

# The PERC manual

Learning from disasters to build resilience:  
a simple guide to conducting a post event review



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# Glossary

**Adaptation** – Responding or adjusting to risk in a way that reduces potential damage or loss, makes the most of resulting opportunities, and helps better cope with the consequences.

**Agents** – People and their organizations, whether as individuals, households, communities, private and public sector organizations, or companies, and their capacity to respond to and shape the world around them.

**Capacity** – The ability to do a specific thing, which requires having the appropriate knowledge, skills, and resources.

**Cascading failures** – When failures in a system lead to a series of failures in the same or other systems. For example, failures in an electricity system can lead to failures across a range of systems that rely on electricity to function, including but not limited to water treatment, communications, transportation, and so on.

**Corrective risk reduction** – Actions taken to reduce risk to already at-risk assets.

**Damages and losses** – The human, financial and physical consequence of an event. Damages and losses are frequently calculated in terms of financial losses resulting from the disaster, number of people injured/killed, and homes and infrastructure damaged/destroyed. Damages and losses can result from both direct and indirect impacts.

**Direct impact** – The impacts through a direct interaction between a shock or stress and a physical, economic, social, or political component. In the case of flooding, this includes people injured or killed and homes and infrastructure destroyed due to floodwaters.

**Disaster** – “A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and

impacts, which exceeds the ability of the affected community or society to cope using its own resources” (UNISDR 2009). Disasters occur due to a combination of hazards and vulnerability.

**Disaster management cycle** – “The systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster” (UNISDR, 2009). The disaster management cycle includes prospective and corrective risk reduction, preparedness, response, and recovery in the context of disasters.

**Disaster risk reduction (DRR)** – “The concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reducing exposure to hazards, lessening vulnerability of people and property, wise management of land and the environment, and improving preparedness for adverse events” (UNISDR, 2009).

**Early warning system** – A system that provides people with advance warning of a potentially hazardous event occurring, giving people time to protect themselves, important assets, and important services.

**Ecosystem services** – Foundational needs (water, air, food) provided by ecosystems as well as some more advanced needs such as coastal defense and water absorption capacity.

**Exposure** – “People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses” (UNISDR, 2009).

**Financial capital** – The level, variability and diversity of income sources and access to other financial resources that contribute to wealth.

**Hazard** – A substance, object or situation that can give rise to injury or damage. Hazard is the potential for threat to life or property. In order to create (flood) risk, a (natural, flood) hazard, e.g., from rivers, the sea or from surface water runoff after intense storms needs to be present first. Flood hazard can be expressed as the probability of occurrence at a given location and can be modeled or mapped using flood maps. Hazards can be natural or non-natural. Natural hazards are caused by weather, climate and geophysical drivers; non-natural hazards are caused by social, political, economic and technological failures.

**Human capital** – The education, skills and health of the people in the system.

**Indirect impact** – An impact due to an indirect, or secondary, interaction between a shock or stress and a physical, economic, social or political component, or an impact resulting from a complex pathway of impacts. In the aftermath of disaster, indirect impacts could include business losses arising from customers spending less money as they recover from the disaster, or indirect physical consequences from a flood due to water contamination (not effects that the flood waters caused directly).

**Institutions** – The rules, norms, beliefs and conventions that shape or guide human relations and interactions, access to and control over resources, goods and services, assets, information and influence. Legal norms are the formal rules and regulations created by legislative and administrative bodies. Cultural norms are informal rules, or social and cultural expectations, that govern human behavior.

**Land-use planning** – Formal management of land development by mandated authorities. Ideally, land-use planning should ensure that land use is efficient, ethical, and minimizes exposure to hazards.

**Levee effect** – When the presence of flood protection structures such as levees leads to greater development in the floodplain or in the ‘shadow of the levee’, and increases potential losses and damages during floods if the protection structures fail. The levee effect increases long-term risk while reducing potentially short-term risk, and possibly increases total risk due to a false sense of safety behind a protection structure. A more detailed description of this phenomenon can be found in Tobin (1995).

**Magnitude** – A measure for the relative size of something. In terms of natural hazards, magnitude often means the extent or severity of a specific natural hazards event. This more general term is not to be confused with the specific term magnitude when discussing earthquakes.

**Natural capital** – The natural resource base, including land productivity and actions to sustain it, as well as water and other resources that sustain livelihoods and wellbeing.

**Physical capital** – Things produced by economic activity from other capital, such as infrastructure, equipment, improvements in crops, livestock.

**Physical protection structures** – Structures built to mitigate hazard impacts or prevent hazards from reaching settlements and important assets. In the case of floods, physical protection structures include levees and dikes.

**Preparedness** – Precautionary actions taken prior to potential disasters. At the household level, this could include understanding your risk and knowing what resources you have and actions you can take to mitigate that risk (such as getting papers and equipment raised off the ground when you receive a flood warning). At the community level, this could include establishing evacuation routes. At the district or national levels, this could include humanitarian agencies prepositioning emergency relief supplies.

**Probability of occurrence** – The probability, typically expressed in percent per year, that a particular hazard event occurs. It is the inverse of the return period.

**Prospective risk reduction** – Actions taken to avoid the build-up of new or increased risks.

**Rapid onset hazard** – Hazards that arrive rapidly with little or no warning such as flash floods or earthquakes.

**Recovery** – The actions taken after a disaster (either in the short- or long-term) to help people cope with disaster impacts, reconstruct damaged physical systems (e.g., homes, roads, damaged flood protection structures) and restore services.

**Resilience** – “The ability of a system, society or community to pursue its economic and social development and growth objectives while managing its risk over time in a mutually reinforcing way” (Keating et al., 2014).

**Response** – The actions taken during and immediately after a disaster to contain or mitigate disaster impacts, including evacuation, search and rescue, emergency relief distribution and first aid.

**Return period** – The long-term average period between events of a given magnitude or probability, e.g., a one-in-100 years return period. The term ‘100-year flood’ refers to a statistical event that has a one percent chance of happening in any given year. It is important to recognize that this does not mean that the event will only happen once in a 100-year period. Rather, a 100-year flood event can happen more than once in any given year, and it can occur once a year over several years in a row. To better understand the flood probability, a ‘one percent annual chance’ is better-suited to expressing the situation. Thus, a 100-year flood is simply a statistical benchmark, and should only be used as such. The water level of a

100-year event may be referred to as HW100 and the corresponding floodwater flow as HQ100.

**Risk** – The probability of an event combined with the negative consequences that people and systems will suffer if that event occurs. Risk is the potential loss, assessed in terms of impact severity and occurrence likelihood. Flood risk is thus the combination of a flood hazard and its occurrence in an area of exposed assets or people that can be harmed to different degrees depending on their vulnerability. Typically, risk is the multiplication of the event probability times the severity of the adverse consequences.

**Semi-structured interview** – A relatively open interviewing method where there is not a rigid set of questions. Rather, there is a set of guiding questions and the freedom to pursue otherwise unforeseen topics.

**Snowball sampling** – A non-probabilistic sampling technique where subjects (in this case, for interviews) are chosen based on a referral system. Interviewees suggest other potential interviewees.

**Social capital** – Social relationships and networks, bonds that aid cooperative action, links to exchange, and access to ideas and resources.

**Systems** – Includes ecosystems (e.g., forests, grasslands, riparian river corridors, etc.) and infrastructure systems (e.g., electricity, water, wastewater treatment, communications, etc.), and the services they provide.

**Vulnerability** – “The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard” (UNISDR, 2009). Vulnerability is driven by a combination of physical, social, economic, and political factors.

# 1. Why conduct a PERC?



Zurich's Post-Event Review Capability (PERC) uses a system-wide approach to understand why a hazard event became a disaster and how resilience might be built."

The Post-Event Review Capability (PERC) is a systematic framework for the analysis of a disaster event, focusing on how a specific hazard event became a disaster. PERC is typically conducted and published within a year of the disaster, though it can be used in other ways or in other timeframes as necessary. The PERC process evaluates the successes and failures in the management of disaster risk prior to the event, disaster response and post-disaster recovery. If the disaster occurred in two different areas with one more badly impacted than the other, PERC can help determine why the impacts were disproportionate. PERC then identifies future opportunities for intervention/action that could reduce the risk posed by the occurrence of similar, future hazard events. PERC uses a system-wide approach to review disasters, analyzing across scales and sectors, and all aspects of the disaster management cycle – prospective and corrective risk reduction, preparedness, response, and recovery. It provides a bird's-eye view of why the disaster occurred and how resilience might be built. While Zurich's PERCs to-date have primarily focused on floods, the PERC process/methodology can be applied to review any rapid-onset hazard or shock, natural or non-natural, such as floods, earthquakes, tsunamis, terrorist attacks, and so on.

Launched in 2013, Zurich's Flood Resilience Alliance created PERC as part of Zurich's corporate responsibility program. The goal of the Flood Resilience Alliance is to link academia with the humanitarian sector, private sector and communities to improve public dialogue around and generate integrated solutions to enhance flood resilience. To date, PERCs have been conducted for floods in Central and Eastern Europe, Morocco, the UK, and Nepal (Zurich Flood Resilience Alliance, 2014a; Zurich Flood Resilience Alliance, 2014b; Zurich Flood Resilience Alliance, 2015a; Zurich Flood Resilience Alliance, 2015b; MacClune et al, 2015).

Common themes appear within the existing body of PERC analyses, with similar points of failure, successes, and capacities in response to floods across geographical, social, political and economic contexts. Disasters anywhere on the globe can provide important, broadly applicable lessons learned for where and how resilience can be built. These lessons learned are critical; 'learning' is the cornerstone of the resilience-building process. As we know, after the event is before the next event. Learning is not only about information exchange; it also helps strengthen and create networks, allows different stakeholders to deliberate together, builds knowledge and capacity among people and groups, and fosters engagement that can eventually create transformative change. This is needed to avoid rebuilding the same risks or building-up more risk, and to reduce loss and misery in future events, both locally and globally.



PERC provides a bird's-eye view of critical gaps and opportunities, particularly actionable opportunities, to reduce risk around which disaster practitioners, authorities and advocates can promote, plan, design and execute interventions that are grounded in the local context."

PERC is designed to provide a holistic analysis of the disaster at event (e.g., watershed) level, which very often might be trans-regional or trans-national. Consequently, it is not aimed at decision-makers or actors at any specific level, nor is it targeted for specific sectors. PERC is also not a Post-Disaster Needs Assessment (GFDRR 2013, see also <http://www.recoveryplatform.org/pdna>); it does not design or recommend specific interventions or provide a framework for recovery. Rather, PERC provides a bird's-eye view of critical gaps and opportunities, particularly actionable opportunities, to reduce risk around which disaster practitioners, authorities and advocates can promote, plan, design and execute interventions that are grounded in the local context. PERC is research independent from insurance coverage and products, political reviews, and other vested interests, implemented to understand what happened during the disaster and why.

In this methodology manual, we lay out the PERC process for individuals and organizations looking to conduct a systematic and holistic evaluation of a disaster. In Section 2, we focus on the framework that PERC is based on. In Section 3, we provide a possible report structure with the type of information each section in the report should ideally include. In Section 4, we break down the PERC methodology and discuss how to obtain needed information. In Section 5, we outline some things to keep in mind when organizing and analyzing the data and writing the final report. In Section 6, we conclude the manual by reiterating the goals and benefits of PERC and reemphasizing PERC strengths and flexibility.

This manual is not a step-by-step protocol. Rather, it provides a set of guidelines for conducting PERC fieldwork and a framework for organizing, analyzing and presenting findings. The guidelines and framework can be adopted and modified to suit the context being studied and ensure that the most accurate and representative review is conducted.

We hope that future PERCs – whether conducted by the Zurich Flood Resilience Alliance or others who are enticed by the concept – will contribute to our growing library of lessons learned. Our goal is to create something more than just the sum of the individual PERC reports on a shelf; the Zurich Flood Resilience Alliance is developing an open-access collection of all the specific learnings coupled with research functionality that decision-makers, planners, practitioners and researchers globally can draw from to better understand disasters, and design interventions and build resilience in their own locales. We do not need to wait for major disaster events to catalyze action; rather, we can learn from the experiences and knowledge gained from previous disasters in other areas to prevent future hazards from becoming disasters.

## 2. The Framework

PERC focuses on the resilience of people, systems, and legal and cultural norms before, during, and after a disaster. The analysis and narrative of what happened and why are structured around the disaster risk reduction and management cycle:

### Risk reduction and preparedness

This is the 'before' part and is about minimizing disaster risk. It includes prospective risk reduction, corrective risk reduction and crisis preparedness. Prospective risk reduction is the action taken to avoid the build-up of more risk. Corrective risk reduction is action taken to reduce risk to already at-risk people and assets. Both prospective and corrective risk reduction tend to focus more on long-term processes, land use and infrastructural change. Crisis preparedness includes 'preparedness for response' and community or localized awareness and action to help mitigate or avoid impacts when an event occurs.

### Response

This is the 'during' part and is about the actions taken during and immediately after a disaster to contain or mitigate disaster impacts. This can include evacuation, search and rescue, emergency relief distribution, and so on.

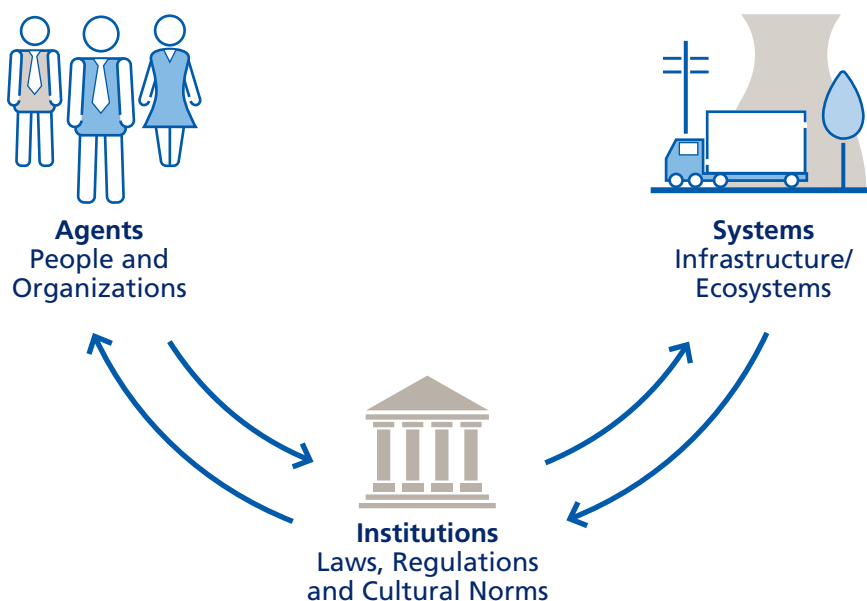
### Recovery

This is the 'after' part and is about the actions taken after the disaster (either in the short- or long-term) to help people cope with or recover from disaster impacts, reconstruct damaged physical systems (e.g., roads, homes, businesses), and restore services.

According to the Zurich Flood Resilience Alliance, disaster resilience is "the ability of a system, society or community to pursue its economic and social development and growth objectives while managing its risk over time in a mutually reinforcing way" (Keating et al., 2014, p.7). It includes both the ability to learn from the disturbance and to incorporate risk into decisions about future investment. As resilience declines, the magnitude of a shock from which the system can recover gets smaller and smaller, whereas a resilient system avoids the creation of more risk, addresses the current risk, and is forgiving of shocks when they do occur. However, resilience needs to go beyond simply recovering from a shock to the pre-shock state; in particular, bouncing back to a previous, 'stable' state is problematic if that state was vulnerable to begin with. Resilience needs to also ensure human well-being by bouncing forward and building back better, such that future shocks have a lesser impact. Disaster resilience is about living – and thriving – in the face of disaster risk.

Resilience is about people, their needs, and the cultural and legal norms that enable their ability to thrive (Figure 1).

**Figure 1:** The interacting components of a resilient system







Resilience is about people, their needs, and the cultural and legal norms that enable their ability to thrive.”

The three major components of resilience, therefore, are:

### **Systems**

This is the ‘what’ component of resilience. It refers to a combination of ecosystems and infrastructure systems and the services they provide. Ecosystems provide basic foundational needs (water, air, food) as well as some more advanced needs such as coastal defense, and water absorption capacity. These ecosystem services are mediated, either positively or negatively, by physical infrastructure and services (transport, water distribution, drainage, power and communications) that are central features of human settlements (Friend and MacClune, 2012).

### **Institutions**

This is the ‘how’ component of resilience. It refers to the rules, norms, beliefs or conventions that shape or guide human relations and interactions, access to and control over resources, goods and services, assets, information, and

influence. While institutions shape agents – equally, agents are able to shape institutions, thus opening the possibility of change (Friend and MacClune, 2012).

### **Agents**

This is the ‘who’ component of resilience. It refers to people and their organizations, whether as individuals, households, communities, private and public sector organizations, or companies, and their capacity to respond to and shape the world around them. Agents have different sets of assets, entitlements, and power. An agent’s ability to access systems, and thus his or her vulnerability and resilience, is differentiated on this basis (Friend and MacClune, 2012). The needs, preferences, resources and capacities of agents can be analyzed using the five capitals approach: human capital, social capital, physical capital, natural capital, and financial capital (Knutsson and Ostwalk, 2006; see Box 1).

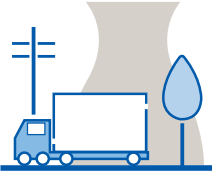

#### **Box 1: The Five Cs (capitals) comprise of a set of measurable indicators and are grouped as follows:**


- Physical – the things produced by economic activity from ‘other’ capital, such as infrastructure, equipment, improvements in crops, livestock;
- Financial – the level, variability and diversity of income sources and access to other financial resources that contribute to wealth;
- Human – the education, skills and health of the people in the system;
- Social – social relationships and networks, bonds that aid cooperative action, links to exchange and access ideas and resources; and
- Natural – the natural resource base, including land productivity and actions to sustain it, as well as water and other resources that sustain livelihoods and wellbeing.

Zurich has developed, and is currently testing, a Community Flood Resilience

Measurement Tool based on these five capitals (a concept which has been drawn from the Sustainable Livelihoods Framework, see Knutsson & Ostwalk, 2006). This tool is designed for disaster and development practitioners to help: 1) determine where in the local context resilience can be built pre-event to reduce the loss of lives and assets; 2) to measure if and how outcomes of resilience have manifested during and after a hazard event; and 3) to evaluate if and how community-based initiatives and risk management strategies are delivering on their promise of building resilience. There is no one-size-fits-all solution to resilience building, and as such local context is critical. This local context is provided by an in-depth analysis of the five capitals. See Box 2 for more information on what this tool is and how it links with PERC.

**Table 1:** Characteristics of resilience

Component	Characteristic	Description	Examples
 <p><b>Systems Infrastructure/ Ecosystems</b></p>	Flexibility and diversity	The ability to perform essential tasks under a wide range of conditions, and to convert assets or modify structures to introduce new ways of performing essential tasks.	<ul style="list-style-type: none"> <li>• Food is imported into the city from numerous, diverse national and international locations, so if crops fail in one region, food is still available.</li> <li>• Community flood shelters can be flexibly used during non-flood periods, doubling as clinics or meeting halls.</li> </ul>
	Redundancy and modularity	Spare capacity for contingency situations or to accommodate increasing or extreme surges in pressure or demand; multiple pathways and a variety of options for service delivery; and/or interacting components composed of similar parts that can replace each other if one, or even many, fail.	<ul style="list-style-type: none"> <li>• Multiple roads lead out of the city so that if one roadway is blocked, alternate routes are available.</li> <li>• Water tanker trucks provide modularity: if one truck fails, the system is not seriously affected.</li> </ul>
	Safe failure	Designed to fail in a predictable and/or planned way that will minimize damage; ability to absorb or respond to sudden shocks or the cumulative effects of slow-onset stress in ways that avoid catastrophic failure.	<ul style="list-style-type: none"> <li>• Dikes and floodways can channel extreme floods into wetlands or retention zones where they cause minimal damage.</li> <li>• Fuses and breakers in home electrical systems break or fail rather than letting a power surge melt wires or destroy electronics.</li> </ul>
 <p><b>Agents People and Organizations</b></p>	Responsiveness and reorganization	Able to organize and re-organize in an opportune fashion; ability to establish function, structure and basic order in a timely manner in response to a disruptive event or organizational failure.	<ul style="list-style-type: none"> <li>• Utilities release water from a water supply or power generation reservoir in advance of a forecasted typhoon to allow for floodwater storage and avoid catastrophic release.</li> <li>• Disaster risk reduction planning, training and re-structuring for community organizations.</li> <li>• Before a large storm or flood forecast, move your furniture up to the second floor.</li> </ul>
	Relationships	Relationships help build trust between different agents and ensure that they can work collaboratively when the need arises. Relationships can expand the networks of agents and help them access different geographies, types of capital, and so on. Therefore, relationships are the basis over which networks are able to provide physical and emotional support and resources.	<ul style="list-style-type: none"> <li>• Neighbors help neighbors during and after floods.</li> <li>• Humanitarian organizations leverage their relationships with community-based organizations (e.g., churches, youth centers) to open evacuation centers.</li> </ul>

Component	Characteristic	Description	Examples
<b>Agents</b> People and Organizations	Resourcefulness	Capacity to identify and anticipate problems; establish priorities, and mobilize resources for action. This includes the capacity to visualize and plan, which may require collaboration. It also includes the ability to access the 5 types of capital, including those of other agents, and resources from systems in order to take action.	<ul style="list-style-type: none"> <li>• The ability to access credit or insurance to protect against and recover from shocks and to leverage opportunities.</li> <li>• Organizations ‘think on their feet’ when unexpected failures occur during a disaster. This includes innovating and implementing solutions quickly and effectively.</li> </ul>
	Capacity to learn	The ability to learn new information, skills, techniques and behaviors, and to internalize past experiences to avoid repeated failures and innovate to improve performance.	<ul style="list-style-type: none"> <li>• Formal and informal review of performance of key systems to identify opportunities for improvement.</li> <li>• The ability to understand and implement innovative changes, such as adopting a new housing design, to address recurrent flooding.</li> </ul>
 <b>Institutions</b> Laws, Regulations and Cultural Norms	Rights and entitlement	The rights and entitlements to use key resources or access the five capitals; equitable distribution of core system services; etc. Rights and entitlements can enable or constrain responses to disruption and significantly influence the ability to recover.	<ul style="list-style-type: none"> <li>• All residents have access to water and water is priced to provide minimum basic needs at a rate that the poorest inhabitants can afford.</li> <li>• Lack of legal standing (e.g., illegal immigration status) can exclude impacted households from accessing post-disaster aid.</li> </ul>
	Decision-making	Decision-making processes, particularly in relation to development and systems management follow widely accepted principles of good governance, chiefly: transparency, accountability and responsiveness.	<ul style="list-style-type: none"> <li>• Diverse stakeholders have ways to provide meaningful input to decisions.</li> </ul>
	Information	Private households, businesses and other decision-making agents have ready access to accurate and meaningful information to enable judgments about risk and vulnerability and for assessing adaptation options.	<ul style="list-style-type: none"> <li>• Useful, clearly presented information regarding hazards and possible response options are available to the public through accessible media, such as in newspapers, on the radio or television, and on websites.</li> </ul>



The three components of resilience – agents, systems, and institutions – are not isolated silos; rather, they are dynamic and constantly interacting with one another.”

The three components (agents, systems, and institutions) are not isolated silos; rather, they are dynamic and constantly interacting with one another. For example, physical infrastructure such as embankments alone do not build or inhibit resilience; what is key is how people interact with embankments under a set of norms and rules, and how and why the embankment impacts other systems that people depend on. Does the embankment attract development towards it (the levee effect)? Do land use policies govern development near the embankment, and are they enforced? Who lives outside the embankment and who lives inside? How does the embankment change people’s behavior? And how does this change hazard risk? In a PERC, it is important to study these interactions.

The recommendations generated using this framework should aim to identify where and how (Tyler and Moench, 2012):

1. Infrastructure and ecosystems can be strengthened to reduce their fragility and to reduce the risk of cascading failures,
2. Capacities of agents can be built to anticipate and develop adaptive responses, and to access and maintain core systems; this involves improving agent access to all five capitals,
3. Institutional factors that constrain effective responses to system fragility or undermine the ability of agents to take action when a disaster occurs can be addressed.

### 3. The Report Structure

The PERC report structure helps one to understand how the PERC framework can be operationalized, the kind of information that needs to be collected and included in the report, and how the information could be organized

(Table 2). This structure is intended to be flexible, as different contexts and needs may necessitate different kinds of information. The bullet points in Table 2 are explained in greater detail throughout Sections 4 and 5.

**Table 2:** A suggested structure of a PERC report

Section	Contents
Executive summary	Report summary with key findings and key recommendations
Introduction	Goals and objectives of the study: <ul style="list-style-type: none"> <li>• Why is this study important?</li> <li>• Why is this disaster, in particular, being studied?</li> </ul> Short overview of disaster (i.e., duration, location, damages/losses). Short overview of geography of area and the hazard-scape. Study methodology. Overview of report structure. Key Figures: Map of study location.
Section I: The Physical Context	How this type of disaster is normally caused in the country/region/location. How this specific event physically manifested (i.e., in the case of floods, this would involve hydrological and meteorological analyses). How this event compares to previous events in the country/region/location. Changes in frequency and severity of this type of disaster over the last two decades. Key Figures: Further maps of study location, timeline showing past disasters and major disaster-related institutional events (i.e., the passing of key acts/policies, formation of key government groups; see Appendix for an example).
Section II: Socio-Economic Disaster Landscape	Risk and vulnerability: <ul style="list-style-type: none"> <li>• How has exposure to this type of disaster changed in the last two decades? Has there been a build-up of assets in this at-risk area?</li> <li>• Which groups of people, services, and functions are vulnerable during this type of disaster?</li> <li>• What underlying factors give rise to that vulnerability?</li> </ul> Constraints to reducing risk and vulnerability: <ul style="list-style-type: none"> <li>• What conditions are maintaining vulnerability and constraining adaptation and resilience?</li> </ul>

Section	Contents
Section II: Socio-Economic Disaster Landscape (continued)	<p>Prospective and corrective risk reduction and preparedness:</p> <ul style="list-style-type: none"> <li>• Has there been attention or action relating to the build-up or reduction of assets in at-risk areas?</li> <li>• What are the socio-economic drivers of trends in the magnitude and type of assets in at-risk areas?</li> <li>• What types of regulations exist to avoid the build-up of more exposure and/or vulnerability?</li> <li>• What types of physical protection structures exist? Have they worked in the past?</li> <li>• How did individuals, households, NGOs, government, and other actors prepare and respond in previous events and prepare before this event?</li> <li>• Have these actions and/or capacities exacerbated or reduced vulnerability to this particular hazard?</li> </ul> <p>Key figures: Institutional landscape map showing the key actors involved in prospective risk reduction, corrective risk reduction, preparedness, response and recovery, and the decision-making and communication channels (See Figure 3).</p>
Section III: What Happened?	<p>Observations and factual information regarding the event; this section should not be mixed with interpretation or recommendations.</p> <ul style="list-style-type: none"> <li>• What happened immediately after people realized a disaster had struck? (Early warnings? Evacuations? Protection of important assets?)</li> <li>• What were the impacts of the disaster? (This will be dependent on the time-frame you're looking at and the context within which you are working.)</li> <li>• How did physical protection structures perform?</li> <li>• What kinds of damages and losses did places experience?</li> <li>• What were the indirect impacts?</li> </ul> <p><b>Response</b></p> <ul style="list-style-type: none"> <li>• How did agents respond? (Rescue, evacuations, relief distribution.)</li> <li>• What enabled and constrained response? How did agents work around constraints?</li> <li>• Were there cascading failures?</li> <li>• Who ultimately benefitted from response activities? Did everyone who needed help receive help?</li> </ul> <p><b>Recovery</b></p> <ul style="list-style-type: none"> <li>• What post-disaster recovery actions are being taken at the household and community levels and by government and organizations at local and higher levels?</li> <li>• Will these actions reduce long-term impacts?</li> <li>• What is enabling and constraining recovery?</li> <li>• Who is benefiting from recovery mechanisms? Is everyone who needs help receiving help?</li> <li>• What are the long-term impacts of the disaster, particularly for the most vulnerable groups in society?</li> <li>• Is reconstruction being undertaken in a way that avoids the rebuilding of the same risk? What is facilitating or constraining this?</li> </ul>

Section	Contents
Section III: What Happened? (continued)	<p><b>Learning</b></p> <ul style="list-style-type: none"> <li>• Who is learning from the event?</li> <li>• How is that learning being accomplished?</li> <li>• Is that learning being incorporated in ways that will improve future outcomes?</li> </ul> <p>What were successes in prospective risk reduction such as land use planning, corrective risk reduction, preparedness, response, and recovery? What are the drivers of these successes?</p> <p>What were critical gaps in prospective risk reduction such as land use planning, risk reduction, preparedness, response and recovery? What are the drivers of these gaps?</p>
Section IV: Key Insights	<p>What were successes in prospective risk reduction such as land use planning, corrective risk reduction, preparedness, response, and recovery? What are the drivers of these successes?</p> <p>What were critical gaps in prospective risk reduction such as land use planning, risk reduction, preparedness, response and recovery? What are the drivers of these gaps?</p>
Section V: Recommendations	<p>Recommendations and opportunities for action:</p> <ul style="list-style-type: none"> <li>• These should be actionable, feasible, equitable and just.</li> <li>• They should also be realistic given the social, political, geographical, and economic context.</li> <li>• Particular attention should be paid to the needs and perspective of the most marginalized and vulnerable groups in society.</li> </ul> <p>Focus not only on the things that went wrong, but also on strengthening things that worked well.</p> <p>Emphasize single points of failure or bottlenecks where small changes to strengthen systems could have substantial impact.</p> <p>Recommendations should emphasize prospective risk reduction pathways, and avoid the rebuilding of risk into the system.</p> <p>Recommendations can consolidate patterns of items or elements repeated across scales that were identified during PERC; they can also summarize patterns seen in this and prior PERC studies that together should be considered going forward.</p>
Conclusions	<p>Concluding statements.</p> <p>Could include the national, regional, and/or global relevance of the study.</p>
References	<p>If you refer to other documents or printed sources in your PERC, provide a list of those documents and sources, referenced in a format that will make them easy for other users to locate.</p>

## 4. The Methodology



PERC studies can be conducted in developing or developed countries, and in rural or urban areas. The lessons learned can be surprisingly similar across the full range of these contexts.”

To effectively conduct a PERC, one must understand:

1. The conditions that caused the hazard to become a disaster. Here, it is important to remember that whilst hazards are natural, disasters are not. Disasters result from a combination of natural hazards events occurring, the presence of people and assets in the impact zone of the hazard, and the social, economic, and political vulnerabilities of people and systems in an area (Blaikie et al, 1994; Oliver-Smith, 2004).
2. The experiences of key disaster management players across scales (i.e., national to local). This allows one to build the narrative of what happened and identify challenges and successes.

3. The core systems, agent capacities, and institutions that need to be strengthened to reduce fragility and enhance resilience during hazard events.

PERC studies can be conducted in developing or developed countries, and in rural or urban areas. The insights and typical problems can be surprisingly similar across the full range of these contexts. PERC can also be conducted in areas where resilience interventions are already underway, and can be integrated with community-based resilience measurement initiatives such as the Zurich Flood Resilience Alliance’s Community Flood Resilience Measurement Tool to further understand resilience and the necessary types and effectiveness of resilience interventions, (see Box 2; Zurich Flood Resilience Alliance 2015c).

### Box 2: Community Flood Resilience Measurement Tool

The Zurich Community Flood Resilience Measurement Tool, jointly developed by the organizations within the Zurich Flood Resilience Alliance, is a community-based tool for measuring flood resilience based on the “5C4R” framework – the five capitals that sustain and can help to improve community members’ wellbeing (physical, financial, human, social and natural capital), and for each capital, four separate properties that characterize that capital’s resilience (robustness, redundancy, resourcefulness, rapidity).

The Community Flood Resilience Measurement Tool can be used pre-hazard to understand where things are resilient, and consequently focus where resilience needs to be built post-hazard to understand how resilience performed and to monitor and evaluate the success of resilience-building initiatives.

The major differences between PERC and the Community Flood Resilience

Measurement Tool are the scales of focus (i.e., community vs. multi-scale). PERC is more individualized and flexible, while the measurement tool is standardized. The measurement tool is designed to be employed before a flood event to understand current resilience or change in resilience over time, while PERC is a post-event review. In the case of a flood-prone area, PERC can help deconstruct the wider physical, social, economic, and political drivers behind the flood disaster impacts faced by communities and their resilience (or lack thereof). NGOs, government, and other key players can use this deeper context and the opportunities for action identified by PERC from a system-wide lens along with the Community Flood Resilience Measurement Tool to really focus, inform and modify resilience-building interventions at the community-level.

If the Community Resilience Measurement Tool, or any other community-based resilience or disaster



risk management evaluations, have been undertaken in the PERC study area, the information contained within these would provide useful input into the PERC study. This would particularly assist in understanding the pre-hazard resilience at the community-level, measured using the Community Resilience Measurement Tool.

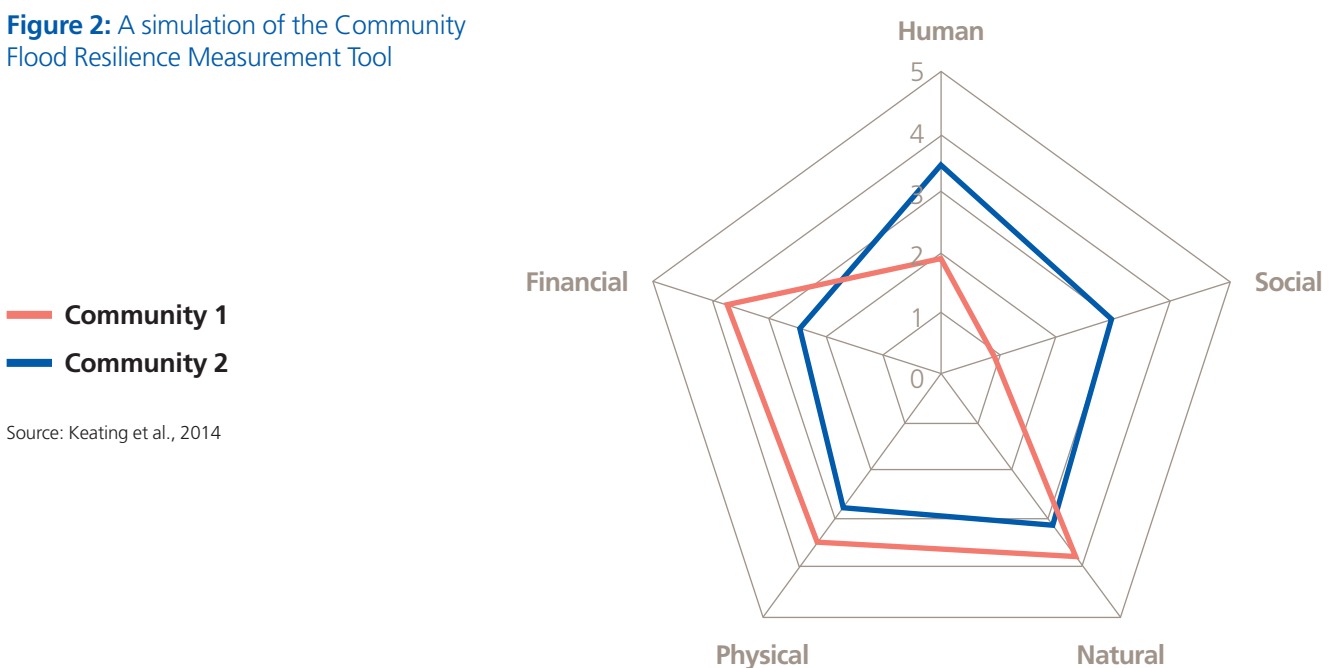
**Breaking down the Community Resilience Measurement Tool**

Users of this tool (for example, community development practitioners, municipal governments, or civil organizations) effectively measure each of the capitals as they are present in the community and pertain to flood resilience. Each capital is built by a set of mutually exclusive elements, referred to as ‘sources’, which can be identified in the communities pre-hazard and are proxies for resilience. These sources provide resilience because they contain one or several inherent properties, or characteristics, of resilience (see Table 1). The insight gleaned from

evaluating the resilience level of each of the sources, and collectively capitals, is an entry point for prioritizing interventions that could be carried out as a part of community programs. Testing is currently underway to validate the sources of resilience measured by the tool.

Each source of resilience is measured by comparing data from the community with a definition of what that source can look like. Scores are assigned to each source, and then can be aggregated to measure the capital or overall flood resilience. This approach brings together quantitative and qualitative data about the sources that contribute to resilience by providing a numerical score of these sources and helping identify strengths and gaps for enhancing resilience. To measure the impact of resilience building interventions, baseline assessment scores can be compared with the scores in an endline assessment.

**Figure 2:** A simulation of the Community Flood Resilience Measurement Tool



Source: Keating et al., 2014



A PERC study should ideally be conducted after the disaster response phase is over and during the recovery phase, but not so late that the momentum created by the disaster is lost.”

A PERC study is best conducted in collaboration with local partners (i.e., government agencies, safety-net organizations, NGOs, community leaders) that have been working in the areas in question for a long time and therefore have an understanding of the local context and the connections needed to collect useful, reliable, and accurate information. However, it is important to work with partners that have a range of perspectives and do not have deeply vested interests in the outcome of a PERC study. While many organizations have a stake in the outcome of a PERC study, partners must be cognizant and welcoming of the fact that this is an independent study. To ensure that the information is collected and analyzed and that recommendations are generated through a multi-disciplinary lens, the PERC team should include people from both social science and physical science fields. There are circumstances, however, in which this may not be possible – in this case you will need to retain an awareness of where the PERC team lacks expertise in a particular sector and make sure to critically evaluate a wide range of additional sources to understand how that sector influenced the event.

Based on existing PERC reports, a PERC study would be conducted after the disaster response phase is over and during the recovery phase, but not so late that the momentum created by the disaster is lost and/or the next phase of disaster risk management has already begun. In the case of floods in subtropical countries, for example, a PERC study should be conducted before the next monsoon season begins. If a PERC is conducted too soon after a disaster (i.e., in the response phase) it is difficult to adequately evaluate what happened and what recovery will look like. Impacted peoples and key disaster management actors need time to overcome the initial shock and process

what has happened. If it is conducted too late, memory will fade and information may be lost.

The PERC flood studies conducted to date have taken 3-6 months from the initial planning to the publication of the final report. This timeline is dependent on size and scope of the study and the local situation. More or less detailed PERC studies, or those conducted for larger or smaller events might require different timeframes.

The PERC methodology can be adapted to address other scopes, scales and timeframes if needed; indeed, this flexibility is one of the strengths of the methodology. For example: a retrospective PERC could be conducted using remotely-sourced materials and interviews; a mini-PERC might be used to try and look at smaller scales or answer specific questions; and a multi-event, historical PERC could be conducted to look at a series of similar historic disaster events to identify places where learning is, or is not, occurring over time. Although the specifics of the information you look for, the way you select interviewees, and the types of questions you ask those interviewees will vary based on your context and goals, the basic PERC approach will remain the same across all these applications.

We now present a guideline for conducting the PERC process.

#### 4.1 Desk Review

Before starting the fieldwork, conduct a desk review. This should include looking at newspaper articles, opinion pieces, peer-review articles, working papers, and reports about the disaster event itself. Further, it is particularly useful to conduct a desk review on previous, similar events, as well as the prevailing risk context, the physical landscape, the vulnerability context, the institutional landscape, and so on. This research will

give you the context you need and will help you direct and focus your fieldwork prior to going to the field. It will help you identify key players in the disaster landscape and potential interviewees. It could also help you find on-the-ground groups or key actors to collaborate with for PERC.

An independent and objective PERC necessitates an honest scoping of the literature that includes opposing viewpoints rather than specifically chosen sources supporting one particular position. Secondary literature (for example, sources used during your desk review) must be drawn on throughout the report, particularly when you are making a judgment. Including citations throughout the report is also essential.

## 4.2 Understanding Physical Conditions

An initial understanding of the physical conditions on the ground will come from the background literature review. This should then be expanded through an analysis of the physical drivers of the disaster event. Much of the more detailed information will come from interviews, as described in the next section. If the team does not have a physical scientist (depending on the hazard, a hydrologist, geologist, etc.), then this information can be derived through secondary literature and through interviews with the appropriate experts.

In exploring event details, consider what the disaster was, why it occurred, how it unfolded. In the case of a flood, this would include hydro-meteorological analysis of the event – was it due to intense rainfall, sustained rainfall, high tide, dam or embankment break, etc. This analysis should be compared back to previous events – for example, was this the expected flood pattern or was this an unanticipated or very different type of event compared to previous disasters?

If possible, calculate or estimate the return period of the event to provide a sense of the frequency or rarity of the event. Identify and explore evidence that these events are occurring more frequently or with greater magnitude than in the past. In particular, give thought to whether perceived increase in frequency and/or magnitude of events stems from changes in the hazard (e.g., heavier rainfalls), changes in exposure (e.g., more people living in the floodplain, infrastructure changing flood water flow paths, etc.), and/or changes in vulnerability of the people and assets in at-risk areas.

In identifying the severity of the event, it is also useful to note whether the event was of a severity that was planned for or whether it was beyond the planned severity. For example, in many parts of the world, infrastructure is designed to handle 1-in-20 to 1-in-100 year floods, or authorities are prepared to provide emergency housing for up to a certain number of people. How did the event compare relative to local planning standards?

If a component of the event was due to physical structure failure, include an exploration into that failure. Why did physical structures fail? Was this anticipated or unanticipated? If anticipated, were damages greater or less than expected?

## 4.3 The Fieldwork

A major part of PERC is the fieldwork. Visiting the affected areas and speaking with those involved in the disaster provides a level of context, information and understanding that would be otherwise near-impossible to obtain. It is during fieldwork that the majority of questions will be asked and answered. As mentioned earlier, the fieldwork is best done in collaboration with at least one local partner.



Interviews form the backbone of the PERC, providing the information needed to understand the institutional landscape, the narrative of what happened, and the conditions that led to vulnerability.”

In the field, the main methods are personal observation and interviews. Personal observation quite simply consists of documenting your and your team’s thoughts, comments, questions and observations. This section will focus more on how to conduct interviews.

Interviews are the backbone of the PERC. The PERC methodology uses a semi-structured interview process. Unlike formal interviews, which follow a rigid format of set questions, semi-structured interviews focus on specific themes but cover them in a conversational style. The loose format means that interviewees can provide valuable information and stories that were not anticipated by the PERC team. It also allows the interviewer to deviate from the plan to explore pertinent topics with the interviewee if they arise.

A snowball sampling methodology is used for conducting the interviews. With a snowball sampling method, you find people to interview through your interviewees’ recommendations. As you identify interviewees from your desk review and from interviewee recommendations, make sure to engage with a broad range of stakeholders from different sectors and levels of action (e.g., household to national) with different vested interests. The interviewees provide the information needed to structure the institutional landscape map, the narrative of what happened before, during, and after the disaster in question, and the socio-economic and socio-political conditions that led to vulnerability.

#### **Who to interview:**

1. Key people and organizations in the disaster risk reduction, preparedness, response, and recovery processes across scales (including local, district, provincial, national, and regional if applicable), including emergency response personnel, key

humanitarian aid agencies, public, private and non-profit groups working on preparedness, government officials, engineers building key disaster protection systems, groups active in recovery, and loan providers among others.

2. Decision-makers and planners whose work affects risk, such as planning authorities, municipal authorities or local governments, community representative groups, local and international NGOs working in the affected areas.
3. Those who are responsible for providing key services such as electricity, water treatment, solid waste management, transportation, communications.
4. Communities, households and businesses that were impacted by the disaster, and possibly those who weren’t if there is reason to believe lack of impacts were due to preparedness or mitigation actions that would provide a valuable story.
5. Local/national academics or experts who may have insight into any aspect of why the event unfolded as it did. This could include people with insight into the contexts of vulnerability, historical and current land-use, enforcement, physical science, political context, and so on.

The initial group of interviewees should be determined with your local partner(s) and informed by your desk review; this may involve people and groups that you and your partner(s) know personally or have worked with in the past. Who else to interview will depend on the questions you have left and the gaps that remain. Stop interviewing once the information provided feels repetitive, you feel like you have stopped learning new, important information, and the institutional landscape map is complete.

**During each interview, it is important to:**

1. Explain the purpose of the interview and the resulting report, emphasizing that this is designed to be an independent process for learning, not assigning blame.
2. Before starting the interview, obtain consent for conducting and recording the interview, and for using the interviewee's name/other identifiers in the report. If they do not consent to recording the interview, take detailed notes throughout. If they do not consent to using their name/other identifiers in the report, keep their identity anonymous in the report, including by removing identifying details in their account.
3. Conduct the interview in the language that the interviewee is most comfortable speaking. If you do not speak the local language, you must have an independent and impartial translator with you who is familiar with the disasters field, the types of questions being asked, and the types of information being sought. While partner organizations may be a useful translator resource, remember that staff of partner organizations may not be as independent as other, external translators.
4. Ask appropriate questions. Box 3 (below) provides a list of questions that can be used to help guide discussion. Whether and how these questions are asked will depend on the context (i.e., who you are speaking with and the type of information you have already).
5. Think outside the boundaries of the guideline questions to get the information you need:
  - a) Probe for more detail – ask who, what, when, where, why and how. (If someone tells you that they have been implementing preparedness activities, ask, “what kinds of preparedness activities have you been implementing? Have they been successful? Why or why not?”)
  - b) Compare and contrast – Prompt the interviewee to think about similarities and differences between things – especially before and after key events. (“How did you change your practices after the 2006 floods? How did it help during the most recent floods?”)
  - c) Imagine alternate futures – Ask question that invite the interviewee to imagine ‘what if’ in an alternative reality. (“What would you have done if the embankment had failed?”)
6. Think critically about the information that is being provided. Do you think it is accurate? Is the interviewee being candid? Is the information provided blurring the facts? Does this information give rise to other questions that the interviewee may not be able to answer? These thoughts should be recorded at the end of the interview.

Make sure you ask your interviewee whom else they think you should talk to, for contact information, and possibly for an introduction to those people. During the site visits, there will also be opportunities to conduct informal interviews, perhaps with directly impacted communities and households, indirectly impacted businesses (e.g., businesses impacted by loss of customer base), and so on. Informal interviews, because they take place within the context of where people live and experience their daily lives, can provide a wealth of information and can serve to answer immediate questions you have at a particular location. The protocols regarding permissions should also be observed for informal interviews.

### Box 3: Guiding Interview Questions

Guiding questions for interviews with key disaster risk management, government, humanitarian aid and safety-net personnel, and community-based organizations and committees:

- What is/was your role with regards to the disaster – what establishment or group are you part of, and what is that group’s specialization with regards to the disaster?
- What was the situation in the area before the disaster in terms of trends in people and assets in the disaster area?
- What, if any, risk reduction activities were in place prior to the disaster? (For example reforestation schemes, embankment walls.) What was the status of those and why? (For example, community levees were poorly maintained, people felt a new government levee would provide enough protection and local levees wouldn’t be needed.)
- What, if any, preparedness actions were taking place? (For example shelter building, emergency drills, first aid training.)
- What happened during the disaster? Was this disaster different from past disasters of this type? Why?
- What was the extent of the loss of life and damage to assets? Which groups were most affected?
- What did the interviewees/their organizations do before/during/after the disaster (depending on whether they/their organizations are involved in preparedness/risk reduction, response, and/or recovery)? Have past disaster events influenced their actions and capacities? How?
- Were their actions successful? Did they achieve what they set out to achieve? Or were there limitations/obstacles that prevented or inhibited them from acting effectively?
- What have they learned from the disaster in question? What would they like to see in terms of preventing future disasters? What can they do better and how can they do it better in future, similar disaster situations?

Guiding questions for interviews with local groups (e.g., Community organizations, community disaster committees) and impacted communities, households and businesses:

- What happened during the disaster?
- How were you affected during this disaster? And why? Was this disaster different from past, similar disasters? How/why?
- Was there an early warning system? What is it? Did it work? Why/why not?
- Have you implemented any strategies to reduce the risks that such a disaster poses? What kinds of strategies? Have you faced obstacles/limitations in trying to implement risk reduction/preparedness strategies? Were the implemented strategies effective during the disaster? Why or why not?
- What has been your experience with external humanitarian aid efforts? Which groups of people benefited, or not?
- How is disaster recovery progressing? How is recovery being financed? Who is getting recovery financing and who is not?



The goal of the institutional landscape map is to show the key actors, decision-making and communication channels, and where there are bottlenecks or points of failure in the overall disaster management system.”

#### 4.4 The Institutional Landscape Map

The goal of the institutional landscape map is to:

1. Identify key interviewees.
2. Show the key actors involved in the disaster management system. This includes actors across scales (national, provincial, district, local) that may be involved in planning, implementing, monitoring, evaluating, and so on.
3. Show key decision-making channels/ structures and communication channels.
4. Show where there are bottlenecks in the system or where the system failed. For example, identify that the whole response system is at risk of collapse if one person/agency is not able to perform.

Creating the institutional landscape map is a process that begins during the desk review and goes through the interview phase. The creation of the map is supported by the identification of interviewees using the snowball sampling methodology, as interviewees largely represent the key actors involved in the disaster management system.

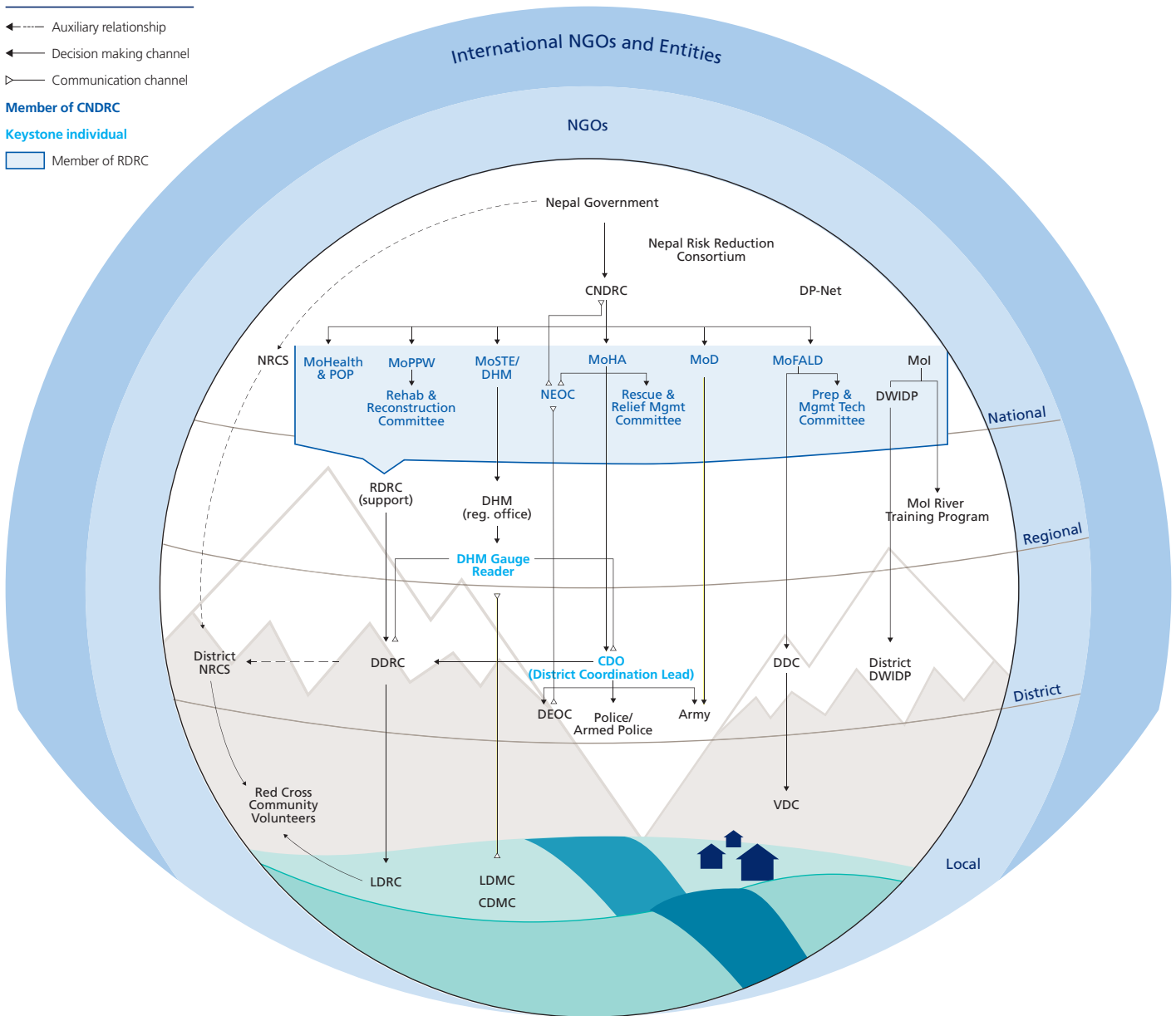
Gaps in the map likely indicate that more interviews are needed to understand how that part of the disaster management cycle functions and point to the types of interviewees needed to clarify that information. It is possible to complete an institutional landscape map once you collect enough information from and about key actors, events and experiences before, during, and after the disaster. However, it can be difficult to access all the information needed to complete such a map due to social, institutional, and political constraints. Gaps that cannot be filled should be mentioned in the PERC analysis.

Disaster management practitioners should be able to look at the map and identify agencies/groups that they need to work with for specific interventions based on the recommendations made in the PERC report. This may include agencies/groups they need to partner with or build the capacities of. Figure 3 provides an example of an institutional landscape map that was built as an info-graphic in Adobe Illustrator. A much simpler figure in Word, PowerPoint, or other available software could be used convey the same information.

**Figure 3: Disaster institutional landscape map of Nepal** (Created by Michelle Fox, ISET-International)

**Legend**

- ←····· Auxiliary relationship
- ←····· Decision making channel
- ▷····· Communication channel
- Member of CNDRC**
- Keystone individual**
- Member of RDRC





## 5. Putting It All Together



It is essential to look at your data critically. Do not accept everything that people say and write as fact. People may have different yet equally valid interpretations of the disaster.”

Now that you have collected your information, you need to organize and analyze it. The report structure in Table 2 provides an example for organizing the data and building the narrative.

The ‘What Happened’ section provides the detail of exactly what happened during the response and recovery phases—this is not an analysis-heavy section. Rather, the goal here is to provide the facts and series of events during and after the disaster in a compelling manner.

On the other hand, the ‘Physical Context,’ ‘Socio-economic Disaster Landscape,’ and ‘Key Insights’ sections will be analysis-heavy. It is in these sections that you will identify larger trends and patterns. In the ‘Physical Context’ and ‘Socio-Economic Disaster Landscape’ sections, you will bring out the underlying physical conditions that caused the disaster to occur and the socio-economic/socio-political conditions that led to the disaster vulnerability. When considering disaster vulnerability, ensure that you consider what kinds of capitals people need to prepare for, cope with and recover from that particular type and severity of disaster and whether or not they have access to them.

The ‘Key Insights’ section is where you will identify the lessons learned and critical gaps. When analyzing the data, look for the characteristics of resilience identified in Table 1. Were core systems flexible and redundant? Were agents able to draw on their capitals to be resourceful and responsive? Did legal and social norms enable equitable, efficient, and effective response and recovery? Have people and organizations learned from past disasters and are people and organizations learning from this disaster? What are the prevalent systemic issues inhibiting disaster

resilience and the disaster management system? These trends and patterns should be grounded in examples from the ‘What Happened’ section; everything you write must be justifiable.

It is essential to look at your data critically. Do not accept everything that people say and write as fact. People may have different yet equally valid interpretations of the disaster. You do not need to pick one position; in fact objectively presenting alternative views on contentious issues can help provide depth to the report. Furthermore, people are not always candid. However, this does not mean that the information they provide is useless. Read between the lines. Does the person claim something and then contradict him or herself? Is the person unable to answer a question that he or she should know the answer to? Is the person deflecting your question? All of these issues may provide useful information about the issues within an organization or components of the disaster management system.

The ‘Recommendations’ section should reflect the key insights and identify actionable opportunities. For example, there is no point in making a recommendation like “the governance system needs to completely change,” as this is something that is unlikely to happen. Rather, it is more effective to make recommendations that are mindful of existing, deep-set constraints. While the recommendations must be actionable, the goal is not to design specific interventions. Rather, the recommendations are built around wider trends and critical gaps identified in the ‘Key Insights’ section. Finally, this section should read as a standalone section so that those who do not read the full report will be able to make sense of the recommendations.



PERC studies are not meant to be individual, isolated event reports, but are part of an overall initiative to collect and share learnings.”

In putting the PERC report together, make sure it is streamlined and focused. Tailor the report to your intended audience, including having it translated into the local language, and make sure what you are saying is justifiable and grounded in the data you have collected.

The completed PERC report should be available as a free online-download on author and partner organization(s) websites and should also be distributed, electronically or in paper-format as appropriate in the local circumstances, to all involved organizations and individuals, in particular interviewees. A distribution or promotional strategy could be devised with your partner organization(s) to distribute the report widely. This could include a media release with high level findings distributed to local and national news outlets, a workshop where findings are presented and discussed in more detail with the audience, or other activities.

As a condition of utilizing the methodology presented here, we remind that PERC studies are not meant to be individual, isolated event reports,

but are part of an overall initiative to collect and share learnings. The Zurich Flood Resilience Alliance is currently building a central knowledge repository ([www.floodsolutions.net](http://www.floodsolutions.net)), including PERC, and suggest that all PERC reports are uploaded to this central PERC database. The learnings collected in this database can be searched and then be shared actively and widely amongst global stakeholders who are grappling with building disaster resilience in their respective locales.

There are full instructions for uploading PERC reports on the page [www.floodsolutions.net/perc](http://www.floodsolutions.net/perc). In addition to making the full document available, we will ask you to fill in a short table of keywords to make the report searchable, as well as a short form for each of the main recommendations, that sets out in brief the nature of the recommendation and its context. We believe this will contribute to a powerful tool for global development practitioners. For any technical challenges with flood solutions catalogue, please contact [webmaster@floodsolutions.net](mailto:webmaster@floodsolutions.net).

## 6. Conclusions



Ultimately, the goal is to inform and encourage resilience-building processes that prevent hazards from becoming disasters while considering people, their needs, and the cultural and legal norms that enable their ability to thrive.”

In this manual, you have been provided with the necessary tools to conduct your own PERC. These tools are not set in stone; rather, they can and should be modified and adapted to suit the context you are studying. This is important because all contexts are different. Using rigid sets of tools, methods and questions will only stifle the unanticipated yet important narratives that exist.

The benefit of conducting a PERC is that it looks at disasters from a systems-wide lens, synthesizing lessons learned across sectors and scales. In this respect, it is exhaustive and provides a full picture of

what happened, why it happened, and what opportunities for action exist. It is not the goal of PERC to design specific interventions that deal with the minutiae; rather, it is to point out wider trends and systemic gaps for which on-the-ground disaster management practitioners need to design interventions.

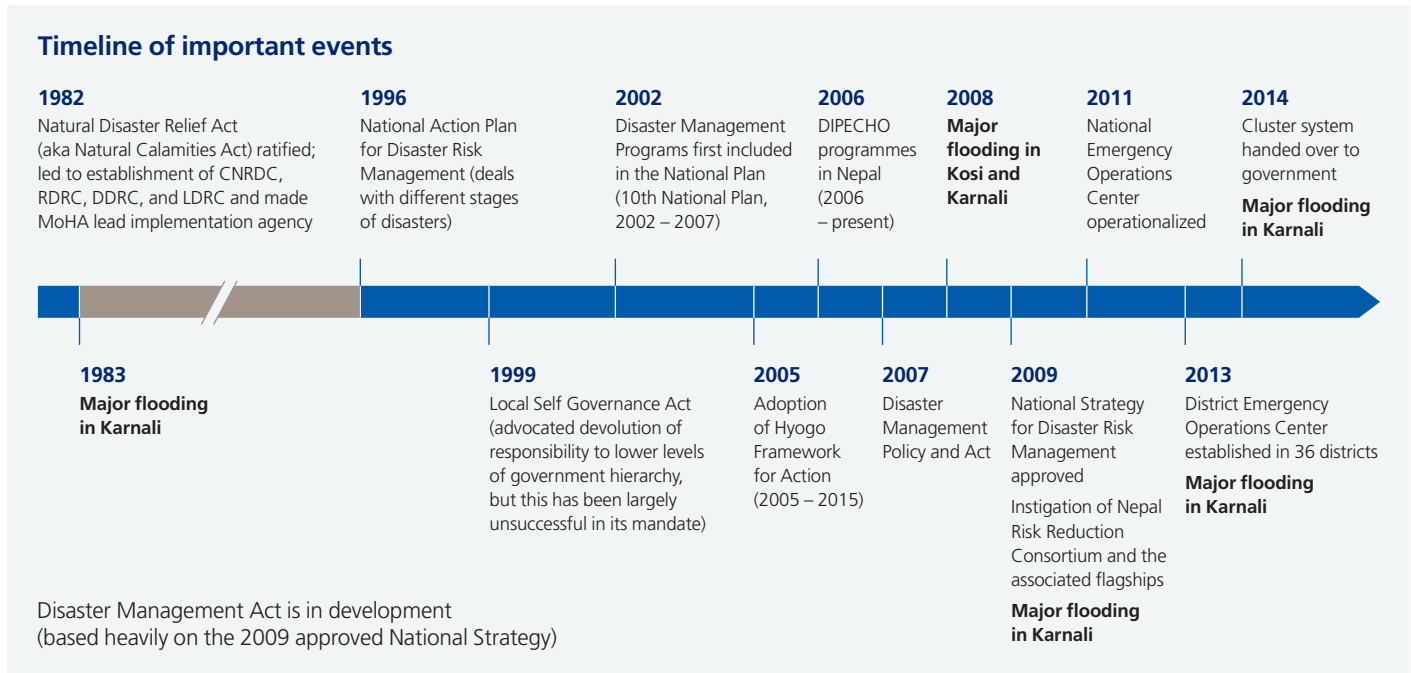
Ultimately, the goal is to inform and encourage resilience-building processes that prevent hazards from becoming disasters while considering people, their needs, and the cultural and legal norms that enable their ability to thrive.

# References

- Friend, Richard, & MacClune, Ken. (2012). *Climate resilience framework: Putting resilience into practice*. Boulder, CO: Institute for Social and Environmental Transition-International.
- GFDRR (2013). *Post-Disaster Needs Assessments*. Volume A. Guidelines. Global Facility for Disaster Risk Reduction.
- Keating, A., Campbell, K., Mechler, R., Michel Kerjan, E., Mochizuki, J., Kunreuther, H., Bayer, J., Hanger, S., McCallum, I., See, L., Williges, K., Atreya, A., Botzen, W., Collier, B., Czajkowski, J., Hochrainer, S., & Egan, C. (2014). *Operationalizing Resilience Against Natural Disaster Risk: Opportunities, Barriers and A Way Forward*. Zurich, Switzerland: Zurich Insurance Group.
- Knutsson, P. & Ostwalk, M. (2006). A process-oriented sustainable livelihoods approach – A tool for increased understanding of vulnerability, adaptation and resilience. *Mitigation and Adaptation Strategies for Global Change*. doi: 10.1007/s11027-006-4421-9.
- MacClune, K., Venkateswaran, K., Dixit, K. M., Yadav, S., Maharjan, R., Dugar, S. (2015). *Urgent case for recovery: what we can learn from the August 2014 Karnali River floods in Nepal*. Zurich, Switzerland: Zurich Insurance Group.
- Moench, M., Tyler, S., & Lage, J. (Eds.). (2011). *Catalyzing urban climate resilience: Applying resilience concepts to planning practice in the ACCCRN program (2009–2011)*. Boulder, CO: Institute for Social and Environmental Transition-International.
- Tobin, G. A (1995). The Levee Love Affair: A Stormy Relationship. *Water Resource Bulletin*. 31, 359-367.
- Tyler, S., & Moench, M. (2012). A framework for urban climate resilience. *Climate and Development*, 4(4), 311-326. doi: 10.1080/17565529.2012.745389
- UNISDR (2009). *Terminology on DRR*. Retrieved from <http://www.unisdr.org/we/inform/terminology>
- Zurich Flood Resilience Alliance (2014a). *After the storm: how the UK's flood defenses performed during the surge following Xaver*. Zurich, Switzerland: Zurich Insurance Group.
- Zurich Flood Resilience Alliance (2014b). *Central European floods 2013: a retrospective*. Zurich, Switzerland: Zurich Insurance Group.
- Zurich Flood Resilience Alliance (2015a). *Balkan floods of May 2014: challenges facing flood resilience in a former war zone*. Zurich, Switzerland: Zurich Insurance Group.
- Zurich Flood Resilience Alliance (2015b). *Morocco floods of 2014: what we can learn from Guelmim and Sidi Ifni*. Zurich, Switzerland: Zurich Insurance Group.
- Zurich Flood Resilience Alliance. (2015c). *Can flood resilience be measured? An innovative collaborative approach may do just that*. Zurich, Switzerland: Zurich Insurance Group. Retrieved from [https://www.zurich.com/\\_media/dbe/corporate/docs/corporate-responsibility/can-flood-resilience-be-measured.pdf?la=en](https://www.zurich.com/_media/dbe/corporate/docs/corporate-responsibility/can-flood-resilience-be-measured.pdf?la=en)

# Appendix

## Example timeline showing past floods and major disaster-related institutional events in Nepal.



## Acknowledgements

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### About the Zurich flood resilience alliance

An increase in severe flooding around the world has focused greater attention on finding practical ways to address flood risk management. In response, Zurich Insurance Group launched a global flood resilience program in 2013. The program aims to advance knowledge, develop robust expertise and design strategies that can be implemented to help communities in developed and developing countries strengthen their resilience to flood risk.

To achieve these objectives, Zurich has entered into a multi-year alliance with the International Federation of Red Cross and Red Crescent Societies, the International Institute for Applied Systems Analysis (IIASA) in Austria, the Wharton Business School's Risk Management and Decision Processes Center (Wharton) in the U.S. and the international development non-governmental organization Practical Action. The alliance builds on the complementary strengths of these institutions. It brings an interdisciplinary approach to flood research, community-based program and risk expertise with the aim of creating a comprehensive framework that will help to promote community flood resilience. It seeks to improve the public dialogue around flood resilience, while measuring the success of our efforts and demonstrating the benefits of pre-event risk reduction, as opposed to post-event disaster relief.

### About PERC

As part of Zurich's flood resilience alliance, the Post Event Review Capability (PERC) provides research and independent reviews of large flood events. It seeks to answer questions related to aspects of flood resilience, flood risk management and catastrophe intervention. It looks at what has worked well (identifying best practice) and opportunities for further improvements. Since 2013, PERC has analyzed various flood events. It has engaged in dialogue with relevant authorities, and is consolidating the knowledge it has gained to make this available to all those interested in progress on flood risk management.





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