

# Zurich's Post-Event Review Capability:

## Global lessons for reducing risk and increasing resilience



### Key messages<sup>1</sup>

Impacts from disasters are getting worse. Yet after a disaster, there is rarely time to learn what happened and what could be done better next time. Zurich's Post-Event Review Capability (PERC) methodology meets this urgent need. PERCs generate actionable recommendations for preventing future damage precisely when they are most needed. We looked at 12 PERC studies across the globe to identify common lessons. Globally, disaster risk managers face strikingly similar challenges:

- The increase in disaster risk we have observed is not being met with an equivalent increase in disaster risk management (DRM) capacity – there is therefore an opportunity to learn and innovate.
- There is an urgent need to incorporate disaster risk considerations into investment and land-use planning in very challenging regulatory environments.

- Globally, spending on response absolutely dwarfs investment in pre-emptive risk reduction. Where money is spent on risk reduction, it is typically on protection infrastructure rather than the more cost-effective environmental planning.
- The levee effect – where protection infrastructure lulls people into a false sense of security – is endemic. Physical infrastructure does not provide absolute safety, and more integrated thinking (and execution) is crucial.
- After a disaster, there are very few incentives to build back better. These incentives need to be strengthened so we do not just build back to the same level of risk.
- The needs of the most vulnerable in society are often neglected both before and after disasters.

<sup>1</sup> For a detailed description of our analysis and findings, see Keating et al (2016) [www.nat-hazards-earth-syst-sci.net/16/1603/2016/](http://www.nat-hazards-earth-syst-sci.net/16/1603/2016/) doi:10.5194/nhess-16-1603-2016. For the PERC manual and repository of PERC studies, see <https://www.zurich.com/en/corporate-responsibility/flood-resilience/learning-from-post-flood-events>

## The need for PERC

Disaster risk is growing at an unprecedented rate: globally, the number of disaster events and the magnitude of their impacts are increasing. While we have seen a successful decline in disaster mortality (in relative terms) over the last decade, in most places there has not been significant success in arresting the substantial increase in monetary losses from disasters. These disaster impacts have profound knock-on effects on economic growth and development, as well as on the general well-being of society. Impacts are typically borne by the most vulnerable and undo many of the growth successes achieved before these impacts occurred.

Learning is central to building disaster resilience. There is much more that could be done to reduce disaster risk and prepare for future disasters. The 2015–2030 Sendai Framework for Disaster Risk Reduction promotes the urgent need to learn about and understand disasters. Strengthening DRM requires looking back and learning from past disaster events to achieve a forward-looking, resilience-building mentality. This is what PERC sets out to achieve: learning to generate actionable input for informing DRM policies and practices.

## The PERC analysis

PERC studies undertake an in-depth analysis of a disaster event and generate actionable findings. They focus on the resilience of people, systems, and legal and cultural norms before, during and after a disaster. The DRM cycle is used to structure the analysis of what happened and why. PERCs cover the:

1. **Risk reduction and preparedness phases, including the build-up of risk and actions taken to reduce risk and prepare for response before the disaster occurred.**
2. **Response phase during and immediately after the event to protect lives and property and manage and contain impacts.**
3. **Recovery phase exploring actions being taken to aid people to cope with and recover from the disaster, restore services and business, and support reconstruction efforts.**

PERC studies analyze the disaster in terms of the relevant systems, institutions and agents. After all publicly available information on the event is gathered, analysts undertake extensive interviews in affected areas and

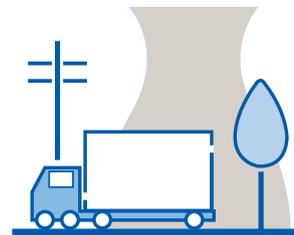
talk with individuals and organizations affected by or involved with the event. The reports follow a standardized structure to ensure the event is analyzed holistically and that no important elements or connections are overlooked. The structure emphasizes understanding key actors, decision-making and communication processes, and identifying points of failure and gridlock. Finally, practical and actionable recommendations are made. Because of this standardized structure we are able to compare lessons across multiple PERC studies. On the following pages, we provide key recommendations from the cross-cutting insights our PERC studies provide so far.

## Lessons for reducing risk and building resilience

Twelve PERC studies have been completed to-date – Table 1 shows the events analyzed. While they are all focused on flood events, the methodology is designed to be applicable to other hazard types as well.



**Agents**  
People and  
Organizations



**Systems**  
Infrastructure/  
Ecosystems



**Institutions**  
Laws, Regulations  
and Cultural Norms



PERC report name	Country(ies)	Event date
Central European floods 2013: A retrospective	Germany (focus), Austria, Czech Republic, Switzerland	June 2013
Floods in Boulder: A Study of Resilience	United States	September 2013
After the storm: How the UK's flood defenses performed during the surge following Xaver	United Kingdom	December 2013
Balkan floods of May 2014: Challenges facing flood resilience in a former war zone	Bosnia and Herzegovina, Serbia, Croatia	May 2014
Emmental, Switzerland floods of July 2014: On a hot, sunny day, a flood alert!	Switzerland	July 2014
Urgent case for recovery: What we can learn from the August 2014 Karnali River floods in Nepal	Nepal	August 2014
Morocco floods of 2014: What we can learn from Guelmim and Sidi Ifni	Morocco	November 2014
Columbia and Charleston floods, South Carolina	United States	October 2015
PERC Cumbria	United Kingdom	December 2015
PERC Flash Floods: The underestimated natural hazard	Germany	May/June 2016
PERC Peru "non-event"	Peru	2016
PERC Peru coastal floods	Peru	2017

Table 1: Zurich PERCs conducted 2013–2017

## Before the disaster

**The frequency and severity of hazards are increasing, and this must be taken into account in order to maintain protection levels.** Several PERCs reviewed the science on the increasing frequency and severity of climate hazards, especially extreme precipitation and storm surges. Future climatic scenarios were reviewed in the European floods PERC, which explored levels of preparedness should a similar event occur in 2023. Across the PERCs we found that if a certain level of protection (e.g. to a 1-in-100-year flood) is to be maintained, it is not enough to rely on historical data, because the goalposts are continually shifting. Hazards themselves are changing, and future planning must take this into account.

**There is an urgent need for disaster-informed investment and land-use planning, but regulation enforcement is a key challenge.** Rather than just responding to disasters – treating the symptoms when they occur – it would be better to treat the cause by preventing the

build-up of assets in high-risk areas. Yet across the PERCs we found little evidence of disaster risk being considered in investment decision-making and land-use planning. In the Karnali river basin in Nepal, the risk that a planned hydropower plant in the upper watershed will increase flooding is not being taken into consideration. Even institutionally strong Germany struggles to effectively prohibit building in legally designated flood hazard zones.

**Make resources available for ex-ante risk reduction.** Many of the PERCs, particularly those focused on developing countries, highlight the imbalance between the investment of resources on disaster prevention versus that on response after their occurrence. Individuals, businesses, communities, civil society organizations and governments all suffer from disincentives to invest in reducing risk before disaster strikes. Correcting these disincentives requires many stakeholders to tackle the problem together.

**Cross-jurisdictional coordination is difficult but essential.** Disasters do not respect jurisdictional boundaries. The PERC studies have identified a number of success stories and challenges of cross-jurisdictional coordination. The Balkan floods PERC contrasts successful coordination within Serbia, which has a relatively strong central government, with that of Bosnia and Herzegovina, where internal divisions led to difficulties and inefficiencies in response operations. A lack of cross-jurisdictional coordination is not only inefficient, but it often significantly hampers efforts to enhance disaster resilience.

**Environmental disaster regulation and planning is extremely effective and should be the first line of defense.** The use of environmental planning techniques to manage flood waters (for example, protection or reforestation in the upper watershed, static or controlled retention areas) is found to be highly effective. The central European floods PERC emphasize the role of park-like areas,

which have the co-benefit of community recreational facilities during non-flood times, as being particularly successful at managing flood waters in Germany and Austria. Also in Germany, the lessons and resultant diligent flood-water-retention planning that emanated from the floods in 2005 and 2007 saw significantly reduced impacts in 2014. The Morocco PERC describes the importance of reforestation and its interaction with physical defenses, which are not as effective as they could be because of a lack of such green infrastructure initiatives.

**Well-designed, maintained and monitored physical defenses are effective, but can increase risk in the long term.** The central European floods PERC shows that well-designed, maintained and monitored dams and risk-reduction measures along rivers do indeed make a significant

difference to impacts. Similarly, coastal defenses provided significant protection to the English coast during hurricane Xaver; in this case, the PERC estimates at least a 6:1 return on protection investment. In the Balkan, Nepalese and Moroccan floods, in contrast, we see a counterfactual example as poorly designed and maintained levees led to catastrophic failures. However, the PERC analyses also recurrently identified the devastating impacts of the 'levee effect' – where levees (or other types of physical defenses) lull people into a false sense of security and induce asset build-up in the 'protected' area. The presence of, and trust in, levees had resulted in low flood awareness in towns in Austria, Germany and the United Kingdom, whose residents were shocked when they suffered severe flooding.

**Community engagement and inclusion of vulnerable groups is essential.** The importance of engaging communities, and in particular vulnerable groups, in all aspects of DRM and resilience building is established recurrently throughout the collection of PERC reports. The central European flood PERC identified that the implementation and success of polders is dependent on community acceptance. The Morocco PERC found that a general atmosphere of mistrust in authority during normal times hampered community-authority coordination during the floods, highlighting the importance of ongoing engaged governance. A number of PERC studies found that it is often the most marginalized groups who live in the most hazardous areas; without their engagement in DRM, initiatives will not be effective.

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## Preparing for disaster

**The vulnerability of critical infrastructure needs to play a more prominent role in disaster planning.** The PERCs on the central European, Balkan, Nepalese and Moroccan floods describe worrisome circumstances where the vulnerability of critical infrastructure in the event of disasters is not taken into account in planning. In Morocco, roads were often built alongside dry stream beds, which were naturally destroyed by floods. PERC studies have shown that vulnerable critical infrastructure not only results in more severe flood impacts, but also results in cascading failures which send shock waves throughout the economy. In the Balkan floods, an inundated power station resulted in hundreds of thousands of households being left without electricity during a critical time.

**There is a need to improve disaster risk awareness and information.** From the UK to central Europe, from Nepal to Morocco, people were unaware that they were at risk of being flooded. Even when warnings were present and of a high technical quality, targeting and communication were inadequate. While information about a hazard does not in itself induce action, it is an essential first step for taking action. In relation

to hazard maps specifically, the central European, Nepalese and Moroccan flood PERCs all call for better flood hazard maps so that individuals, businesses and authorities know where flood hazard zones are and to prevent a situation whereby a lack of this basic information impedes risk reduction.

**Improving the language describing event-return periods is vital.** "Since there was a 1-in-100-year event five years ago, there will not be another of that magnitude for 95 years" is a common and devastating misunderstanding of the meaning of event-return periods. Our PERCs found evidence of this type of misunderstanding leading to complacency and surprise when large events occurred. Instead, disaster risk should be communicated in terms of probability – instead of a "1-in-100-year event," one should say that "the event has a 1% chance of occurring each year," and furthermore it should be emphasized how impactful the consequences of such an event occurring might be for individuals.

**Improving forecasting is an essential first step in disaster resilience.** Strikingly, we found a need for improved forecasting right across the PERCs. The central European

floods PERC, which focused on Germany, found that meteorological and hydrological forecasting needs improvement. In Nepal and Morocco, even modest improvements in rainfall observation and run-off measurement data would provide significant benefits.

**Early-warning systems save lives.** Across the PERCs we found that early-warning systems save lives. However, an early-warning system is not just the presence of a warning about an event; it is also a means to distribute, interpret and respond to that warning so that action is taken. In both the Balkan and Moroccan floods, while meteorological and hydrological information was present, the absence of a well-integrated warning system meant this information was largely ineffective. On the other hand, we found that the lack of fatalities in the Emmental floods is credited to learning and subsequent improvement of early-warning systems which took place following previous floods.

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## After the disaster

**Institutional capacity is the key to successful response operations.** A central lesson from the PERCs is that much of the successes or failures of crisis response comes down to the capacities of relevant institutions to plan and coordinate for a disaster event. In the Karnali floods in Nepal, the PERC shows how local community disaster-management committees provided the vast majority of the response effort, while the national government and NGO response was slow and poorly coordinated. In contrast, in Boulder, pre-existing relationships between a range of institutional players allowed for rapid response and resource mobilization. Improving institutional capacity for crisis response cannot be neglected.

**Recovery support must be carefully designed and implemented.** In the cases of Germany and the UK, the PERCs highlight significant concerns about the potential disincentive for undertaking risk reduction when government fully reimburses recovery costs (a problem also known as a 'moral hazard'). In Boulder, although recovery support was technically available to marginalized households, many of these householders consisted of undocumented migrants who were unwilling to come forward for assistance out of fear of being reported. The seemingly simple concept of supporting recovery can have long-term impacts on risk and vulnerability.

**Improve incentives to build back better.** 'Building back better' is a term which has become a staple of the disaster-management landscape in recent years. Clearly, rebuilding to the same level of risk after a disaster and ignoring the opportunity to rebuild to a better standard is futile. While this is well understood, implementing building back better remains a challenge. PERCs have identified a number of ways to operationalize this idea. The central European flood PERC

describes the need to amend compensation schemes (both public- and private-insurance-based) that currently only compensate to the previous standard. The Xaver PERC recommends a building back better strategy be developed before the next disaster, so that the desire to rebuild rapidly and minimize business interruption after an event does not inhibit building back better.



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## The future of PERC

It is not enough to understand the dynamics of disaster risk and resilience, including what went wrong and what worked well in the DRM cycle. This lesson is a necessary first step, but must be turned into action. The PERC methodology has been designed specifically to facilitate turning lessons into action. PERCs can be carried out relatively quickly and inexpensively; in this way PERCs can be available when attention is still focused on questions of disaster risk, reconstruction decisions are still being made and disaster policies are being revisited.

We are constantly learning and adapting our approach as new information and insights about disaster risk and resilience become available. The PERC approach is adaptable and flexible, meaning it can be utilized for different areas while maintaining the core fundamentals of the approach. For example,

retrospective PERCs conducted remotely, mini-PERCs looking at specific questions and PERCs that take a historical look at multiple events to track changes are all possible. While we have focused on floods so far, we are investing in opportunities to apply the methodology to other hazards.

The PERC approach is freely available and we encourage any interested parties to apply the methodology and contribute to the repository of learnings. The freely available repository itself is being designed to be searchable so that successes and insights around particular themes can be accessed by those wanting to learn from the experiences documented in the PERCs. Please visit <https://www.zurich.com/en/corporate-responsibility/flood-resilience/learning-from-post-flood-events> and our Knowledge Portal <http://floodresilience.net/> to find out more.

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