Flood resilience measurement for communities: data for science and practice

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Given the increased attention put on strengthening disaster resilience, there is a growing need to invest in its measurement and the overall accountability of resilience strengthening initiatives. There is a major gap in evidence about what actually makes communities more resilient when an event occurs, because there are no empirically validated measures of disaster resilience. Similarly, an effort to identify operational indicators has gained some traction only more recently. The Flood Resilience Measurement for Communities (FRMC) framework and associated, fully operational, integrated tool takes a systems-thinking, holistic approach to serve the dual goals of generating data on the determinants of community flood resilience, and providing decision-support for on-the-ground investment. The FRMC framework measures "sources of resilience" before a flood happens and looks at the post-flood impacts afterwards. It is built around the notion of five types of capital (the 5Cs: human, social, physical, natural, and financial) and the 4Rs of a resilient system (robustness, redundancy, resourcefulness, and rapidity). The sources of resilience are graded based on Zurich's Risk Engineering Technical Grading Standard. Results are displayed according to the 5Cs and 4Rs, the disaster risk management (DRM) cycle, themes and context level, to give the approach further flexibility and accessibility.

The Zurich Flood Resilience Alliance (ZFRA) has identified the measurement of resilience as a valuable ingredient in building community flood resilience. In the first application phase (2013-2018), we measured flood resilience in 118 communities across nine countries, building on responses at household and community levels. Continuing this endeavor in the second phase (2018 – 2023) will allow us to enrich the understanding of community flood resilience and to extend this unique data set.

We find that at the community level, the FRMC enables users to track community progress on resilience over time in a standardized way. It thus provides vital information for the decision-making process in terms of prioritizing the resilience-building measures most needed by the community. At community and higher decision-making levels, measuring resilience also provides a basis for improving the design of innovative investment programs to strengthen disaster resilience.

By exploring data across multiple communities (facing different flood types and with very different socioeconomic and political contexts), we can generate evidence with respect to which

characteristics contribute most to community disaster resilience before an event strikes. This contributes to meeting the challenge of demonstrating that the work we do has the desired impact – that it actually builds resilience. Our findings suggest that stronger interactions between community functions induce co-benefits for community development.