination with distributed ledger technologies (DLT) at the EU level. Adapted from: Sushchenko and Schwarze (2020).



## News from the PLACARD Project: Narratives as a “soft” policy tool for climate change adaptation and disaster risk reduction

The overwhelming impacts of the current climate crisis are widely acknowledged by scientists, governments and - more recently - the general public. Despite this common understanding, policies and concrete action have been slow to materialise, and it can be daunting for people to consider how they might help. Policy-makers and researchers can provide technical solutions to reduce the impacts

of their operations with innovative risk transfer instruments. Application of DLT could also improve management of climate-related risks, whereby collecting, processing and storing the information could become quick and reliable.

Oleksandr Sushchenko, Reimund Schwarze, Gabriela Michalek, Helmoltz Centre for Environmental Research (UFZ), Leipzig, Germany, and Ingrid Coninx, Wageningen University & Research, The Netherlands.

For more information:  
[www.placard-network.eu/wp-content/PDFs/PLACARD-Economics-and-finance-of-CCA-DRR.pdf](http://www.placard-network.eu/wp-content/PDFs/PLACARD-Economics-and-finance-of-CCA-DRR.pdf)

of disasters or to adapt to those impacts. However, the potential for narratives and storytelling to reach a much broader audience is often overlooked. People understand their local community better than anyone else, so why not harness that knowledge and encourage the sharing of narratives to change behaviour? This article describes work carried out as part of the EU Horizon 2020 project PLACARD (Platform for Climate Adaptation and Risk Reduction), in which strategic “narratives” (i.e. stories with a purpose in mind) were explored as “soft” policy tools to facilitate actions, across scales, on climate change adaptation and disaster risk reduction, for a climate-resilient future.

The concept of strategic narratives is quite new (and still underestimated) in the domains of climate change adaptation and disaster risk reduction. However, in other fields, such as international relations, it has proven to be effective and is widely recognised and used.

Scholars in international relations refer to strategic narratives as “soft power in the 21st century”. In the post-Cold War political scene, strategic narratives were used to create the new world order (Roselle et al., 2014). These narratives determine acceptable (or not) actions, legitimised (or not) policies, and building on and attracting shared meanings and values, involving feelings and / or emotions (Nye Jr., 2008; Miskimmon et al., 2013).

Cognitive psychologists and neuropsychologists confirm that that it makes sense to argue this way. As humans, we are exposed to stories from early childhood (e.g. bedtime stories). We understand and produce stories of our own in order to learn and develop social skills. Therefore, it is not surprising that our brain is very used to processing stories, even better than pure explanatory texts or data. According to the new cognitive psychological models, stories can also induce “mental simulations” by experiencing corresponding emotions (Mar 2004), which are considered as particularly effective triggers for action.

Using strategic narratives for prevention and preparedness can potentially facilitate climate adaptation and risk reduction, thereby supporting existing resilience policies. However, constructing such narratives is anything but trivial. A successful strategic narrative must be tailored to the selected Target Group (one size does not fit all) and context. Here the prevailing norms and values of the Target Group, previous experiences, as well as many personal factors such as origin or education need to be appropriately considered. The credibility of the narrator is also decisive for the strategic success of a narrative.

The PLACARD Recipe Book (which is available at the web-link below) provides a compact guide to help you to design effective strategic narratives for disaster preparedness and resilience, and is based on the results of a series of PLACARD workshops involving practitioners and scholars in climate change adaptation and disaster risk reduction.

Gabriela Michalek and Reimund Schwarze, Helmoltz Centre for Environmental Research (UFZ),



Germany, and Ingrid Coninx, Wageningen University and Research, the Netherlands

For more information:  
<https://youtu.be/p190i0-Q8s8>  
[www.placard-network.eu/recipe-book/](http://www.placard-network.eu/recipe-book/)



## European Commission's latest Annual Report on Forest Fires in Europe, the Middle East and North Africa



On 31st October 2019, the European Commission published its latest Annual Report on Forest Fires in Europe, the Middle East and North Africa, covering the year 2018. According to the report (which can

be downloaded at the first web-link below), during 2018 wildfires destroyed nearly 178,000 hectares (ha) of forests and land in the EU. While this is less than a sixth of the area burnt in the previous year (2017), and less than the long-term average, more countries than ever before suffered from large fires in 2018.

Key findings of the latest Annual Report on Forest Fires:

- Sweden had its worst fire season in reporting history in 2018. The total burnt area of over 21,605 ha mapped in Sweden was the second highest in the EU - an unusual ranking for a northern country. Although Portugal was again the country with the highest burnt area, its total was a small fraction of the area lost to fire in 2017 and one of the lowest totals of the last 10 years.
- Vulnerable ecosystems of the Natura 2000 network - home to several endangered plant and animal species - lost 50,000 ha to fires, accounting for 36% of the total burnt area in 2018.
- Despite a smaller overall area burnt than in previous years, above average temperatures persisted in central and northern Europe for most of the summer of 2018. This created conditions that helped the ignition and spread of forest fires, causing high economic and environmental losses.

The EU's Union Civil Protection Mechanism (UCPM) was activated five times in 2018 to respond to forest fires in Europe (in Sweden, Greece, Latvia, and Portugal). In total, 15 planes, 6 helicopters and over 400 firefighters were mobilised in the summer of 2018, with the EU funding €1.6 million in transportation costs to mobilise support to affected countries. Furthermore, over 139 Copernicus satellite maps on forest fires were produced at the request of Member States. In addition, the EU sent forest fire experts from across the EU to Portugal on a prevention and preparedness mission, to help boost the country's capacity to deal with forest fires.

In March 2019, as part of the upgraded UCPM, a new European reserve of capacities - “RescEU” - was launched, in order to complement existing national capacities, and improve further the protection of citizens from disasters and the manage-

Cartoon by Bertram de Rooij, Wageningen University and Research / PLACARD Project.

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- Roselle, L., A. Miskimmon, and B. O'Loughlin. 2014. *Strategic narrative: A new means to understand soft power*. Media, War & Conflict, Vol. 7 (10).



ment of emerging risks in Europe and beyond. In the summer of 2019, the EU created a transition fleet of firefighting aircraft, which was deployed in 2019 to fight forest fires in Greece and Lebanon, for example. Additionally, in July 2019, the European Commission published a comprehensive Communication (see web-link below) calling for the stepping up of EU action on global deforestation and forest degradation, and committed itself to further action, including the development of the European Forest Fire Information System (EFFIS) into a tool for wildfire monitoring on a global scale.

The report “Forest Fires in Europe, Middle East and North Africa 2018” also notes that the 2019 fire season started early, due to dry and windy conditions, with high temperatures. Already by March 2019, the number of fires was higher than the average for a whole year during the last decade, with numerous fires in mountain regions and critical fires in the Danube delta.

The Commission’s Annual Report on Forest Fires 2018 was prepared and published by the Joint Research Centre (JRC) in collaboration with other Directorate-Generals (DGs) of the Commission, including DG ENV, DG CLIMA, DG GROW and DG ECHO, and the national wildfire administrations of 33 countries out of the 43 countries that constitute the Commission’s Expert Group on Forest Fires (EGFF).

Jesús San-Miguel-Ayanz  
European Commission, Joint Research Centre (JRC)

For more information:  
<https://ec.europa.eu/jrc/en/publication/forest-fires-europe-middle-east-and-north-africa-2018>  
[https://ec.europa.eu/environment/forests/eu\\_comm\\_2019.htm](https://ec.europa.eu/environment/forests/eu_comm_2019.htm)  
[https://ec.europa.eu/info/publications/commission-policies-forest-fires\\_en](https://ec.europa.eu/info/publications/commission-policies-forest-fires_en)  
<https://effis.jrc.ec.europa.eu>

Country	Number of fires	Burnt area (ha)
Italy	147	14,649
Spain	104	12,793
Portugal	86	37,357
UK	79	18,032
Sweden	74	21,605

### News from the Horizon 2020 project BRIGAD’s Wildfires Community of Innovation (Col)

Fires are a paradox. While on the one hand, the control of fire is one of humanity’s greatest and most positive discoveries, on the other hand - when

Countries with the highest numbers of fires of 30 ha or larger, mapped by the European Forest Fire Information System (EFFIS) in 2018:

it is uncontrolled in time and in space - fire can be devastating, threatening lives, goods and nature. Wildfires - an example of the latter instance - have been increasing in number and intensity in recent years. Although in the past southern Europe has been most commonly affected by wildfires, in more recent times all parts of Europe are starting to face this threat, with various studies highlighting the high vulnerability to wildfires of northern European countries. BRIGAD (Bridging the Gap in Innovations in Disaster Resilience) is a four-year (2016-2020) Horizon 2020 project that aims at effectively bridging the gap between innovators and end-users in resilience to three groups of climate-driven disasters that affect Europe - namely floods, droughts and extreme weather (including wildfires). As part of the BRIGAD project, so-called “Communities of Innovation” (Col) have been developed, which are defined as a form of Communities of Practice aimed at supporting innovation, by facilitating outreach marketing and the uptake of innovative and operational products and solutions.

Specifically, BRIGAD’s Col are designed as social networks composed of several geographically connected actors in one or more disciplines, but with a common goal: the development and uptake of innovative solutions to specific impacts from climate change. Recognising that climate change adaptation is a place- and context-specific process, each Col is aimed at bringing together the actors - specifically innovators, end-users, leading sectoral users, investors and societal interest groups - in areas with common problems, such as risk reduction to a specific hazard or cluster of hazards, and environmental conditions.



The key role of BRIGAD’s Wildfires Col - which is coordinated in Portugal - is dissemination, by facilitating the sharing of knowledge between teams and bringing together innovators, researchers, end-users, policy makers and stakeholders. For this purpose, a powerful and useful tool for dissemination and engaging the interest of different innovators, is BRIGAD’s “Climate Innovation Window” (<https://climateinnovationwindow.eu/>), which is a web-based platform that provides a virtual window and market-place for end-users and innovators to meet, and share and discover innovations for climate change adaptation.

In relation to wildfires, there are seven innovations (three in Portugal, one in Spain, one in Italy, two in Albania), ranging in Technology Readiness Level (TRL, indicating the maturity level of the technologies - see Table below) from TRL 3 to TRL 7, and addressing different phases of the Integrated Fire Management (IFM) approach that is used for effective forest fire management and risk-informed policy-making. As can be seen in the Figure below, four of the Wildfires Col innovations address the IFM Preparedness phase, which includes surveillance and fire detection, mostly using drones and Artificial Intelligence. Three innovations address the IFM Prevention phase, focussing directly on reduction of fuel load, or implementation of low flammable fibres in the soil. These latter three innovations also address the IFM Response phase, aimed at increasing the effectiveness of firefighting and safety, using drones helps to extinguish fires, as well as providing real-time information to the firefighting crews. The IFM Restoration and Adaptation phase is the only one that has not been addressed so far by innovators.

BRIGAD’s Wildfires Col has proved to be an effective forum for bringing together innovators and end-users, and providing rich discussions and opportunities for mutual learning. It has opened new pathways, for example by tweaking practices with redesigned approaches, such the use of nature-based solutions (e.g. grazing) to create “FireSmart” landscapes, with the focus of prevention, restoration and adaptation.

Conceição Colaço and Susana Dias,  
Centro de Ecologia Aplicada Prof. Baeta Neves (CEABN),  
Instituto Superior de Agronomia, Portugal, and  
Elena López Gunn,  
ICATALIST S.L., Spain.

For more information:  
<https://brigaid.eu/>  
<https://brigaid.eu/engage-as-an-end-user-2018/communities-of-innovation/>

LEVEL	DEFINITION
TRL 1	Basic principles observed.
TRL 2	Technology concept formulated.
TRL 3	Experimental proof of concept.
TRL 4	Technology validated in lab.
TRL 5	Technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies).
TRL 6	Technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies).
TRL 7	System prototype demonstration in operational environment.
TRL 8	System complete and qualified.
TRL 9	Actual system proven in operational environment (competitive manufacturing in the case of key enabling technologies; or in space).

### News from the Horizon 2020 project GEO-SAFE: Connecting scientists and first responders to provide modelling solutions for wildfire management in Australia and Europe

GEO-SAFE (Geospatial-based Environment for Optimisation Systems Addressing Fire Emergencies) is a four-year (2016-2020) Horizon 2020 collaborative project aimed at creating a network enabling the EU and Australia to exchange knowledge, ideas and experience , thus boosting the progress of wildfires knowledge and the related development of innovative methods for dealing efficiently with such fires. More precisely, GEO-SAFE focuses on developing the tools for setting up an integrated decision support system

Scale of Technology Readiness Levels (TRLs), as defined in the EU’s Horizon 2020 Work Programme 2016-2017 (European Commission Decision C(2017)2468 of 24 April 2017).

Integrated Fire Management (IFM) phases addressed by the seven innovations of the BRIGAD project’s Wildfires Community of Innovation (Col), and corresponding Technology Readiness Levels (TRLs).



optimizing the resources during the response phase. In November 2019, mathematical experts in disaster risk and practitioners closely linked to humanitarian cooperation, computer science, physics and emergency management, with a long history of managing wildfires in both Australia and Europe, met at the Royal Melbourne Institute of Technology (RMIT) University in Australia, to present the outcomes of the GEO-SAFE project and to highlight possible solutions to manage wildfires.

Key topics addressed at the GEO-SAFE meeting in Melbourne were: fire risk mapping; methods for wildfire prevention and mitigation; innovative solutions for fire managers; first responders and initial attack; evacuations and tools for emergency managers. In addition, the meeting hosted special sessions on: trans-disciplinary pathways for collaboration with indigenous people; research gaps and priorities to be addressed in the future; wildfire risk reduction - opportunities for international collaboration.

The results of the special session on identifying research needs and priorities (chaired by Prof. John Handmer of RMIT) are highlighted below. Research gaps are grouped under three main topics: Collaboration between science and practice; Next steps for fire modelling; Knowledge needs to improve models.

Collaboration between science and practice: The existing policy and legal framework needs an urgent re-examination. Getting information about wildfires in real time is a challenge, due to bureaucracy. The collection of data and useful information is needed to better coordinate research and drive innovation in the field of wildfires. Regarding data collection, currently data and information are fragmented

and dispersed. It is hard to find case studies with all data to cover research needs. There is the need to join efforts for a coordinated global database. One of the main challenges is to integrate all of the models to develop efficient tools to help practitioners in the decision-making process.

Next steps for fire modelling: Fire models should consider the effects of suppression operations on fire progression: fire growth should be modified while suppression operations are deployed, and the resulting fire perimeter should reflect these operations when validated on the field. To understand reality we build fuel models that are simple. But sometimes the models are too simple to explain the most complex fire phenomena like energy release and the relationship of spotting and flammability thresholds.

Knowledge needed to improve models: To improve models, first there is the need for a better understanding of the fire behaviour mechanisms - e.g. generation, travelling and ignition - that drive spotting (i.e. the behaviour of a fire producing sparks or embers that are carried by the wind and which start new "spot fires" beyond the zone of direct ignition by the main fire). Smoke generation models need to integrate implications for the health of first responders. There is a lack of understanding about the energy and atmosphere thresholds that can cause a pyrocumulus cloud (also called a flammagenitus or fire cloud) to develop into a pyrocumulonimbus (PyroCb) cloud: specifically, how this phenomenon creates feedbacks with the main wildfire.

After identifying the main gaps, participants at the conference were asked to select those three gaps which they considered the most urgent. First

responders are of the opinion that the research should focus primarily on operations, PyroCb and fire modelling, while researchers find that there is firstly the need to solve the issues regarding lack of data, and focus on decision-making gaps.

**John Handmer,**  
Royal Melbourne Institute of Technology (RMIT)  
University, Australia  
**Oriol Vilalta, Jordi Vendrell, and Celia Conde,**  
Pau Costa Foundation (PCF), Spain

For more information:  
<https://geosafe.lessonsonfire.eu/fireconference/>  
<https://geosafe.lessonsonfire.eu/2019/07/09/workshop-optimization-methods-in-wildfire-emergency-management/>



## News from the Horizon 2020 project CLARA: Climate forecast enabled knowledge services

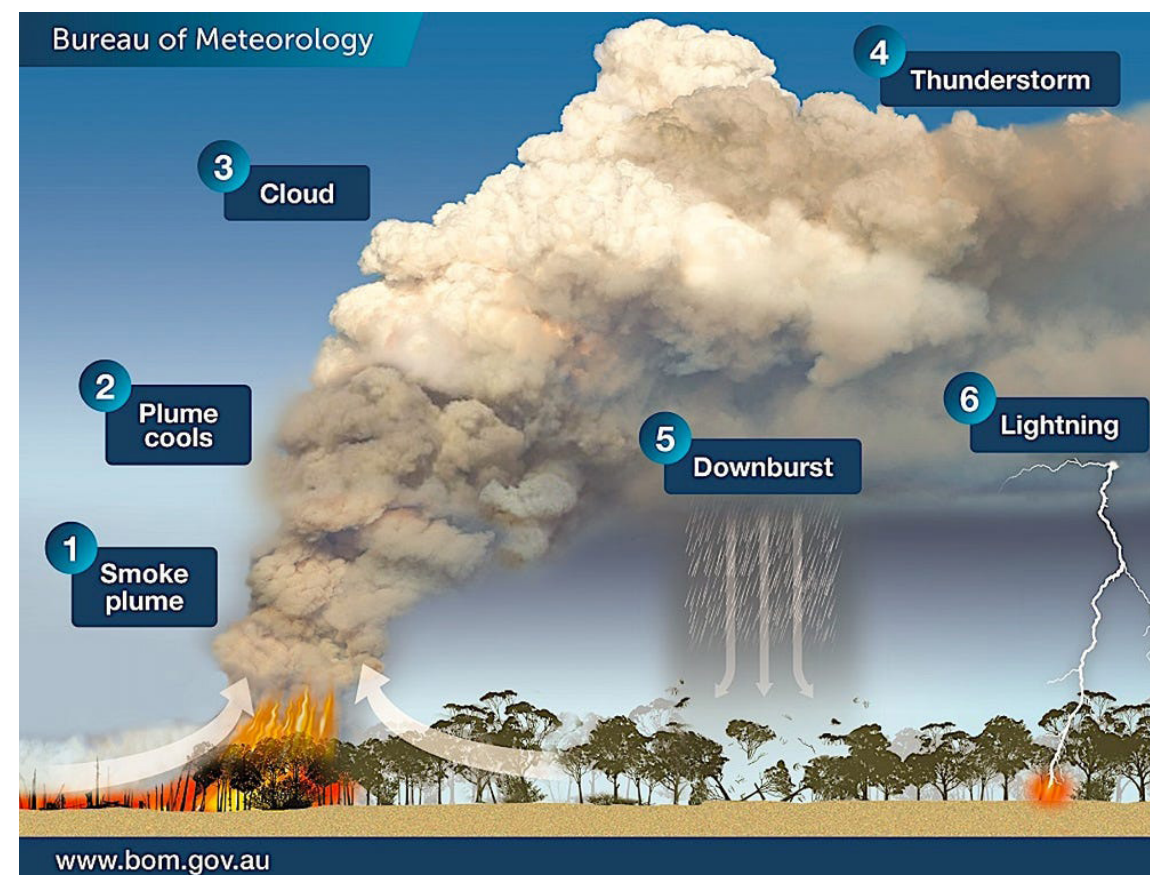
The Horizon 2020 project CLARA (Climate forecast enabled knowledge services) was created to develop climate services able to translate climate information into climate knowledge, thus helping local decision-makers to take informed and science-based decisions on climate adaptation issues. Building on recent advances in climate modelling in the context of the EU's Copernicus Climate Change Services, the CLARA project, which started on 1st June 2017, illustrates the genuine benefits and economic value of short and long-term climate forecasts, and aims at further developing operational climate services for more efficient management of natural resources and better resilience to climate change.

To achieve its aim of developing leading edge climate services, the CLARA project team set up a Multi-User Forum (MUF) that facilitates the dialogue with the many and different intended users of the climate services developed. The MUF journey started in March 2018 in Stockholm, Sweden, with a first Workshop that focused on the meaning and value of seasonal and sub-seasonal forecasts for users. The second MUF Workshop took place in November 2018 in Cordoba, Spain, and focused on co-development: how users and providers can work together to maximise the impact of climate services.

The third and last MUF Workshop of the CLARA project took place on 3-4 October 2019 in Venice, Italy, hosted by the project coordinator, the Euro-Mediterranean Centre on Climate Change (CMCC). The meeting included 60 participants from different organizations such as public administrations, civil protection agencies and commercial enterprises. This third MUF Workshop, which aimed to identify and address the barriers to and enablers of the implementation of the climate services developed within the project, focused on the final and most exciting phase of climate services development: business plans and marketing strategies. Current strategies were revised and barriers to implementation were identified and analysed in their social and economics dimensions through a series of innovative and interacting settings.

The MUF has proven to be an efficient - and essential - tool to foster the co-generation of the CLARA climate services beyond the context of the local case studies engaged in the project. Not only the MUF diversity of stakeholders, but also their individual scopes, have led to key discussions and final decisions regarding the following steps in the co-generation process during the project. In particular, the definition of an inter-phase language between data providers of forecasts and end-users within the services, their range of applicability, the framework to produce valuable and business-like products, and market issues, have largely benefit-

A pyrocumulonimbus (PyroCb) cloud is a type of cumulonimbus or thunder cloud that forms above a source of heat, such as a wildfire, that may cause extreme weather phenomenon, like downburst or lightning, creating extreme fire conditions for ground and aerial firefighting operations. Graphic from: <http://media.bom.gov.au/social/blog/1618/when-bushfires-make-their-own-weather/>



Participants at the CLARA project's third Multi-User Forum (MUF) Workshop - "Business and market strategies for climate services" - held in Venice Italy, on 3-4 October 2019. © CLARA Project, 2019.



ted from the conclusions of each MUF. Without a doubt, the MUF itself is one of the most relevant products from CLARA, which will continue its dynamics beyond the project duration.

As the project coordinator, Jaroslav Mysiak, said, “Climate services will play a crucial role in the new European Green Deal [released in November 2019] to set the priorities of the European Commission towards climate action: they will help decision-makers to deliver on promises and pledges for climate adaptation and to push forward the transformational shift needed. Climate services are the enablers of a better climate adaptation in Europe”.

Ottavia Carlon,  
Euro-Mediterranean Centre on Climate Change (CMCC)  
and  
Maria Polo (University of Cordoba)

For more information:  
<http://www.clara-project.eu/news/clara-3rd-muf-work-shop-a-successful-and-innovative-event-131/>



Successful testing of JRC’s  
“Tsunami Last Mile” early  
warning prototype system, in  
Kos, Greece

Late last year (on 9 November 2019), on the Greek island of Kos, the last step of the Tsunami Last Mile project - called the “KOSWAVE19-LM” exercise - took place. The Tsunami Last Mile project was initiated by the European Commission’s Joint Research Centre (JRC), following two tsunami



events in the Aegean Sea on 12 June and 20 July 2017, which affected the coasts of Greece and Turkey. In both cases, tsunami warnings issued at central level did not reach local authorities to enable the timely alerting of the exposed population.

In agreement with and supported by DG ECHO (the Commission’s department for humanitarian aid

and civil protection), the JRC designed an innovative prototype for a local tsunami warning network aimed at solving the so-called “Last Mile” issue - namely the timely provision of alert information to the local population, in the worst case scenario of near-to-shore tsunami events. The Tsunami Last Mile prototype system relies on a suite of technological solutions, installed locally, that can detect tsunami events and alert the community in question in a timely fashion. This system foresees integration with the national tsunami warning system, ingesting national alert messages, to confirm or integrate what is detected locally.

During the KOSWAVE19-LM exercise - which started at 10:31 (local time) and lasted about 4 hours - the full local emergency management system (i.e. Municipal Civil Protection, Fire Service, Police, Municipal Police, Ambulance Service, Kos General Hospital, Greek Red Cross and Hellenic Rescue Team) was mobilized. At national level, officers of the Hellenic National Tsunami Warning Centre participated from the National Observatory of Athens. The Secretary General for Civil Protection, Nikos Chardalias, personally followed the exercise on site and participated with great interest in the immediate “after-action” debriefing. At European level, besides JRC, DG ECHO was represented and fully involved in evaluation of the exercise.

The Tsunami Last Mile network was proved to work properly, with only minor technical refinements needed. The integration into the TLM network of KATWARN - a mobile phone application for public warnings, developed by Germany’s Fraunhofer Institute - was agreed and successfully performed after some adaptation effort. The application was triggered by the TLM network and sent timely warning messages (in Greek and in English), enabling effective warning of the selected receivers. Full integration between the local TLM network and the national tsunami warning service was demonstrated: National Observatory of Athens (NOA) personnel successfully interacted with the local TLM network, manually sending national warning messages from Athens to the Tsunami Alerting Device (TAD) panels in Kos, which were correctly and timely visualized.

As part of the exercise, students of the Kos elementary and high schools were involved as population target groups, to be evacuated along the evacuation routes - where temporary ISO-approved standard tsunami signs were positioned - and to gather in the assembly areas, which were identified by the TLM project. The evacuation time was relatively short, with students reaching the assembly areas within 10 minutes (compared with the first arrival of the 2017 tsunami in Kos, which was about 13-14 minutes).

A meeting with the local administrators was planned, once the exercise evaluation results would be available, in order to present the results and discuss possible follow up activities after the end of the project. Final evaluation of the system will also form the basis for future implementations of the TLM technology: the European Commission has already scheduled a second phase of the implementation of this concept in two more Mediter-

ranean countries, and in Indonesia.

Alessandro Annunziato and Marzia Santini  
European Commission, Joint Research Centre (JRC)  
(M. Santini - formerly Italian Civil Protection Department / Seconded National Expert at JRC)

For more information:  
<https://ec.europa.eu/jrc/en/news/tsunami-alert-system-shows-life-protecting-potential>  
<https://ec.europa.eu/jrc/en/news/kos-greece-tsunami-warning-system-put-test>

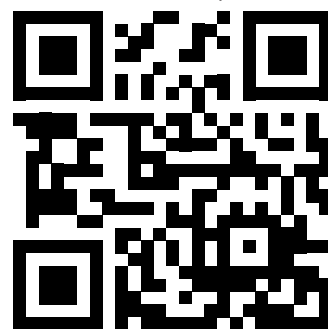
With 433 participants, the successful tsunami exercise in Kos was also a good opportunity to raise awareness of the alert system among the local population. Here we see the European Commission’s team at the end of the exercise: Marzia Santini, Olimpia Imperiali (DG ECHO), Alessandro Annunziato and Daniele Galliano.  
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[http://drmkc.jrc.  
ec.europa.eu](http://drmkc.jrc.ec.europa.eu)

**Info and contacts:**  
[EC-drmkc@ec.europa.eu](mailto:EC-drmkc@ec.europa.eu)



JRC120993

Ispra: European Commission, 2020

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Bibliographic Information:  
McCormick, N., Marin Ferrer, M., Bortolamei, F., Guana, R.  
and Rios Diaz, F., DRMKC Bulletin #19 - May 2020,  
European Commission, 2020, JRC120993.