

Foundations for Change

Building resilience through co-created resilience data
Lessons and case studies from Year 5



learning

 /'lɜːnɪŋ/

noun

- 1 the activity or process of gaining knowledge or skill by studying, practicing, being taught, or experiencing something: the activity of someone who learns
- 2 knowledge or skill gained from learning

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Year **5**



The [Zurich Flood Resilience Alliance](https://floodresilience.net/) is a multi-sector collaboration between the humanitarian sector, academia, and the private sector focusing on shifting from the traditional emphasis on post-event recovery to pre-event resilience. As an Alliance, we work to achieve our objectives through longterm flexible programming; we are eleven years into an eleven-year program that has been delivered in two Phases (Phase I from 2013-2018; Phase II from 2018-2024). As of 2023, we operate in over 250 communities in 24 countries, where we are delivering community programming; local, sub-national, and national advocacy; and generating knowledge to improve flood resilience practice, spending, and policy. The Alliance's goals are to increase investment into pre-event resilience building by USD 1 billion and to help make 2 million people more resilient to flooding.

Find out more: <https://floodresilience.net/>

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1.0 Introduction

'Building resilience' is increasingly a centerpiece for development, disaster risk reduction (DRR), disaster risk management (DRM), and climate change adaptation. A critical aspect of many of these efforts is collecting demographic, socio-economic, and risk data to inform programming. However, building resilience requires more than this. In particular, it requires resilience data — data that is cross-scalar and cross-sectoral, community connected, collaboratively developed, and for which the process of data generation is itself part of the resilience building process.

This type of data is difficult both to develop and work with. Taking a cross-scalar and cross-sectoral approach results in a very broad dataset that can be a challenge to analyze and communicate. Taking an approach in which communities are a key part of the process of generating the data, which is then actively used to build resilience in and with those communities, requires substantial time and resources. Yet this approach, for the Zurich Flood Resilience Alliance (the Alliance), is not simply aspirational.

Over the past ten years, the Alliance, working with over 400 communities globally, has demonstrated the value of investing in the development and application of resilience data tools and approaches. User feedback on the Alliance's foundational tools – the Flood Resilience Measurement for Communities (FRMC) and the Post-Event Review Capability (PERC) – both of which rely on assembling a broad, multi-sectoral, and multi-scalar dataset via participatory information exchange, contextualization, and engagement with stakeholders, indicate that the resulting information and involvement



Blessing Jonga, Senior Energy Development Officer in the Ministry of Energy, explains the process of biogas digester construction at one of four sites piloted in partnership with Practical Action, Zimbabwe © Practical Action

in the processes contribute to community resilience (Keating and Hanger-Kopp, 2020; Keating et al., 2017; Venkateswaran et al., 2020).

This report – presenting insights from Year 5 of Phase II of the Alliance – specifically highlights how Alliance teams have collaborated with communities to apply the Alliance resilience data tools and approaches and use the resulting data and information for impact. Other Alliance publications illustrate how these tools and their application are a key, yet not the only, component of integrated programming. In particular, [previous annual reports](#) address:

- Year**
- 1** The systems thinking needed to understand the resilience context of a community and how the FRMC encourages this holistic understanding.
 - 2** How the application of the FRMC framework and tool and the resilience information generated can both build capacity and support decision-making around the development of resilience building actions.
 - 3** Examples of how Alliance teams have used resilience information generated from the FRMC in combination with additional contextual information to proactively adapt their programming in response to COVID-19.
 - 4** How application of the FRMC and resulting information and data have formed the foundation for many of the Alliance’s advocacy wins.

Alliance resilience data tools and approaches have proven to be useful: all current Alliance country teams have used data-driven action pathways to scale their efforts. In this report we provide three case studies that illustrate this usefulness and show how Alliance teams used the tools within their specific contexts to create impact. Specifically, we:

- Explore resilience data and information through the different resilience datasets produced by the Alliance’s tools;
- Explore why resilience data and the process through which it is generated is uniquely useful; and
- Outline some of the challenges in utilizing this data and information, along with solutions that have been identified by Alliance practitioners.

We start with an overview of the Alliance’s two principal resilience tools, the FRMC and PERC; discuss the strengths and challenges of using them as a core part of our resilience work; and then present case studies illustrating how the information generated by these tools forms a key part of the Alliance’s integrated programming approach.

BOX 1. WHAT WE MEAN BY “RESILIENCE DATA”

For the Alliance, resilience data is:

- Data for understanding the gaps and opportunities in how communities anticipate and respond to, cope with, and/or are impacted by rapid onset natural hazard events;
- Comprehensive, multi-sectoral information that spans two or more levels (e.g., things within the community/ community control and things outside the boundaries of the community or outside of community control);
- Co-created with communities; and therefore
- Community-centered and reflective of community insights, perspectives, and priorities.

2.0 Alliance tools for collecting resilience data and information

2.1 Flood Resilience Measurement for Communities (FRMC)

The FRMC is the Alliance’s participatory approach to measuring flood resilience at the community level. The FRMC guides users through a structured process for generating evidence about the ways in which a given area or community is and is not already resilient to floods and provides insight into what is needed to further build resilience¹. The FRMC is composed of two parts: a conceptual framework for measuring community resilience to flooding², and an associated tool for implementing the framework in practice. The second component – the tool – is a practical hybrid software application composed of an online web-based platform for setting up the process and analysing data, and a smartphone- or tablet-based app that can be used offline for field data collection.

2.1.1 FRMC sources of resilience, FRMC baselines, and FRMC endlines

FRMC users conduct at least two studies – a baseline and an endline – at least 18 months apart to measure a community’s flood resilience across 44 ‘sources of resilience’. The sources span five interconnected capitals, drawn from the United Kingdom’s Department for International Development’s (DFID) Sustainable Livelihoods Framework (1999) (Keating et al., 2014; Keating et al., 2017). These capitals – social, physical, financial, natural, and human – individually and combined provide insight into a community’s resilience. The sources are also mapped to several other ‘lenses’ through which the same data from the 44 sources can be viewed, for example the four Rs – robustness, redundancy, resourcefulness, and rapidity (Bruneau, 2006; Cimellaro et al., 2010)³. The result is a broad, multi-sectoral, cross-scalar dataset that explores both flood issues and underlying vulnerabilities and capacities from a variety of perspectives. These results can be used to identify entry points for building resilience.

For every community and application of the tool, data is collected the same way for the same 44 sources. In this way, a consistent measurement can be taken across different points in time. The sources are graded, which translates qualitative data into semi-quantitative data that can be used to identify community strengths and weaknesses. Results are validated with the communities, shared with local government, and used to co-identify community resilience priorities. This in turn informs resilience-building efforts, encompassing both community-level interventions and advocacy. Baseline measurements with the FRMC provide an assessment of community resilience strengths and gaps in the absence of a stressor event. Comparing two or more measurements can help

1 <https://floodresilience.net/frmc/>

2 For the Alliance, ‘flooding’ includes any and all climate events that result in unwanted water. Thus, the FRMC has been used to assess pluvial, riverine, tidal, and flash floods; floods resulting from or exacerbated by poor drainage; floods associated with tropical depressions and storms; and both acute and chronic flooding.

3 Based on the properties of a resilient system developed at MCEER at the University of Buffalo.

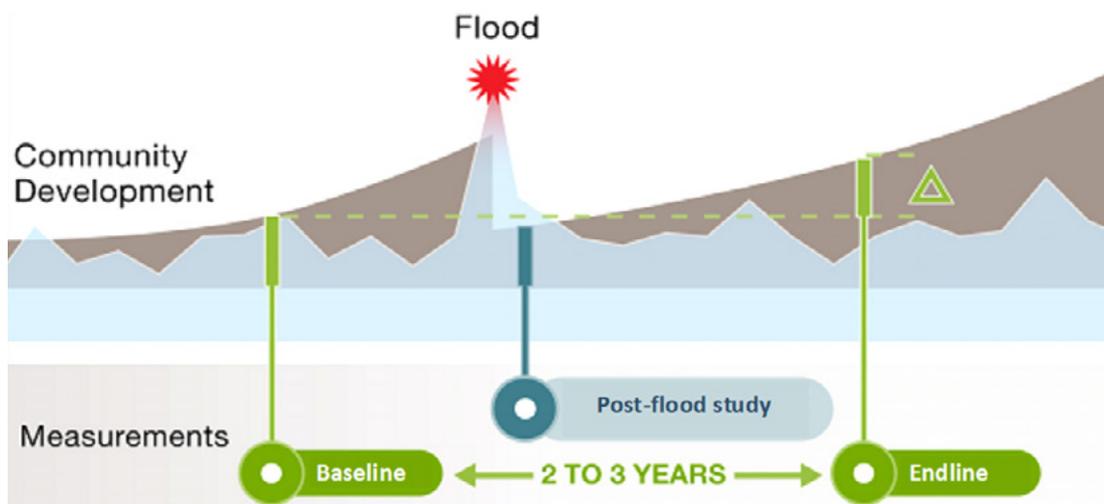
implementers and the community identify whether, and specifically where, resilience is increasing or decreasing for the community. This allows for an assessment of the impact of resilience building activities. The validity, reliability, and usefulness of the FRMC data has been empirically and anecdotally established via numerical and social science analyses (Hochrainer-Stigler et al., 2020; Hochrainer-Stigler et al., 2021).

2.1.2 FRMC post-event study (PES)

The FRMC PES is a valuable part of the FRMC, filling out the FRMC ‘story line’ and providing a perspective on the sources of resilience after a flood has happened. It is conducted in the months immediately after a community flood event to document and better understand the impacts of the event on the community, the ways in which the community and other stakeholders responded, and the extent to which activities undertaken to build flood resilience in the community were helpful in an actual flood.

The FRMC PES evaluates resilience outcomes directly after a flood event using a set of 29 ‘outcome variables’. These do not assess whether the underlying resilience of a community has increased or decreased since the baseline; rather, the outcome variables used are separate from and not directly comparable to the 44 sources evaluated for baselines and endlines. Instead, the PES serves as a reality check on the baseline assessment and highlights resilience strengths and gaps more easily seen during a shock or stress rather than purely theoretically. The data produced by the FRMC baseline/endline and post-event studies provide complementary snapshots in time (Figure 1, below). This is a unique aspect of the FRMC approach: to our knowledge, there are no other resilience tools that establish a baseline of resilience, track the results of resilience building efforts over time, and also evaluate resilience outcomes directly post-event.

Figure 1 FRMC baseline, endline, and post-flood (event) study



Source: IIASA in collaboration with the IFRC

2.2 Post-Event Review Capability (PERC)

Building on the field of disaster forensics, the PERC is an additional post-event review approach developed and used by the Alliance to understand how events turn into disasters (Keating et al., 2016; Venkateswaran et al., 2020; Szönyi et al., 2023). The

PERC evaluates the successes and failures in the management of disaster risk prior to the event, disaster response, and post-disaster recovery through reviewing secondary data and by conducting a series of semi-structured interviews with a range of stakeholders including government actors, academics, communities, households, businesses, and community-based organizations. The PERC is comparatively more fluid than the FMRC, which has a structured platform, multiple measurement points, and utilizes a standardized application of a suite of tools across teams. Put another way, the PERC is an applied research study accompanied by an implementation methodology.

The PERC uses a system-wide approach, analyzing across scales and sectors, and across all five aspects of the disaster risk management cycle: prospective⁴ and corrective risk reduction⁵, preparedness, response, and recovery. It provides a bird's-eye view of why the event manifested in the way it did and how resilience might be built. Within the Alliance, we use PERCs to:

- Explore specific resilience questions post-event, including understanding both where systems performed as well or better than expected and where things were not resilient, either due to pre-existing gaps or unexpected failure;
- Establish a knowledge base that complements the FRMC pre-event and/or post-event datasets and tells a sub-national or national-scale story about the flood events and fundamental resilience needs at a broader scale; and
- Influence post-disaster recovery thinking and funding flows.

Additionally, because the PERC is implemented in part through key informant interviews, it can be intentionally used as part of a strategy to engage key stakeholders and build new relationships in addition to collecting data.

A PERC is typically conducted and published within a year of an event, though it can be used in other ways or timeframes as necessary. If the event occurred in two different areas with one more severely impacted than the other, a PERC can help determine why the impacts were disproportionate. A PERC then identifies future opportunities for intervention and action that could reduce the risk posed by the occurrence of future hazard events.

PERCs differ from two other, more common post-event analyses — the post-disaster needs assessment (PDNA) and the after-action review — primarily in its ability to stitch together information to understand the bigger, cross-sectoral, and cross-scalar picture. PDNA's are typically specifically focused on needs and may not ask why impacts were sustained, while most after-action reviews are sector specific. We have yet to see another methodology that has been specifically designed to connect across scales and sectors as the PERC does. Given that many failures during disasters lie along jurisdictional boundaries (e.g., as responsibility moves from one level of government to another, or as information moves from responsible agencies into the public sphere, etc.), which are often blind spots in other more narrowly-focused methodologies, the PERC methodology can highlight lessons not drawn out elsewhere.

4 Prospective risk reduction: the actions taken to avoid the build-up of new or increased risks.

5 Corrective risk reduction: the actions taken to reduce risk to already at-risk assets.

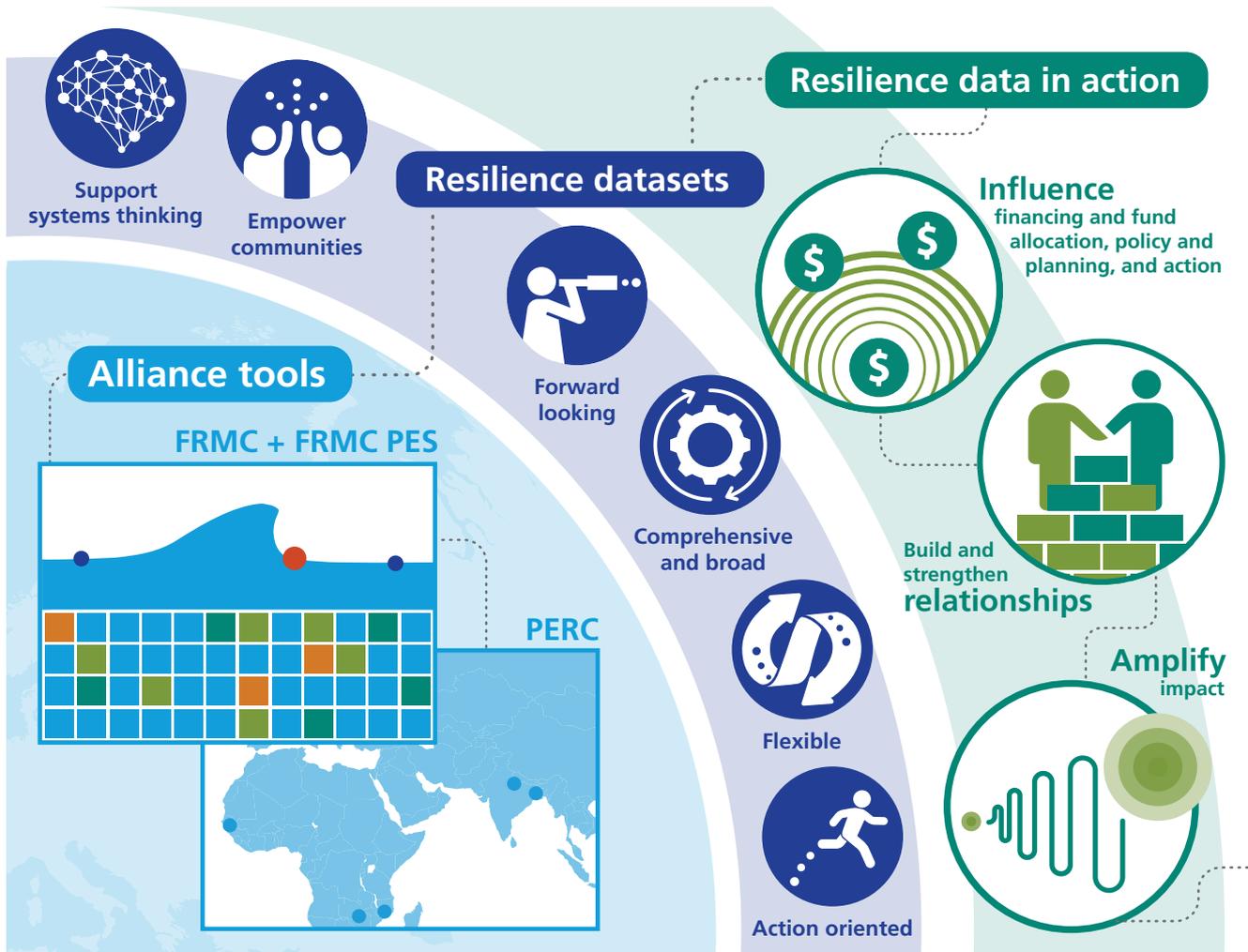
3.0 The value of our resilience data and information

“Resilient communities are knowledgeable about their local environment, the hazards and risks, and their assets and strengths.”

- [Create Resilience: Building a Resilient Community](#)

Working closely with communities over the past ten years to implement the FRMC, FRMC PES, and the PERC has resulted in resilience datasets that extend beyond facts and statistics conveying information without a broader understanding of the context from which they are drawn. Rather, the Alliance’s long-term, collaborative work with communities has resulted in contextualized resilience information that is deeply embedded in our programming.

Figure 2 The value of resilience data and information



Below, we identify the key value of our resilience data and information to implementing teams, the communities they work with, and the broader stakeholder community, and provide brief examples that are further explored in this and other (linked) Alliance reports.

Support systems thinking. Our resilience datasets consist of data that are holistic, cross-scalar, and multi-sectoral, and which illustrate how systems within and external to communities work and interact with other systems.



- The [Concern Kenya](#) and [Practical Action Zimbabwe](#) teams indicated that communities are now identifying different interventions than those they would have considered in a typical development program addressing flooding, with Kenyan communities suggesting fully equipped solarized irrigation systems installed on higher ground rather than dykes, and Zimbabwean communities connecting deforestation and the increasing frequency of storms to flooding. As the Zimbabwe team says, “At first, we were doubtful about acceptance, and how it would be delivered within the communities. But it was a pleasant surprise how the communities grasped the concepts. [...] It was the rigorous nature of the tool which caused you to really go deeper and analyze the issues.”

Empower communities. Our resilience datasets consist of data that are produced and used by communities, often in collaboration with local planners and decision-makers. This gives stakeholders ownership of the data and outcomes.



- Using the FRMC, [Mercy Corps Jordan](#) worked with communities to identify flood-related issues and priorities including the establishment of an early warning system (EWS), improved infrastructure related to flood management, increased vegetation coverage, and awareness raising campaigns. Mercy Corps then provided advocacy training, equipped community members with policy research and the skills to write policy papers, and connected them with networks and platforms where they could engage and lead in policy efforts to inform better policies and plans. Members of each community developed advocacy plans and policy papers which included FRMC and other evidence to support their analysis, and proposed recommendations for policy-makers. In a series of policy dialogues with the participation of communities and local governments, the core community members took the opportunity to present the key findings and recommendations. The communities positively embraced the project interventions, as evidenced by the significant majority noting observable enduring changes directly attributed to Mercy Corps’ efforts. Project interventions were also successful in imparting crucial knowledge on flood resilience, with community members demonstrating retained understanding. Moreover, participants actively applied the knowledge acquired from project activities and expressed a commitment to continuing such practices in the future, highlighting the project’s sustainability.

Include a forward-looking element. Our resilience datasets provide information not just about current conditions and needs, but also necessarily take into account climate change; demographic, political, and economic trends; development trajectories; and other elements.



- [ISET Vietnam](#) used the PES to explore an unusual dry-season flood, a type of event that appears to be becoming more common as a result of climate change. The PES resulted in a different pattern of strengths and weaknesses than were seen in the FMRC baseline data. This type of information can be used to help focus on which

aspects of new and unusual flooding are problematic and need to be prioritized. The data from the study also proved to be immediately valuable in multiple ways: it provided deeper insight into the flood's impacts, built the community's knowledge of new behaviors needed to maintain their resilience during dry-season floods, and provided a fuller picture of resilience gaps and strengths relative to an unusual but increasingly frequent climate event for which communities are poorly adapted. Running the PES thus provided a fuller picture of resilience while also highlighting how critical it is to be specific when it comes to community resilience by clarifying resilience for whom, to what, and when.



Are comprehensive and broad. Our resilience datasets cover a wide range of sources and variables, much wider than a typical hazard- or sector-focused dataset.

- **Practical Action Senegal's** resilience datasets provided the team with a strong overview of the whole DRM structure on which to base the rest of their four-year program. In the process of conducting both an FRMC baseline and a PERC, the Practical Action Senegal team learned a lot about the way that DRR for flooding is organized in Senegal. The team had conducted a prior desk review, but talking directly to people in charge of organizations deepened knowledge about how things are structured, provided an opportunity for learning from other organizations, and allowed them to hear firsthand about how departments and agencies are organized.



Are action oriented. Our resilience data provides the evidence to both justify and drive implementation and action by highlighting resilience gaps and strengths.

- The **Plan International Nicaragua**⁷ FRMC data collection and socialization process made it evident that for our Nicaraguan communities, financial resources are a major constraint to reducing the impact of floods. Therefore, strategies for the uptake of flood resilience practices need to be aligned with the government's existing goals and resources. In particular, FRMC data showed a gap in community access to and use of early warnings. Improving community-based EWS turned out to be an important pathway for influencing government to take up and invest in better resilience practices.



Are flexible. Our resilience data both supports our approach to systems thinking and resilience building while also complementing standard planning, development, and policy influence approaches.

- **The Red Cross of Montenegro** shared FRMC baseline data with subnational authorities in a way that aligned with local flood protection plans in order to deepen the government's understanding of local community needs. In the case of the Zeta Municipality, the government had already identified large-scale flood protection as an important area of intervention but had been unable to implement these actions due to competing priorities and limited budgets. As a result of their Alliance and other work, the Red Cross of Montenegro, and the communities they worked with, were able to advocate for the prioritization of both structural and non-structural measures to increase community resilience and consolidate a collaborative relationship with the municipality to ensure the co-financing and shared

⁷ Regrettably, after nearly 30 years of operation in Nicaragua, Plan International made the decision to close their Nicaragua office in late 2023 due to growing political constraints that made it effectively impossible to operate as an independent, humanitarian NGO working to advance children's rights and equality for girls.



Flood canal in need of maintenance in Bistrica, Montenegro © Jonathan Ulrich

implementation of three initiatives related to flood resilience: the construction of a flood wall, a canal cleaning campaign, and the green islands project, all accompanied by awareness-raising and training around the role of environmental and waste management in reducing the impact of floods.

These characteristics of our resilience datasets as well as the knowledge and capacity building they have supported have allowed teams to utilize them, as a part of their programming, to:



Build and/or strengthen relationships. Resilience data and information can be utilized to anchor stakeholder involvement, generate buy-in from stakeholders, and improve coordination between levels of governance and different stakeholders.



Influence financing and fund allocation, policy and planning, and action at multiple levels, from local to global.



Amplify impact. Data and information can be used to amplify existing knowledge, community voices, the Alliance approach, and Alliance member programming. This includes scaling approaches and ways of thinking. Increasingly, teams are scaling not just what they are doing, but also how they are thinking about it, by more broadly influencing how other stakeholders think about problems and implement solutions that support communities to self-mobilize to address climate risks.

These are powerful ways – beyond evidence-driven programming – to use resilience information. For many programs or organizations, this may be reason enough for the significant up-front investment of resilience data collection. These three themes – relationships, influence, and amplification – have been explored in greater detail and in slightly different ways, alongside case studies, in the [Zurich Flood Resilience Alliance Year 4 Learning Report](#).

4.0 Using resilience data in practice

“Embracing data-driven strategies via the FRMC data collection tool, we’ve also been able to delve deeper into the specific requirements of marginalized groups such as women, children, people with disabilities, and the elderly. This more nuanced understanding has been instrumental in developing interventions that are truly inclusive, ensuring that no one is left behind in our pursuit of community resilience.”

- Plan International and IIASA, reflecting on their collaborative efforts in the Philippines, 2021-2023.

Despite more than a decade of discussion⁸ and calls to build resilience, success in doing so for the most vulnerable remains insufficient. This is evidenced by the UN Secretary General’s message for 2023, calling for the globe to “reaffirm our commitment to investing in resilience and adaptation, and building a safe and just future for everyone, everywhere⁹”.

This is understandable: building resilience involves significant paradigm shifts in seeing, thinking, and doing, within a constantly shifting context that is inherently dynamic and complex. Additionally, resilience is inherently contextual — resilience in one context will look different in another context. Within this opaque resilience environment, resilience data can provide some clarity by grouping contexts to identify common entry points (Laurien et al., 2020), and by breaking resilience into relevant, relatable, and understandable elements. This can help communities, practitioners, and decision-makers better understand how and where resilience can be built. Such work remains a critical need. Though the growing focus on resilience has engendered much-needed growth in DRM practitioner capacity to work with complexity and the interconnections driving vulnerability, disaster risk, and development outcomes, practitioners are still overwhelmingly calling for support for in-depth resilience assessments, both in terms of funding and tools/guidance (Keating and Hanger-Kopp, 2020).

For the Alliance, collecting and analyzing resilience data is highly participatory, which has significant advantages. By taking the time to methodically and comprehensively collect and analyze contextually driven, community information to inform action, the opportunities and gaps that need to be addressed become clear to everyone participating in the data generation process. However, it is a high-effort endeavor, produces data with limitations (albeit like any data tool) and how to use the data across scales and sectors is not always obvious. This is, no doubt, part of why resilience data is often underutilized in resilience building. These challenges are explored in summary below and in more detail in the subsequent case studies.

8 E.g., OECD (2014) Guidelines for resilience systems analysis, OECD Publishing; <https://www.oecd.org/dac/Resilience%20Systems%20Analysis%20FINAL.pdf>

9 <https://www.un.org/en/observances/disaster-reduction-day/messages>



People depend on the river for fishing, transportation, and other uses, Bolivia © Mónica Cuba, Practical Action

4.1 Addressing challenges in the collection and use of resilience data

The Alliance resilience tools were designed to support building and strengthening relationships; influencing financing, policy, planning, and action; and amplifying impact at the community and local levels. Consequently, all of the Alliance teams are seeing positive impact in all three of these areas at the community and local levels. At the same time, because our resilience datasets are broad, highly detailed, complex, and community connected, they can serve multiple purposes and be applied at multiple scales. Yet, seeing beyond initial community and local applications can be difficult. Because these datasets are large and granular, they require time to explain to new audiences, and identifying appropriate ways to share the data beyond the community and local decision-makers that were involved can be difficult.

For example, though most Alliance teams have begun influencing local decision-making and funding, scaling to higher levels of government requires different messaging, including that which shifts from the individual community to communities in aggregate, requiring aggregation of already complex datasets, but is also simplified for decision-makers with less time and attention. Because the Alliance programmatic approach focuses on community-specific action by first applying resilience data collection tools in and with communities to build understanding of community resilience strengths and weaknesses before identifying and prioritizing actions to further build resilience, teams have found it challenging to think beyond the ways they have already used the information. Below we explore some specific challenges teams have faced and the solutions they are developing to address those challenges.



Challenge

Collecting and using resilience datasets is a high-effort endeavor

The process of using data tools to collect resilience data – from learning to use a new tool, to gathering the data, to analysis and application of results with communities and stakeholders, to dissemination of products – takes time and effort. In the Alliance, we have found that by building on standard practice and creating a well-structured process it is possible to de-mystify and galvanize communities, government, and others to invest in positive resilience building actions. Nonetheless, it takes new Alliance teams 6 to 12 months to understand the FRMC: setting it up, collecting and grading baseline data, sharing the data with communities, and beginning the process of developing and implementing activities with communities on the basis of that data. The process does not become intuitive until teams have collected and used the data for one to two years. While this timeline may appear daunting, it is also realistic and practical: learning new tools and processes always takes time, and building a working knowledge of resilience and systems thinking is time consuming. Though data collection and analysis takes time, Alliance teams have found that the process itself presents an opportunity for unexpected learning and relationship building with community partners and beyond.



How the Alliance is addressing this challenge

Provision of regular, long-term support and encouragement

Sustained effort, resources, and input from Alliance program staff and management has meant that over the last decade, every team that has used the FRMC data collection tool has significantly built their capacity and understanding of resilience, and the capacity and understanding of the communities and partners they have worked with, in ways that directly impact their work for the better. This has required significant investment in initial training, ongoing upskilling, development of active platforms for sharing and cross-collaboration, and identification and dissemination of particular successes and learning.

This effort has not just been the responsibility of Alliance partners. Using data tools to support evidence-informed resilience work requires long-term funding on the part of donors. For the Alliance, the Z Zurich Foundation and Zurich Business have enabled the Alliance through long-term commitment and support, flexible funding, and active engagement in and contribution to the work. A realistic approach to resilience work will take into account that an initial one to two year data collection and learning ramp will require at least five-year funding cycles.

“After using the FRMC we can now, in a way, inform our policy makers, government, etc. exactly what is flood resilience. The FRMC has made the understanding of resilience organized. When discussing resilience, you have to see it from the different lenses, that’s how you narrow things down. It has informed me well. I now have a better understanding of the components that build resilience to floods.”

- Alliance country team member

 **Challenge**

All data tools have limitations

Resilience data are only as good as the tools used and people using them, and no tool or person is perfect. This is why the Alliance begins from the perspective of “resilience of what, to what, for whom?” Each of the Alliance’s tools can be considered comprehensive in its own way: each addresses resilience at a specific point in time, focuses on a specific hazard, and engages with specific people at specific scales. The resulting datasets are unique to each tool. This is also why the Alliance continues to engage in validating, or determining how ‘good’ – valid, reliable, and useful – the data are that are produced from its tools. To the best of our knowledge, there are no other resilience assessments that engage in a comparable exercise.

Yet, gaps remain. The FRMC has been developed for global application, and consequently considers resilience from a perspective that is not fully aligned with all the highly local contexts in which it is being applied. It also doesn’t consider all intersecting aspects of resilience; for instance, it doesn’t take an explicitly gender-focused approach, though as we evolve the FRMC we are working to address this. For example, Plan International and IIASA developed a set of gender and inclusion-specific questions to be asked along with the FRMC, in addition to guidance on inclusive data collection developed by IIASA, Plan International, Practical Action, and Concern Worldwide.

The PERC is flexible and fluid and could be used to dive deeply into specific questions, but those questions need to be identified prior to or during the study. Revisiting existing PERC data to answer specific questions can be inconclusive. For example, to date, post-disaster finance has not featured prominently in Alliance PERCs.

 **How the Alliance is addressing this challenge**

We carefully consider the data we need or want as we select and apply resilience data tools

Flexibility in thinking is required in using resilience data tools, particularly in considering what ways the data collection tool can be adapted to fit the context, instead of trying to fit the context into the tool. For instance, one Alliance team added a new lens to the FRMC for analyzing their data to ensure greater coherence with national policy frameworks. All of our teams have worked closely with field workers to make sure that as FRMC data collection questions were asked, they were framed relative to the local context. In the absence of this level of thought and adaptation, the resulting data would be much weaker.

Teams also found that they could do a better job of applying the FRMC if they had already considered how they would use the resulting data. In particular, initial planning for data dissemination, sharing, and leveraging helped identify stakeholders and key informants to include in the data collection process.

With PERCs, we are now more actively conducting studies designed to complement Alliance community work. These studies can both generate information and new connections, and can be used to deepen existing work and/or identify new opportunities.



Challenge

Envisioning how to use resilience data can be hard

While resilience data generation needs to have a focal scale – such as community or city level – resilience data can and should be used across scales to influence policy, decision-making, investment, and action. However, the reality is that the opportunities and ways in which you can use resilience data shift over time, and understanding how to use resilience data, particularly community-level data, beyond the community level can initially be difficult. This was true for many of the Alliance teams that had not previously collected and used resilience data. However, newer teams have been able to learn from more experienced teams, decreasing the length of time necessary for integration of tools.



How the Alliance is addressing this challenge

Sharing experiences and learning from others

Transparently sharing knowledge and developing practical examples that showcase practitioner experimentation bolsters the effective use of resilience data.

Developing appropriate tools for synthesizing and presenting knowledge can provide space for sharing challenges, successes, and learning. For example, the Alliance has set up quarterly regional discussions and hosted both virtual and in-person Learning Events to connect teams and allow for active collaboration and exchange. This need for effective collaborative spaces is an often understated and underestimated part of the resilience process, as we explored in our [Year 3 Learning Report](#) (Box 2, pgs. 8 & 9).

Regular monitoring and evaluation focused on identifying good practices and approaches to resilience programming can generate practical learning and support adaptive management of programs to address challenges and needs and deepen impact. Investing the time and support to develop an institutional willingness to learn and share in what may be a confusing learning process has been critical for overall Alliance success.

“From my experience when we talk about the FRMC it is highly appreciated. Especially since it gives the community the opportunity to take part in their own resilience implementation plan. Although we are pro-participation, the fact that the FRMC enables communities to participate in the planning as well as implementation is appreciated.”

- Alliance country team member

5.0 Putting it all together

Alliance teams are facing and meeting the challenges of resilience data collection and usage head on. With an understanding that context makes application more understandable, we present the accompanying three case studies. Ultimately, Alliance teams can attest to the fact that recognizing, planning, and budgeting for the unique realities, benefits, and challenges of resilience datasets – including realistic scheduling and budget, staff time, and capacity resourcing – and engaging in the work with a degree of flexibility goes a long way toward setting programs up for success.



Evidence Mutitsve is one of the three female local artisans trained by Practical Action to construct biogas digesters, Zimbabwe © Practical Action

The multiple uses for resilience baseline data in East Africa

Alliance country programs in Zimbabwe, Kenya, and Malawi all implemented the FRMC tool in 2021/2022 to collect and use baseline resilience data. Though each of these program contexts is unique, this group of programs highlights that you don't need multiple datasets for different purposes. One comprehensive resilience dataset, with findings tailored to the needs and priorities of specific stakeholders, is sufficient to develop new and strengthen existing relationships, inform local and national policy-making dialogues, influence funding and budgeting, and amplify community voices and knowledge, all while supporting resilience-building at the community level.

What using resilience data enabled

The Practical Action Zimbabwe team used data from the FRMC baseline study to:

- Develop new and strengthen existing relationships with donors and development partners and government;
- Provide input on a new DRM bill;
- Influence local (subnational) level budgeting; and
- Advocate for and secure additional funding from USAID.

The Concern Kenya team used data from the FRMC baseline study to:

- Support capacity development for communities in advocacy and public participation;
- Inform local, sub-national, and national government policy and budgetary processes;
- Develop new relationships with communities, governments, and regional actors;
- Shift community thinking around resilience;
- Support communities to successfully advocate for themselves for evidence-supported interventions; and
- Inform proposals to donors (as an evidence base) for funding for community priorities.

The Concern Malawi team used data from the FRMC baseline study to:

- Shift community thinking around resilience, and to support communities to successfully advocate for flood response and resilience services;
- Inspire non-program communities to advocate for government services; and
- Input into the review of the new DRM Act;
- Inform an After-Action Review of Cyclone Freddy; and
- Develop new relationships with communities and strengthen existing relationships with government.



A bridge under construction in Mikameni village in Kenya's Tana River County © Lisa Murray, Concern Worldwide

The story

Zimbabwe, Kenya, and Malawi are no strangers to disaster. Cyclone Idai in 2019 was devastating for Zimbabwe and Malawi, with losses of life, livestock, and livelihoods, and destruction of agricultural and transport infrastructure. Abnormally heavy rains in Kenya fell in 2020, causing deaths, displacement, flooding, and landslides across the country. Tropical Storm Ana and Cyclone Gombe impacted Malawi in 2022, and Cyclone Freddy — which at the time was the longest lasting and highest cumulative energy cyclone ever recorded worldwide — hit the region in 2023.

The increasing frequency and severity of disasters has made it more and more difficult for communities to recover. While DRR is not a new conversation in Zimbabwe, Kenya, or Malawi, there is increasing political will and public pressure for addressing the issue, even if this does not necessarily translate into action in resource allocation. Yet at the same time, donor space is shrinking while the need for investment in resilience and the impacts of loss and damage are increasing. In this context, resilience data – such as that derived from the FRMC – provides much-needed evidence for influencing and knowledge amplification.

“Sometimes interactions with stakeholders depend on the evidence that you have.”

- Concern Kenya team

Baseline resilience data was first used by all three teams to directly support communities in identifying priority interventions – a standard practice with the FRMC approach – a subset of which were directly supported by Practical Action and Concern teams, and to advocate for action either by Alliance teams and/or communities themselves.

Resilience data to support communities

At the local level, the Practical Action Zimbabwe team presented FRMC baseline data to the Chimanimani Rural District Council, advocating for district-level investment in resilience building. This contributed to a 2022 verbal commitment becoming a 2023 budget line-item. The Zimbabwe team also brought FRMC data to the Ministry of Energy’s Rural Electrification Program, which agreed to co-finance demonstrations of biogas digesters – a technology prioritized by the communities.

At the national level, the Concern Kenya team commented that “it was a good thing we had a finalized [resilience data] product for the new government that came in August 2022,” as it allowed them to immediately engage with shaping the government’s thinking around the next five-year plan.

Resilience data for community empowerment

In Kenya, FRMC information supported community-led advocacy to the private sector, resulting in funding for prioritized interventions, even those typically difficult to fund, such as a footbridge funded by a Korean philanthropist. At the county level, the



Zurich coordinator visit in Mbenje, Malawi © Ernest Kambiya, Concern Malawi

information helped in advocating and lobbying for resources to go towards community priorities. Through a public participation forum, community champions from the target communities presented their priorities that were documented in booklets. After the exercise, at least one priority per community was included in the County Integrated Development Plan, a five-year plan prepared by every county government. Some of the priorities include: minor irrigation schemes, footbridges, dispensaries, roads, and drilling of boreholes.

Overall, as a result of the public participation forums and one-on-one engagements with the county planning teams, the county budget for disaster was increased from 2% to 10% of the total annual budget. Furthermore, 1.4% of the total disaster budget was allocated specifically to flood preparedness, mitigation, response and recovery. This was a clear departure from the past where disaster related budget allocations were not specific and could be drawn to meet any form of disaster, with minimal interest in flood resilience priorities.

In Malawi, non-program communities learned about evidence-supported interventions being implemented by Concern Malawi in FRMC communities and used this information to take on implementation of Alliance community interventions including updating community contingency plans, drills, and simulation exercises; search and rescue operations; and disaster-rapid assessments. Program communities mobilized around key resilience gaps in their communities to advocate to private sector entities to support earth moving equipment for dredging of the silted Nyachilenda riverbed and to support water drainage around Nsanje Boma which were amplifying local flood impacts. In addition, the findings of the FRMC were used to initiate discussions around Community Disaster Fund mechanisms, with a pilot approach being developed and rolled out in two communities to explore the potential for further scale up in other communities.

Using resilience data to amplify community knowledge

The three teams have found that resilience data co-developed with communities can be a key way to amplify community knowledge. For example, the Kenyan government had been prioritizing the creation of eco villages as part of their development planning. Such villages require moving communities to higher ground, then setting up infrastructure and services in those areas. However, communities have long been loath to resettle, because in their view to do so is to leave behind their family land and heritage. Communities instead prefer to control the flow of water, which they recall has been done before, or to keep both the ancestral land and the relocated land. Baseline FRMC resilience data indicated that there were a multitude of options other than resettlement. Moreover, the data indicated that water from flooding is, in fact, beneficial for communities in terms of food

“If you’ve involved communities, you realize that what they want is different from what governments want. They’re not speaking from the same page.”

- Concern Kenya team

security, as it brings in protein sources in the form of fish, the community practices flood recession agriculture, and the silt from the flooding diminishes the need for fertilizer.

In Malawi, the FRMC data also indicated communities had a range of local adaptation and flood resilience approaches. For instance, they planted green dykes along the Shire riverbank using locally sourced trees like banana and bamboo suckers. They also adapted their houses by raising floors, raising houses on stilts for protection from flash floods and crocodiles, increasing their stability and ventilation, elevating storage areas (and putting valuables in safe or water-proof areas), and/or having dual houses (temporary shelter in flood-prone areas for farming purposes and permanent homes in safer communities). These initiatives were observed in communities like Nyachikadza, Malekeza, and Tchapo. However, the lack of financial capital made it difficult for these communities to invest fully and scale up these initiatives; there is ongoing advocacy to the government and private sector for additional support. In addition, based on gaps indicated by the FRMC data, Concern engaged with the Red Cross Society of Malawi and the non-governmental organization (NGO) Churches Action in Relief and Development in supporting first aid knowledge, drills and simulation exercises, and EWS.

Using resilience data to develop new and strengthen existing relationships

FRMC evidence served as a 'common ground' for deeper engagement and was used by teams to support the growth of new relationships. For example, up until 2022, Practical Action Zimbabwe had encountered difficulty in successfully acquiring funding from USAID. However, because the American aid organization is strongly evidence- and context-driven, Practical Action recognized an opportunity: the FRMC provides



Community advocacy champion, Mohamed Masha Boru, looks at a community resilience plan on his telephone in Handaraku Village in Tana River County, Kenya © Lisa Murray, Concern Worldwide

very context-specific, community-driven data, validated by government and NGO stakeholders with whom it is developed, shared, and used. Over a period of six months, Practical Action used the FRMC data and process to go from introductory meetings with USAID to developing a full proposal together, with FRMC data forming a key part of the proposal. The result of Practical Action's targeted cold call was USD1.712 million in funding for interventions prioritized by the community and local government through the FRMC process. This case illustrates the multifaceted ways in which resilience data can be supportive: in addition to an obvious funding win, resilience data can illustrate a systematic approach to context-driven action, even for well-established organizations.

For the Zimbabwe team, the hope and challenge now is to convince the government and donors such as USAID that this needn't be a one-off occurrence: this approach can be replicated anywhere that people face climate disaster risk.

Resilience data can also increase stakeholder buy-in by informing planning and partnerships, showing that a need exists, and encouraging prioritization of resilience needs in the face of funding limitations. All three teams are using their FRMC data to engage in various dialogues, working groups, and other stakeholder conversations at the national and local levels, and to strengthen their relationships in-country. The highly structured and systematized approach to resilience has strengthened the reputation of both organizations and individuals. The Malawi team had particular success in this area, where they noted that it was good to be seen as an active presence in communities, particularly in their assessments and analysis of flood response when Cyclones Ana/Gombe and Freddy hit. Additionally Concern Malawi utilized findings from the FRMC to inform the review and feedback of the draft DRM Act being tabled in Parliament in the wake of Cyclone Freddy, in coalition with members of the Civil Society Network on Climate Change, as well as subsequent engagement with stakeholders around plans for dissemination of the Act.

Making resilience data usable

However, as the Concern Malawi team notes, to garner interest and engagement, resilience data needs to be presented in ways that are relevant and easy to understand. Practical Action Zimbabwe used visualizations taken from the FRMC tool in its presentation to USAID. They understood their stakeholders well enough to recognize that for USAID, the quality of the data itself was sufficient to shift thinking. However, for other stakeholders, the Zimbabwe team is in the process of developing different products with other presentation formats.

Both the Concern Kenya and Malawi teams have also developed fit-for-purpose presentations of the FRMC data. In Kenya, three different print products for each of their partner communities have been developed, with the key briefing of the community action plan being a simple two-page, primarily visual booklet. Concern Malawi has also taken a visual approach, using a "traffic light" system to provide an at-a-glance overview of communities' resilience scores to facilitate easy understanding of the complexity of FRMC findings (Table 1, next page).

Table 1 Concern Malawi’s approach to presenting FRMC data for all their communities simultaneously. Each column is a community, and each row is one of the 12 physical capital sources in the FRMC. A, B, C, and D source-grades are color-coded for visual impact, with consistent weaknesses in particular sources across multiple communities immediately obvious.

Physical Capital															
Resilience Source	Grading Scale														
Communication interruption	A	B	B	B	B	B	B	B	B	C	C	C	D	D	D
Flood energy supply	A	C	C	C	C	C	C	C	C	D	D	D	D	D	D
Transportation interruption	B	B	B	C	C	C	C	C	C	D	D	D	D	D	D
Flood emergency infrastructure	C	C	C	C	C	C	C	C	D	D	D	D	D	D	D
Early Warning Systems (EWS)	B	B	B	C	C	C	C	C	D	D	D	D	D	D	D
Flood emergency food supply	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Flood healthcare access	A	A	A	B	B	C	D	D	D	D	D	D	D	D	D
Flood safe water	B	C	C	C	C	C	C	C	C	D	D	D	D	D	D
Flood waste contamination	C	C	C	D	D	D	D	D	D	D	D	D	D	D	D
Household flood protection	B	B	B	C	C	C	C	C	C	C	C	C	C	D	D
Large scale flood protection	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D
Provision of education	A	B	B	B	B	C	C	C	D	D	D	D	D	D	D

Challenges in collecting and using resilience data

The Zimbabwe, Kenya, and Malawi teams all felt that the detail-oriented, context-driven nature of the resilience data they collected was, in part, a driver of their success. But, they also all noted that it was not without challenges. Collecting FRMC baseline data was an involved process for all three teams, requiring intensive procedural training, repeated engagement with communities, and upwards of five months of time. Translation can be necessary, although the Zimbabwe team notes, “asking the [FRMC] questions in local language, it has its own complications.” This is in spite of the fact that Alliance teams use enumerators from the local context whenever possible. The Zimbabwe team resolved this after conducting a pilot in which they noted that communities actually understood the questions better in English, and so translated documents were only used when necessary.

An additional challenge was a mismatch in expectations. All three teams described that community experience with disaster resilience has been primarily in receiving aid, and their engagement with resilience data primarily limited to responding to surveys. As a result, there was a gap in expectations of funding amounts for interventions and what was eventually allocated; this occurred in spite of strong expectation setting from the start. However, with some training, communities eventually shifted their thinking, recognizing that they could now use the data themselves to advocate for what they wanted. Communities in Kenya were also appreciative that for once, surveyors were returning to give feedback on areas of discussion and that the process was not just one of extraction.



A bridge under construction in Mikameni village in Kenya's Tana River County © Lisa Murray, Concern Worldwide

Overall take-away

The process of co-generating resilience data with communities shifted how communities, as well as other stakeholders, thought about resilience issues.

Communities see different connections between activities, and as the Malawi team noted, the complexity of the FRMC data opens up the idea that there are a lot of different components that go into resilience. Both the Kenya and Zimbabwe teams spoke about communities now identifying different interventions than they would have considered in a typical development program addressing flooding, with Kenyan communities suggesting fully equipped solarized irrigation systems installed on higher ground rather than dykes, and Zimbabwean communities connecting deforestation and the increasing frequency of storms to flooding. As the Zimbabwe team says,

“At first, we were doubtful about acceptance, and how it would be delivered within the communities. But it was a pleasant surprise how the communities grasped the concepts. [...] It was the rigorous nature of the tool which caused you to really go deeper and analyze the issues.”

Using PERC data to inform a new resilience program in Senegal

Practical Action Senegal's Alliance program launched in January 2021. In rapid succession, the team ran an FRMC baseline in April-May 2021 and a PERC in June-August 2021 for a major flood that occurred in the city of Thiès in 2020. In running both tools, the team's goal was to develop a broader understanding of issues and stakeholders in-country at both the local and national levels and expand and strengthen their in-country network. Though running both tools was a very heavy lift, the tools used in combination unlocked knowledge, relationships, and opportunities the team would not have otherwise had.



What using resilience data enabled

For Practical Action Senegal, conducting a PERC in addition to the FRMC baseline:

- Served as a platform to make new connections and engage in conversations that wouldn't otherwise have happened;
- Strengthened the organization's network and amplified the organization's existing expertise in EWS;
- Provided the team with a strong overview of the whole DRM structure on which to base the remainder of their four-year program;
- Sparked thinking about the multidimensional aspects of floods in ways that have deepened and enriched their work;
- Allowed them to more deeply explore community resilience gaps evident in the FRMC data; and
- Provided them with qualitative data and stories that could easily and powerfully be fed into and beyond their Alliance work.

The story

Senegal, particularly the city of Thiès in which the Practical Action Senegal Alliance program is focused, was impacted by severe floods in 2020. This timing meant two things for the program as it launched in January 2021:

- Greater awareness of flood issues amongst relevant authorities; and
- An opportunity to combine FRMC baseline resilience data with post-event data collected via the PERC to frame program activities.

In Thiès, Alliance programming is active in neighborhoods in the commune of Thiès Nord, the most flood-exposed area in the city. The commune authorities are "very receptive" to the work of the Alliance and have supported Alliance work by facilitating contact with neighborhood leaders, providing rooms for community involvement, and



Practical Action Senegal presenting FRMC results to community members in Thiès, Senegal © Practical Action Senegal

preparing a partnership agreement. This support has lasted through changes in political leadership; the new Thiès Nord mayor, elected in January 2022, ran on a platform that included flood issues. However, despite local political support of Alliance work, local authorities play a relatively limited role in flood management. At the local level, laws require communities to have a communal development plan that focuses on the various economic and social sectors, but those plans do not focus on sustainable solutions to flooding. Furthermore, there remains a gap in coordination between the national and local levels, such that DRM is not always community focused.

Using resilience datasets to inform programming

The FRMC baselines in the Thiès Nord communities highlighted a number of community resilience gaps, including EWS and urban planning, while the team used PERC as an opportunity to explore these issues at a broader scale, beyond just the communities themselves, and to position the overall Alliance resilience program for greater impact. As part of the dissemination and advocacy plan with stakeholders, the aim was to share opportunities for improving EWS through improved forecasting systems and the transmission of timely and actionable warning messages. Similarly, the team wanted to be able to propose measures to improve urban policies like waste management aimed at reducing the risk of flooding.

PERC data has been shared with key DRR stakeholders since the project launch workshop in December 2021, and has resulted in significant interest and new relationships, some of which are already being translated into new partnerships and projects. The Practical Action Senegal team is also now using data products such as the EWS policy brief as a key to open doors to dialogue and support an amplification of visibility and reputation.

Overall, the team noted that “there is a lack of reliable and recent statistics on DRR in Senegal. And if we do have statistics, they tend to focus on the overall impact of disasters. The solutions proposed by the Alliance through the FRMC and PERC help to bring out the community aspect more clearly. Under the FRMC, we have had the opportunity to assess resilience at the community level, using specific indicators. The PERC complements this, enabling us to go beyond quantitative data to gather stories, and to learn more from stakeholders following a disaster, and to inform opportunities for improving flood risk management.”

Using resilience datasets and learning to secure funding

Both the FRMC baseline and PERC identified EWS as a significant gap in the Senegalese context. One of the first PERC knowledge products was a policy brief outlining actions to improve the dissemination of early warning messages. Following publication, Jokalanté, a Senegalese social enterprise specializing in climate information and a stakeholder interviewed as part of the PERC process, requested the brief. This request initiated a novel partnership with Jokalanté: the two organizations collaborated on a successful proposal to the UK Met Office to strengthen community flood resilience in Senegal and Niger. That this relationship was initiated through a PERC interview and has already been translated into new, funded, joint work is a testament to the strength of clearly defined and evidenced resilience gaps and needs.

Practical Action Senegal also leveraged the PERC policy brief on urban planning to secure funding for improved waste management. Specifically, the project aims to reduce the health and environmental impacts of open waste burning in Senegal, particularly in the Mbeubeus (Dakar) and Thiès landfills. The team developed the proposal, “Improving human health and livelihood through reducing open burning waste in Senegal” in collaboration with the École Polytechnique de Thiès, which is a local research institute, and the Unité de Coordination et de Gestion des Déchets Solides, which is the public organization in charge of waste management in Senegal. This is yet another example of how resilience data can support securing funding for community needs.

Learning from the collection of resilience datasets

In the process of conducting both an FRMC baseline and PERC, the Practical Action Senegal team learned a lot about the way that DRR is organized in Senegal, mainly focusing on floods. The team had conducted a prior desk review, but talking directly to people in charge of organizations deepened knowledge about how things are structured, provided an opportunity for learning from other organizations, and a chance to hear firsthand about how departments and agencies are organized. In addition, discussions with stakeholders, many of whom have worked with the flood risk management space for decades, deepened the teams’ knowledge on the history of floods and how they have changed over time.

They also found that talking directly to people that had experienced historic floods provided new and unexpected learning. Similarly, talking directly with agencies and practitioners regarding EWS and urban planning provided new learnings about the difficulties in implementation and key opportunities for improvement. Because the data collection process also expanded their networks within these sectors, they are now more strongly positioned to take on projects in these areas, and are encouraged to do so as a result of the clear gaps identified through in the FRMC baseline data.

Challenges in collecting and using resilience data

Running any single resilience data tool results in a lot of data. Running two tools resulted in even more data, all of which had to be analyzed, organized, and packaged for presentation. While the PERC is structured with the expectation that the information comes together into a report and/or policy briefs, the lack of similar, clearly defined, shareable knowledge outputs for the FRMC baseline data made it harder to share FRMC data. To facilitate the process, the team developed a template for sharing FRMC results with their audience in mind. Based on their engagement with communities, the team realized that communities better understood the results as they related to the capitals than to other ways of sharing the data.

The amount of data also made integrating the FRMC and PERC data difficult. While the two methodologies highlighted similar issues (for example, gaps in the dissemination of EWS messages), which helped to validate findings, the team noted that the use of the two tools might have been more efficient if they had better thought through how to use them in a complementary rather than duplicative manner. For example, the FRMC could be utilized to bring community knowledge into conversations and the PERC could complement this information at other scales and/or go deeper into related questions.

Overall takeaway

While both the FRMC and PERC require dedicated staff time and investment, the team found that conducting the FRMC and the PERC at the same time was advantageous. The PERC proved to be a useful tool especially at the start of the program as it allowed the team to identify and engage with the main actors working on floods. In turn, this engagement led to strengthening their network and helped to establish the Alliance project in their area of focus. In addition to supporting engagement, the PERC also complemented the FRMC approach by providing a qualitative analysis of the flooding in Senegal and through helping to identify entry points for flood resilience measures. Also, as part of their business development strategy on climate resilience, the team relied on the knowledge products developed from the PERC to strengthen their proposals; they were able to secure funding from proposals focused on the two major themes identified from the PERC, namely EWS and urban planning with a particular focus on waste management.



Using the FRMC Post-Event Study for new insight and learning in Vietnam

ISET Vietnam launched their Zurich Flood Resilience Alliance program in January 2021. They began their work with community engagement, the completion of FRMC baselines, and the co-development of evidence-based flood resilience interventions with communities and local government partners. In early 2023, the team conducted FRMC post-event studies (PES) in all of their communities to learn from the 2022 flood season. They chose to focus one of their studies on a highly unusual dry-season flood that occurred in one of the rural communities where they work. Doing so highlighted additional aspects of resilience which had not emerged from the baseline studies and provided further insight into a new and growing hazard in Vietnam.

What using resilience data enabled

For ISET Vietnam, conducting a PES of a rare dry-season flood:

- Provided an opportunity to learn about a new and intensifying hazard;
- Highlighted different aspects of resilience from the baseline studies, including unexpected resilience gaps related to the unusual flood seasonality;
- Emphasized that even in a flood-adapted country, there are still novel lessons that can be learned from floods; and
- Supported identifying gaps and opportunities in DRM and development practices to build resilience.

The story

At the end of March 2022, the Vietnamese province of Thua Thien Hue, located on the Central Vietnam coastal floodplain, experienced an unusual dry-season flood. Because it was relatively uncommon, and because there is no other formal mechanism to learn from these types of events in Vietnam, ISET Vietnam chose to focus on this flood for the PES rather than on the more common rainy season flooding. The data from the PES proved to be valuable in multiple ways: it provided insight into the flood's impacts, built the community's knowledge on flood impacts and resilience, and provided a fuller picture of resilience gaps and strengths as it revealed different aspects of the resilience indicators as compared to the FRMC baseline study.

Insight into flood impacts

Compared to a typical flood event during the rainy season, which might be the result of 700mm of rainfall, the March flood event was not the result of particularly dramatic rainfall: over the course of two to three days, it rained 400-500mm. The rains resulted in flood depths of 20-30cm, not enough to impact household assets, but enough to cause 100% crop loss and one death within the community – extraordinary impacts for a rainfall event of this magnitude.



The October 2022 flood event in An Dong ward, Hue City, Vietnam © Thua Thien Hue Steering Committee for Natural Disaster Prevention and Control

The PES revealed that people, communities, and government were neither individually nor at a systems-level prepared for a flood: in the dry season, hazard events are typically restricted to drought and saline intrusion. All were equally surprised, the more so because while heavy rain had been forecasted, actual rainfall was greater than the forecast. However, even with more warning, there was little the community could have done to avoid the agricultural losses as the rice was too young to be harvested before the event. The exception was the death that occurred: a householder ventured out during the storm and was washed away at a low road crossing. The crossing was designed to allow water to flow through and was well signed indicating that it was dangerous during floods. Yet despite being a marked crossing, because it was out of season or because the storm was perceived as relatively small, a sign that would normally be heeded was ignored.

This death was highly concerning for the community. There have not been human losses for many years now in the community and many other parts of Vietnam, even during big floods. As a result of this loss, the local commune government identified the most dangerous areas within the commune and now stations a person at each location during flood events, whether wet season or dry. However, the designation of flood ‘events’ is triggered by the Vietnamese warning system (levels 1, 2, 3, tied to water levels in the main rivers). Consequently, even in this community, whose awareness has already been built regarding the need for more proactive action, there may still be a gap if the official warning underestimates likely flood levels.



Flood level in October 2020 and October 2022 at Nhi Dong community house, Hue, Vietnam © ISET-International

There were also gaps at higher levels. Annual DRM planning in many provinces in Vietnam, including in Thua Thien Hue province where this study was conducted, is often finalized in June or July because January to June is typically quiet in terms of serious disasters. This meant that when the floods hit at the end of March in 2022, plans for the year were being prepared. Because the DRM plan guides how people respond to events, provincial and commune level staff were unprepared. It was only because structures and practices of DRM are strong and well-practiced that people were able to mobilize quickly. Higher levels of government (e.g., provincial) responded quickly with support in the form of emergency food, equipment, and medical staff.

Compensation and support for disaster events is based on losses: after each event, the government requires the commune level government to conduct a comprehensive inventory of losses that informs who gets how much support. This was triggered for the dry-season floods: in the recovery phase of the event, the provincial government provided support through district and commune levels to farmers to replant rice fields. But many people, including local government DRM staff, do not always know their rights and how to access support – a problem highlighted in the FRMC baseline data and seen again in the PES. To help fill this gap, ISET Vietnam prepared and distributed a flier to local communities and commune and ward DRM committees about what help is available and the steps to go through to access support.

Providing a fuller picture of community resilience

Conducting both an FRMC baseline study and a PES revealed new insights about community resilience, emphasizing the value of using two or more complementary resilience assessment tools to look more deeply into the gaps and opportunities to build resilience, and of investigating different types of hazard events. In particular, the pattern of source grades was quite different between the baseline and PES, highlighting how measuring resilience in the absence of a shock or stress can differ from the actual experience of a shock or stress. This is a critical distinction. Even the best baseline assessment



Chairman of Quang Dien District's People's Committee checking the smart flood gauge during November 2023 flood in Thua Thien Hue Province, Vietnam © Thua Thien Hue Steering Committee for Natural Disaster Prevention and Control

of resilience will have limitations. Evaluating that baseline against actual performance during an event can highlight gaps and deepen understanding.

For example, for the community that experienced the dry-season flood, risk awareness and asset protection scored quite high in the baseline. For Vietnamese communities faced with typical floods, PESs continue to show these scores to be quite high. However, when tested by an unusual event where flood conditions and the assets at risk were unusual, those sources scored much lower. Conversely, performance of key lifeline services like power, communications, and transportation were not heavily disrupted, though they typically would be in a rainy-season flood. This type of information can be used to help focus on which aspects of new and unusual flooding are problematic and need to be prioritized.

Running the PES thus not only provided a fuller picture of resilience, but also highlighted how critical it is to be specific when it comes to community resilience by clarifying resilience of what, to what, for whom, and when.

Challenges and considerations in collecting and using resilience data

The FRMC post-event study is quite broad, similar to the FRMC baseline data. In contrast to the baseline data, however, it directly explores how local people and local government responded to a specific event. Yet in doing so it explores what happened, but not why. This is not unlike many post-disaster needs assessments. This highlights that such assessments could be significantly more valuable if they identified the problems and then

probed more deeply into why those problems exist and what could be done to address them (e.g., running a PERC could help to answer some of these questions).

The team identified several challenges or considerations for optimizing the use of a post-event analysis, including:

- The question of when to run a PES. The primary learning that ISET Vietnam took away from running PESs is the need to be better prepared for unexpected situations and have the spare capacity to respond quickly, potentially at an unusual time of year.
- Conducting PESs for events from which there is likely to be something significant to learn, whether very big events, or very unusual events.
- Considering whether two or more PESs over time are needed. For example, in the Mekong Delta, tidally driven flooding is increasing annually – the ‘flood of record’ has been broken three out of the past five years in Can Tho. This pattern is a chronic and growing stressor. In an environment like this, PESs conducted across a gap of several years to explore changes over time could be very useful in identifying new and problematic trends.

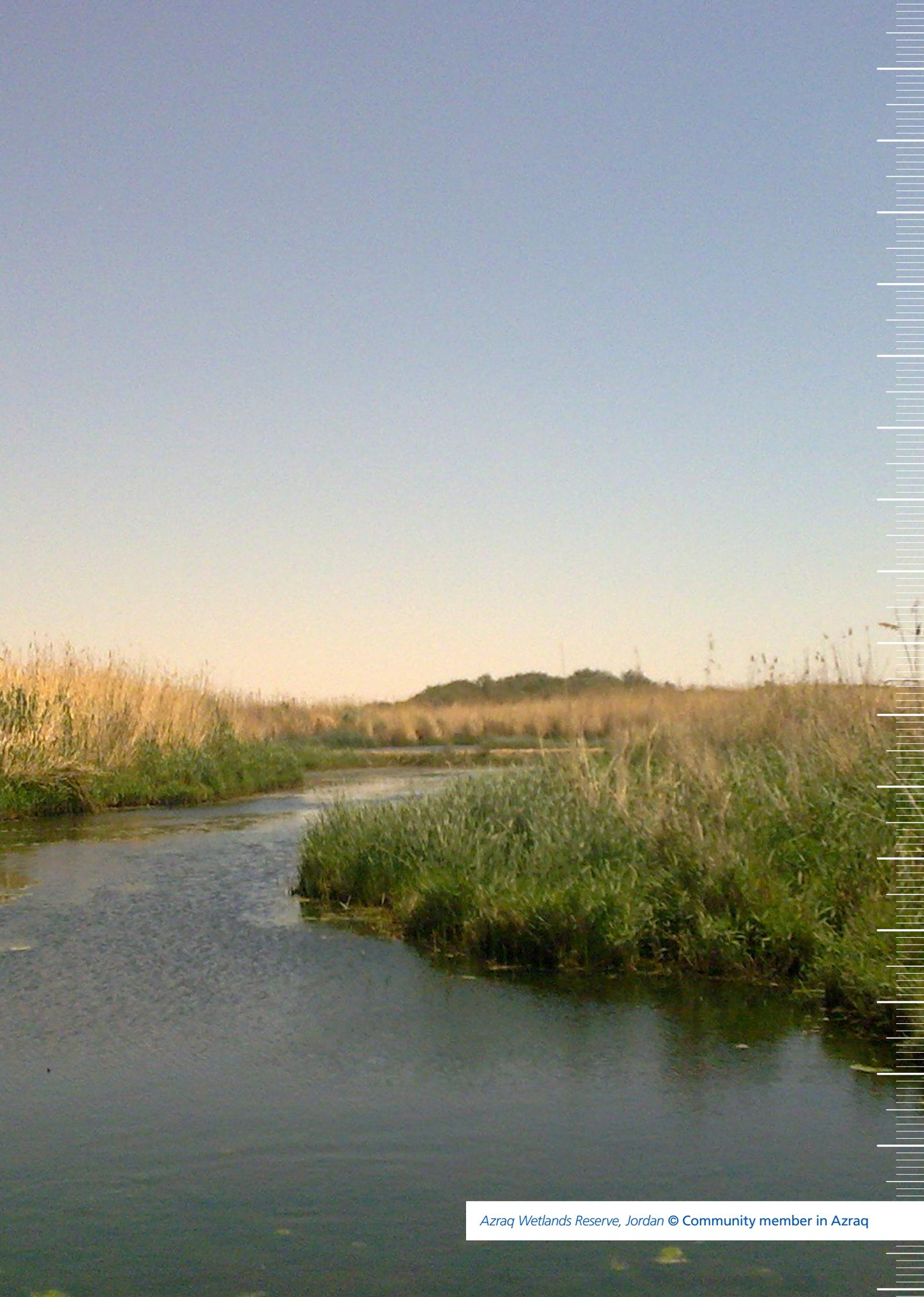
Overall takeaway

As more and more events lie outside of what is anticipated (e.g., they are bigger, the timing is unusual, the hazards are unfamiliar, etc.), running PESs will be critical to really understanding resilience gaps and strengths, as PESs pick up different aspects of resilience indicators compared to the baseline studies. Therefore, there is enormous value to both running baseline and endlines studies, which are a generalized assessment of resilience in the absence of a shock or stress, as well as examining, post-event, what actually happened.

In addition, in spite of clear gaps in awareness and highly unusual flooding, prior to the ISET Vietnam team conducting this post-flood study, other than the commune’s decision to station people at dangerous crossings during dry-season floods, no serious lessons learned had been drawn, nor had there been any other in-depth analysis of the event. The hope was that it was just an exceptional event that wouldn’t happen again soon. Yet, another smaller but similar event happened in March 2023, suggesting that this type of event needs greater attention and learning.

The ISET Vietnam team intends to use the following take-aways in their advocacy work moving forward:

- The need to recognize the very different impacts flooding can have based on timing and seasonality;
- The value of prior experience and regular practice in responding to and recovering from hazard events; and
- The need to actively watch for other unusual, non-seasonal events or emergent climate hazards that will pose new challenges for communities.



References

Bruneau, M. (2006) Enhancing the Resilience of Communities Against Extreme Events from an Earthquake Engineering Perspective, *Journal of Security Education* 1:4, 159-167, DOI: 10.1300/J460v01n04_14

Cimellaro, G., Reinhorn, A. and Bruneau, M. (2010) 'Seismic resilience of a hospital system', *Structure and Infrastructure Engineering* 6(1-2), 127–144.

DFID (1999) Sustainable Livelihoods Guidance Sheets, Department of International Development, United Kingdom, <http://www.eldis.org/vfile/upload/1/document/0901/section2.pdf>

Hochrainer-Stigler, S., Laurien, F., Velez, S., Keating, A. and Mechler, R. (2020). Standardized disaster and climate resilience grading: A global scale empirical analysis of community flood resilience. *Journal of Environmental Management* 276: DOI: [10.1016/j.jenvman.2020.111332](https://doi.org/10.1016/j.jenvman.2020.111332).

Hochrainer-Stigler, S., Velez, S., Laurien, F. et al. (2021). Differences in the dynamics of community disaster resilience across the globe. *Sci Rep* 11, 17625. <https://doi.org/10.1038/s41598-021-96763-0>

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 Flood Resilience Alliance. https://pure.iiasa.ac.at/id/eprint/11191/1/zurichfloodresiliencealliance/ResilienceWhitePaper_2014.pdf

Keating, A., Campbell, K., Szoenyi, M., McQuistan, C., Nash, D. and Burer, M. (2017). Development and testing of a community flood resilience measurement tool. *Natural Hazards and Earth System Sciences*, 17(1), 77-101. 10.5194/nhess-17-77-2017

Keating, A. and Hanger-Kopp, S. (2020). Practitioner perspectives of disaster resilience in international development. *International Journal of Disaster Risk Reduction* 42 e101355. [10.1016/j.ijdrr.2019.101355](https://doi.org/10.1016/j.ijdrr.2019.101355)

Keating, A., Venkateswaran, K., Szoenyi, M., MacClune, K., and Mechler, R. (2016). From event analysis to global lessons: disaster forensics for building resilience. *Natural Hazards and Earth System Sciences*, 16(7), 1603-1616. <https://nhess.copernicus.org/articles/16/1603/2016/>

Laurien, F., Hochrainer-Stigler, S., Keating, A., Campbell, K., Mechler, R. and Czajkowski, J. (2020). A typology of community flood resilience. *Regional Environmental Change* 20 (1): e24. DOI:[10.1007/s10113-020-01593-x](https://doi.org/10.1007/s10113-020-01593-x).

Szönyi, M., MacClune, K., Norton, R., Rosen Jacobson., B. (2023). PERC Medley 2023: Cross-learning to improve disaster resilience globally. Zurich Flood Resilience Alliance. <https://www.preventionweb.net/publication/perc-medley-2023-cross-learning-improve-disaster-resilience-globally>

Venkateswaran, K., MacClune, K., Keating, A., Szönyi, M. (2020). The PERC Manual Learning from disasters to build resilience: A guide to conducting a Post-Event Review. Zurich Flood Resilience Alliance. <https://www.i-s-e-t.org/publications-and-resources-1/the-perc-manual-%E2%80%93-learning-from-disasters-to-build-resilience%3A-a-guide-to-conducting-a-post-event-review-2020>

Annex 1: PERCs conducted to date

Since 2013, the Zurich Flood Resilience Alliance has been conducting post-event reviews (PERCs) of disasters, primarily floods, in various countries around the world. The PERC is an independent review that seeks to answer questions related to disaster resilience, disaster risk management, and disaster risk reduction. It looks at what went well, as well as opportunities for improvement, and provides a set of recommendations which can be operationalized across the disaster risk management cycle to enable building resilience.

Table 2 Overview of post-event reviews conducted to date (March 2024), including the geographies addressed in each study and the date of the hazard event

1 – Central European floods 2013: a retrospective	Germany (focus), Austria, Czech Republic, Switzerland	June 2013
2 – Floods in Boulder: A Study of Resilience	United States	September 2013
3 – After the storm: how the UK’s flood defenses performed during the surge following Xaver	United Kingdom	December 2013
4 – Balkan floods of May 2014: challenges facing flood resilience in a former war zone	Bosnia and Herzegovina, Serbia, Croatia	May 2014
5 – Emmental, Switzerland floods of July 2014: On a hot, sunny day, a flood alert!	Switzerland	July 2014
6 – Urgent case for recovery: what we can learn from the August 2014 Karnali River floods in Nepal	Nepal	August 2014
7 – Morocco floods of 2014: what we can learn from Guelmim and Sidi Ifni	Morocco	November 2014
8 – What can be learned from the Columbia and Charleston floods 2015	United States	October 2015
9 – Flooding after Storm Desmond	United Kingdom	December 2015
10 – Southern Germany Flash Floods	Germany	May/June 2016
11 – Managing El Niño risks under uncertainty in Peru	Peru	2016
12 – Learning from El Niño Costero 2017: Opportunities for building resilience in Peru	Peru	2017
13 – Houston and Hurricane Harvey: A call to action	USA	August 2017

14 – Hurricane Florence: Building resilience for the new normal	USA	September 2018
15 – Fort McMurray Wildfire - Learning from Canada's costliest disaster	Canada	2016 – 2017
16 – California fires: Building resilience from the ashes	USA	2017 – 2018
17 – When the unprecedented becomes precededent: Learning from Cyclones Idai and Kenneth	Malawi, Mozambique, Zimbabwe	March – April 2019
18 – The Southwest Tasmania Fires of Summer 2018-2019	Australia	December 2018 – March 2019
19 – Learning from the 2020 Floods in Faridpur District, Bangladesh to build resilience	Bangladesh	
20 – 2020 Tabasco floods: Learning from the past to prepare for the future	Mexico	October/ November 2020
21 – Strengthening community flood resilience in Senegal: Learning from the 2020 floods in Thiès	Senegal	September 2020
22 – Vietnam - Using new disaster patterns to highlight resilience opportunities: Lessons from the 2020 Floods in Central Vietnam	Vietnam	October/ November 2020
23 – PERC Flood event review 'Bernd'	Germany, Belgium, Netherlands, others	July 2021



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