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ZURICH

Turning knowledge into action: processes and tools for increasing flood resilience

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Key messages

- The Zurich flood resilience alliance has contributed significantly to the knowledge base on flood resilience: Community interactions and research findings clearly demonstrate that flood disasters have adverse impacts on people, communities and economies.
- There is a need to move beyond the status quo of treating the symptoms of flooding to treat the causes as well. Turning this knowledge into action is our next challenge.
- Together the alliance is producing a set of tools to assess and manage flood resilience.
- These tools can be used locally or on a global scale to increase awareness, support decision-making and monitor achievements.

Flood resilience: what we know so far

Floods impede social and economic development. Floods have significant immediate and long-term impacts on development and well-being. They pose a profound threat to education, health, infrastructure, economic growth, and environmental sustainability worldwide. While flood damage can be just as devastating as high inflation or war, preventing this damage rarely gets the attention and investment it deserves (Mechler et al., 2014).

Flood damage is increasing as populations grow and the assets in flood-prone areas increase. The frequency and severity of flood events is increasing, too, a trend that is expected to continue. In the developing world flood risk is not just growing in proportion to economic growth, it is outpacing it (UNISDR, 2015). Development to foster economic growth and the way in which growth is often achieved can significantly affect threats.

Development typically affects disaster risk in three main ways:

1. It increases physical assets and people exposed to the risk (negative).
2. It increases the capacity to undertake risk reduction, preparedness, response and recovery operations (positive).
3. It affects vulnerability to floods (positive or negative, depending on the nature of the growth).

Unfortunately, the first factor dominates. It's not uncommon in both developed and developing countries for the necessity or the promise of economic opportunity to drive uncontrolled urbanization, leading to an increased concentration of high-value assets in flood-prone areas (IPCC, 2012; UNISDR, 2013; UNISDR, 2015).

Despite 'ex-ante' action paying off, efforts to address flooding have been dominated by response. Deaths from flooding have been substantially reduced (in relative terms); this critical work in addressing floods' most devastating effect must continue.

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> “Resilience and development can be mutually reinforcing.”

But there is also a need to increase the investment that gets at the underlying cause of flood loss and damage before a flood occurs. Currently, a miniscule amount of resources goes toward protecting development gains from flood damage. Our analysis shows that for every dollar spent on selected flood risk reduction measures, an average of five dollars is saved through avoided and reduced losses. However, the current operating environment in many countries, both developed and developing, is such that taking advantage of these benefits poses a significant challenge.

We need to learn to live with floods and thrive despite the threat of floods (and other hazards). There will always be floods, but there are things we can do to ensure they do not erode hard-won economic growth and development gains. Learning to live with, and even thrive in the face of floods means considering flood risk in planning and investment decisions right from the start; we need to move beyond simply reducing risks. We need to stop risks from being created. Where crucial at-risk assets already exist, we need to take steps to retro-fit flood protection. This also means planning for response and recovery to protect and even enhance development and growth potential. Contrary to popular belief, judiciously managing flood risk need not reduce development. Learning to be flood resilient means identifying and taking action to mitigate flood risk while enhancing development. Both resilience and development can be mutually reinforcing. Development and flood risk management can work for, rather than against each other. The Zurich flood resilience alliance is building knowledge and expertise by doing precisely this.

Flood resilience can only be achieved in cooperation with communities. People living and trying to thrive in areas affected by floods contribute in an essential way to the success of flood-resilience enhancing initiatives. Community values and aspirations must drive decisions about flood risk management, planning and investment. Community flood resilience is about more than just protecting physical and financial assets; it’s also about the human, social and environmental factors that enable a community to live and thrive despite floods. When living with floods is untenable, relocation in a way that protects the most vulnerable and ensures genuine development potential can be considered as an option. Based on such considerations, the Zurich flood resilience alliance includes development and humanitarian NGOs that are experts at implementing community-centered initiatives. Our work builds on established community engagement processes as described in the following sections. (For members of the Zurich flood resilience alliance, see page 8).

Tools for putting flood resilience into practice

Enhancing flood resilience is a learning process. We have made a case for investing in flood resilience – for the public sector, civil society, and private actors including insurers. We are also presenting the tools needed to do this effectively and efficiently. We are using these tools in communities across the world. Enhancing flood resilience is a learning process – so we follow a learning cycle, also called an ‘adaptive management cycle’ (see Figure 1). The adaptive management cycle contains the steps required in any process to enhance community flood resilience. It is a cycle that emphasizes its learning character – as results are measured and evaluated, understanding grows. Initiatives are amended or new ones are added. This cycle of learning and action continues, increasing resilience.

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A stakeholder-focused, adaptive and innovative cycle

Figure 1: Flood resilience learning cycle (Source: IIASA and Practical Action)

A stakeholder-focused, adaptive and innovative cycle. Enhancing flood resilience is not a one-time action – it is a learning process – in order to represent it we use a modified adaptive management cycle (see Figure 1). It starts with a comprehensive assessment that leads to identifying and selecting specific actions. As results are measured and evaluated, understanding grows, which leads to amended or new initiatives. This cycle of learning and action continues leading to increasing flood resilience.

Before the cycle starts in earnest, the first step requires that the organization(s) involved, (including but not limited to NGOs and governments) analyze the situation to identify an overall focus for the program, and stakeholders that need to be involved, ensuring that it will address critical flood risks. The next step is to assess how development and flood risk are linked. This is done together with stakeholders. This assessment is designed to explore the current situation, and potential for change. Based on the outcome of this assessment, a development plan is selected together with stakeholders. This plan will incorporate new strategies or solutions to improve community flood resilience. One or more strategies (solutions) are then chosen to implement, emphasizing a practical ('learning-by-doing') approach. Those involved in the process monitor and evaluate activities to track how they unfold and if they deliver results as planned, and to capture lessons that are fed back into assessment.

At the center of the diagram is an iterative community-driven learning process. The center arrow indicates that this process doesn't always follow a prescribed path – the specific sequence of steps is often very nonlinear allowing stakeholders to adapt flexibly to a complex and changing situation. This process emphasizes continuous learning and innovation among stakeholders and is complemented by externally-driven analytical process involving supporting external organizations; these two processes interact within the 'adaptive' management cycle and ultimately bring about lasting change.

Different tools to be used at different stages. The Zurich flood resilience alliance is gaining knowledge and experience to use these tools to enhance community flood resilience. All of the tools outlined here are being refined in collaboration with the IFRC and Practical Action. (see figure 4). The tools are compatible with, and being applied in conjunction with established community initiative process tools such

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> “Enhancing resilience is a learning process.”

as vulnerability and capacity assessment, participatory capacity and vulnerability analysis, stakeholder mapping, hazard mapping and vulnerability assessments, household economic analyses, political economic analysis, etc.

1. Analyzing and assessing the flood resilience system. An organization seeking to foster growth in flood resilience starts by analyzing the context. This is done to understand the flood risk and potential for taking action. During the assessment phase, stakeholders build a better understanding of the factors and interactions driving flood risk and community development. Alliance members Practical Action and the research institute International Institute for Applied Systems Analysis (IIASA) have jointly developed an approach for both analysis and assessment based on resilience. This approach is being tested and refined in flood-prone river basins in Peru and Nepal. We are building, testing and refining analysis and assessment methodologies based on the FLORES (FLOod RESilience System) Framework (see Figure 2). The methodologies are being used with stakeholders ranging from those at community levels to national bodies to generate shared insight into the underlying causes of flood risk, adequacy of flood response measures and how these factors are related to development.

In a simplified version (more suitable for situations in which stakeholders are involved), FLORES starts with a hazard (floods) that leads to losses (direct risk – affected by crisis preparedness), which in turn lead to further losses (indirect risk – mitigated by response and coping strategies). These losses affect land use, infrastructure, buildings and assets in flood-prone areas. They can also undermine longer-term community development and well-being. Reconstruction efforts, depending on the ‘community capitals’ that are available and external support, aim to rebuild what was destroyed. But without deeper understanding and planning, these efforts may exacerbate the vulnerability and exposure that are the underlying causes of the problem. To address these root causes, disaster management efforts must be expanded to include risk reduction (both corrective and prospective). This can be done only if the links (feedback/transfer loops) between disaster risk reduction (DRR) and community development are understood and taken into account.

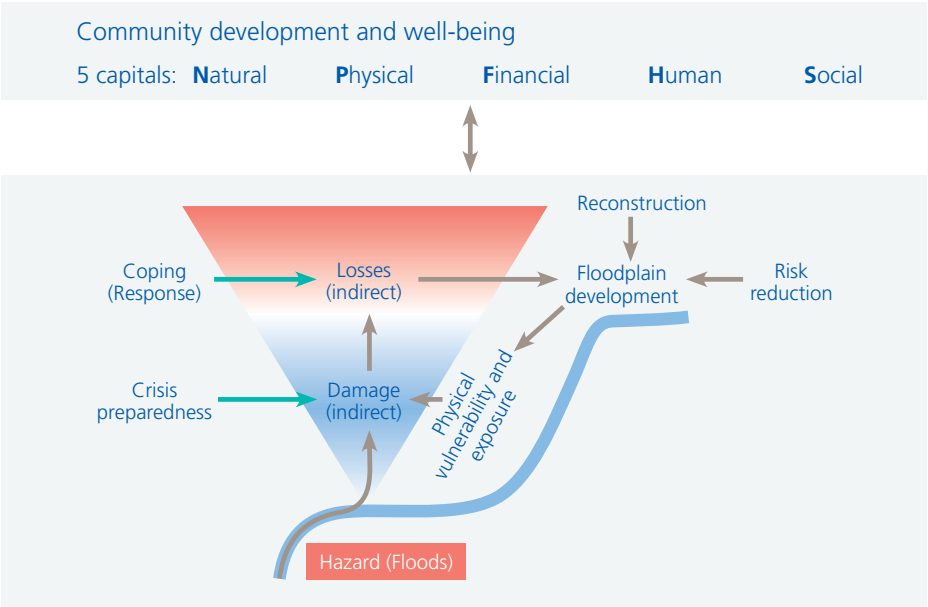

Figure 2: Simplified FLORES Framework (Source: Adapted from Keating et al. (2014)

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Sources of community flood resilience. An alliance-wide initiative to develop a robust framework for assessing community-level flood resilience is also used in the analysis and assessment phases. This initiative is being used to do research in several hundred communities worldwide, and the research will identify critical sources of resilience at community level. It is important to note that measuring can be done before an event takes place to provide a snapshot of communities' strengths and weaknesses. Flood resilience over time can be measured to estimate how effective interventions are; these actions are designed to enhance flood resilience even when they have not been tested by an actual flood. Up to now, this type of measurement has been notoriously difficult. Measurement takes into account a community's human, social, natural, physical and financial capital assets, which together provide resources for flood resilience (see Figure 3). The alliance is conducting research and carrying out development using communication technology (including smart phones) to increase stakeholders' capacity to capture critical information on community flood resilience.

Sample community flood resilience measurement

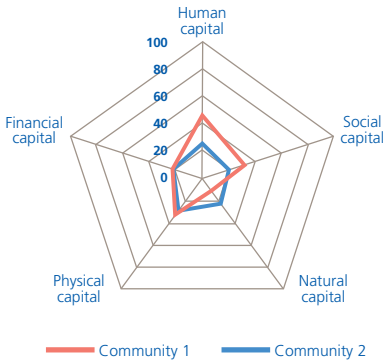

Figure 3: Sample community flood resilience measurement output (Source: Zurich flood resilience alliance)

2. Innovation – flood resilience that breaks the mold. The progress in assessment that the alliance has made is helping catalyze innovation in flood resilience thinking. Assessing community flood resilience in a systematic and holistic way helps stakeholders identify novel approaches that build on existing plans and capacities. These can deliver long-term results and address the underlying causes that increase flood losses and damage. We are recording these and compiling a solutions catalogue that includes other novel interventions used in other flood-related projects and programs. The solutions catalogue will be made publically available to spread good ideas to flood-prone communities everywhere. It should be emphasized that innovations are the effect not only of this specific step but result from the whole iterative process where local understanding is smoothly combined with external analytical support.

3. Selecting sustainable, efficient and equitable solutions. Deciding on actions to use to enhance flood resilience requires, in many cases, determining which actions take priority. Selecting the course of action with a limited budget is no easy task, particularly when balancing both short- and long-term considerations. Selection also requires taking into account many different viewpoints and constraints. Decision processes should be appropriate to the decision at hand, transparent, and systematically ensure that all potential costs and benefits (both quantifiable and more intangible) are considered. We are building a toolbox of flood resilience decision-support tools (see Figure 4). For example, the IFRC has already done a qualitative cost-benefit analysis of flood management solutions together with flood-prone communities in the Tabasco region of Mexico. Practical Action has completed an analysis of a community

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> “It is through monitoring and evaluation that we can see what is working.”

project in Nepal to better understand the economic tradeoffs involved in different flood response measures.

4. Implementing flood-resilience enhancing initiatives. The IFRC and Practical Action are experts in implementing community-based actions to address flood risks. Both have worked with communities in five countries to identify the impact of floods on communities’ well-being. In all countries, pilot sites have been identified with the help of national stakeholders; sites were selected based upon flood risk, poverty, vulnerability and the potential to learn lessons and mainstream best practice. By working with flood-vulnerable communities, flood resilience measures can be assessed, innovations explored and the contribution of flood resilience to improvements in well-being can be measured. Together we are carrying out work on the ground to help build flood resilience in hundreds of communities around the world, striving to learn what works – and most importantly why it works.

5. Monitoring and evaluating flood resilience. Monitoring and evaluation are an essential part of the learning process. It is through monitoring and evaluation that we can see what is working (managing flood risk while protecting and enhancing well-being), and what needs to be changed. The monitoring and evaluation tools being developed by the alliance can be used in real community work, and with other tools – in particular, assessment tools such as a measurement framework. Monitoring and evaluation can thus help to ensure that the original concerns are being addressed. Learning can also feed into the next cycle. Our measurement framework is being designed to be used in this phase.

Conclusion and outlook: process does matter

Enhancing flood resilience means identifying novel ways in which communities can live with floods and even thrive in at-risk areas. This requires ‘smart’ development, which provides economic opportunity and avoids creating more flood risk, while adapting to existing risk by increasing resilience. It means investing in risk reduction, because risk reduction pays off significantly in the long run. It means putting in place flood response and recovery plans that enable communities to not only bounce back, but also to move ahead after a flood.

Achieving this is no small task, particularly when resources are tight and people are struggling to meet immediate needs, unable to invest in longer-term goals. This means that when there is impetus to take action on flooding, it is imperative that the process genuinely engage stakeholders and take into account their often competing objectives. We’ve presented an adaptive approach with a supporting toolbox, which can be used by organizations such as NGOs or government agencies to engage stakeholders in learning and in taking action on flood resilience.

In the next report we’ll describe in detail how this is being implemented on the ground to enhance flood resilience in flood-prone communities. The first phases in Peru and Nepal will involve a series of stakeholder workshops, which will bring together diverse stakeholders at different levels to explore the root causes and potential solutions for the flood and development nexus in high-risk areas.

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A stakeholder-focused, adaptive and innovative cycle

Figure 4: Tools (aggregated in a set of toolboxes supporting flood resilience processes to bolster (Source: IIASA and Practical Action)

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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 programs 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. Our collective goal is to work closely with a number of communities in need on the ground, and also to develop a body of new knowledge and expertise that can be applied much more broadly as we work with business leaders and policymakers alike in OECD and non-OECD countries.

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